Conference Program

STS/EACTS Latin America Cardiovascular Surgery Conference

November 15-17, 2018 | Cartagena, Colombia

The Society of Thoracic Surgeons

EACTS
European Association For Cardio-Thoracic Surgery

CardiovascularSurgeryConference.org
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COURSE DESCRIPTION

This conference, led by Program Directors Juan P. Umana, MD (El Rosario University/Fundacion Cardioinfantil - Instituto de Cardiologia in Bogota, Colombia), Vinod H. Thourani, MD (MedStar Heart and Vascular Institute in Washington, DC, USA), Nestor F. Sandoval, MD (Fundacion Cardioinfantil - Instituto de Cardiologia in Bogota, Colombia), Jose L. Pomar, MD, PhD (University of Barcelona, Spain), Manuel J. Antunes, MD, PhD, DSc (University Hospital in Coimbra, Portugal), and Joseph E. Bavaria, MD (University of Pennsylvania in Philadelphia, PA, USA), is a 2.5-day educational activity that will provide a unique and innovative format for the attendees, highlighting the management of cardiovascular surgical diseases.

Sessions will incorporate not only invited lectures from a world-class international faculty on traditional and new technology procedures, but also original scientific abstracts presented in oral and poster sessions. They will concentrate on the multidisciplinary approach to coronary artery disease, valvular heart disease, thoracic aorta disease, atrial fibrillation, and the surgical management of heart failure. New this year, select presentations will focus on congenital heart disease. An integral component will be invited technical videos related to procedural expertise in these disease processes, followed by robust panel discussions. This innovative conference will provide attendees access to the highest level of education with the goal of improved patient management.

TARGET AUDIENCE

The conference is designed for all members of the cardiac surgical team, including cardiothoracic surgeons, cardiovascular surgeons, cardiologists, anesthesiologists, perfusionists, physician assistants, nurses, and other health care professionals interested in the topic.

LEARNING OBJECTIVES

Upon completion of this activity, participants should be able to:

- Evaluate the impact of new knowledge and the application of new technology on the treatment of cardiovascular diseases
- Discuss surgical techniques in order to improve the standard of care for cardiovascular patients
- Review the results of clinical and laboratory investigations designed to reveal new knowledge of cardiovascular disease
- Describe the multidisciplinary approach to coronary artery disease, valvular heart disease, thoracic aorta disease, atrial fibrillation, and the surgical management of heart failure
- Discuss quality improvement as it pertains to pediatric cardiac surgery
- Describe new surgical strategies in neonates and children with congenital heart disease

CERTIFICATES OF PARTICIPATION

No continuing medical education credit is being offered for this meeting. Certificates of participation will be given out at the Registration Desk. To complete an online evaluation of the conference, visit sts.org/2018Latam. You also may contact the STS Education Department at 1-312-202-5800 or education@sts.org with any questions.

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Additionally, the fact that the presentation, paper, or other educational product describes (a) the use of a device, product, or drug that is not FDA approved or (b) an off-label use of an approved device, product, or drug must also be disclosed. This requirement has been adopted in response to FDA policy and case law involving medical societies, and is not intended to prohibit or inhibit independent presentation or discussion regarding the uses of devices, products, and drugs as described in (a) or (b) above.

For live presentations, all disclosures must be stated orally and on a slide at the beginning of the presentation and will be noted in published material related to the activity. Slides, handouts, and other materials utilized as part of an educational activity cannot contain any advertising, trade names or a product group message. Speakers are required to disclose that they have nothing to disclose if this is the case.

Amended by the STS Executive Committee: April 11, 2012

Program Director, Faculty, and STS Staff Disclosure Information

Unless otherwise noted, the individuals listed below have nothing to disclose.

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Educational scholarships provided for this meeting through STS's charitable arm—The Thoracic Surgery Foundation—were made possible by the generosity of W.L. Gore & Associates, Inc.

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Please make sure to visit the exhibits during scheduled breaks in the educational program:

Thursday

10:00 a.m. – 10:30 a.m.
12:50 p.m. – 1:50 p.m.
3:10 p.m. – 3:30 p.m.

Friday

10:40 a.m. – 11:00 a.m.
12:50 p.m. – 1:30 p.m.
3:20 p.m. – 3:40 p.m.

STS/EACTS Booth

Learn about the many offerings each organization has to offer and apply for membership.

Industry-Sponsored Satellite Activities

Satellite activities are programs offered by industry and held in conjunction with the STS/EACTS Latin America Cardiovascular Surgery Conference. They are not developed or sponsored by STS or EACTS.

Thursday

5:30 p.m. – 7:00 p.m. | DRAKE Meeting Room
Mitral and Tricuspid Repair Techniques – Hands On
Medtronic

Friday

6:30 p.m. – 8:30 p.m. | Gran Salon Bolivar
Inspired by Innovation Presenting the New Inspiris Resilia Aortic Valve
Edwards Lifesciences

Saturday

9:00 a.m. – 10:45 a.m. | Gran Salon Bolivar
Thoraflex Hybrid and the Frozen Elephant Trunk Procedure: The Hannover Experience
Terumo Aortic

Conference Agenda

Day 1: Thursday, November 15, 2018

8:00 a.m. – 8:10 a.m. Opening Remarks

General Session: Mitral Valve

Moderators: *Steven F. Bolling, MD, Steven Hunter, MD, and Juan P. Umana, MD*

8:10 a.m. – 8:22 a.m. The Case for Watchful Waiting in Mitral Valve Regurgitation
Steven Hunter, MD

8:22 a.m. – 8:34 a.m. Minimally Invasive Mitral Valve Repair: On- or Off-Pump?
Juan P. Umana, MD and Vinod H. Thourani, MD

8:34 a.m. – 8:46 a.m. Mitral Valve in Rheumatic Disease: Scenarios for Repairing vs Replacing
Steven F. Bolling, MD

8:46 a.m. – 8:58 a.m. Transcatheter Mitral Valve Replacement: Where Are We?
Vinod H. Thourani, MD

8:58 a.m. – 9:10 a.m. Mitral Valve Repair: Does Hospital Volume Matter?
Juan P. Umana, MD

9:10 a.m. – 9:20 a.m. **Abstract I:** Transcatheter Mitral Valve-in-Valve Implantation: A Fertile Ground to Plant the Transcatheter Seed—Reports on the First 50 Cases in a Latin American Center
Leonardo Paim, MD See page 115 for full abstract text

9:20 a.m. – 9:30 a.m. **Abstract II:** Minimally Invasive Mitral Valve Surgery After Previous Sternotomy Without Aortic Clamping: Short- and Long-Term Results of a Single Surgeon at a Single Institution
Kinsing Ko, MD See page 121 for full abstract text

9:30 a.m. – 10:00 a.m. Panel Discussion

10:00 a.m. – 10:30 a.m. BREAK

10:30 a.m. – 11:00 a.m. Antoni Gaudi and the Mitral Valve
Jose L. Pomar, MD, PhD

General Session: STS/EACTS and Latin America Quality and Outcomes Initiatives

Moderators: *Daniel O. Navia, MD, Jeffrey P. Jacobs, MD, and Jose L. Pomar, MD, PhD*

11:00 a.m. – 11:12 a.m. International Databases/Their Role in Quality Improvement Worldwide
Orjan Friberg, MD, PhD

11:12 a.m. – 11:24 a.m. Bundled Payments in Cardiac Surgery
Jason Arora, MD, MPH

11:24 a.m. – 11:36 a.m. Does Volume in a Pediatric Cardiac Surgery Program Impact the Results?
Jeffrey P. Jacobs, MD

11:36 a.m. – 11:48 a.m. The Future of Randomized Trials: The Use of Registries
John C. Laschinger, MD

11:48 a.m. – 12:00 p.m.	How the STS National Database Impacts a Cardiothoracic Surgery Division *Joseph E. Bavaria, MD*
12:00 p.m. – 12:10 p.m.	**Abstract I:** Use of the Quality of Life in Cardiovascular Surgery (QLCS) Questionnaire in Patients Undergoing Coronary Artery Bypass Grafting Surgery: Validation, Reproducibility, and Quality of Life Analysis at the First Year of Follow-Up *Marina Bond, MD* See page 151 for full abstract text
12:10 p.m. – 12:20 p.m.	**Abstract II:** Cancelation of Same-Day Cardiac Surgery at a Large Single Cardiac Center in the UK *Sara Jasionowska, MD* See page 154 for full abstract text
12:20 p.m. – 12:50 p.m.	Panel Discussion
12:50 p.m. – 1:50 p.m.	LUNCH

Parallel Sessions	Track I: How to Videos – Adult **Moderators:** *Jose L. Pomar, MD, PhD, Enrico R. Ferrari, MD, and Joseph E. Bavaria, MD*	Track II: How to Videos – Pediatric **Moderators:** *Nestor F. Sandoval, MD, David J. Barron, MD, and Marcelo B. Jatene, MD*
1:50 p.m. – 2:00 p.m.	Hypertrophic Obstructive Cardiomyopathy: The Midventricular Approach *Douglas R. Johnston, MD*	Mitral Valve Repair *Pedro J. del Nido, MD*
2:00 p.m. – 2:10 p.m.	Discussion	Discussion
2:10 p.m. – 2:20 p.m.	Rheumatic Mitral Valve Repair *Vinay Badhwar, MD*	Modified Konno Procedures *Christian Pizarro, MD*
2:20 p.m. – 2:30 p.m.	Discussion	Discussion
2:30 p.m. – 2:40 p.m.	Aortic Arch Replacement: The Elephant Trunk Technique *Malakh L. Shrestha, MD, PhD*	Aortic Valvuloplasty: Osaki Reconstruction of Aortic Valve in Children and Young Adults *Pedro J. del Nido, MD*
2:40 p.m. – 2:50 p.m.	Discussion	Discussion
2:50 p.m. – 3:00 p.m.	Transcatheter Valve in Mitral Annular Calcification *Enrico R. Ferrari, MD*	Double Switch Operation in levo-Transposition of the Great Arteries: How I Do It *David J. Barron, MD*
3:00 p.m. – 3:10 p.m.	Discussion	Discussion
3:10 p.m. – 3:30 p.m.	BREAK	

Conference Agenda

Parallel Sessions	Track III: Atrial Fibrillation **Moderators:** *Vinay Badhwar, MD, Steven Hunter, MD, and Javier D. Maldonado, MD*	Track IV: Heart Failure / Ventricular Assist Devices **Moderators:** *Francis D. Pagani, MD, PhD, Christian A. Bermudez, MD, and Rodrigo V. Gonzalez, MD*
3:30 p.m. – 3:42 p.m.	Does Ablation for Atrial Fibrillation Improve Long-Term Survival? *Vinay Badhwar, MD*	Update on Momentum 3 Trial: The Final Word? *Francis D. Pagani, MD, PhD*
3:42 p.m. – 3:54 p.m.	Concomitant Atrial Fibrillation Ablation: What Are the Right Lesion Set and Energy Source? *Javier D. Maldonado, MD*	How to Develop a Comprehensive Ventricular Assist Device Program *Rodrigo V. Gonzalez, MD*
3:54 p.m. – 4:06 p.m.	Should Hybrid Ablation Be the Standard of Care Instead of Transcatheter Ablation Techniques? *Christian C. Shults, MD*	What Is the Best Device for Post-Cardiotomy Short-Term Support? Extracorporeal Membrane Oxygenation vs CentriMag vs Impella *Ezequiel J. Molina, MD*
4:06 p.m. – 4:18 p.m.	Minimally Invasive Mitral Valve Surgery with Biatrial Maze Operation *Steven Hunter, MD*	Extracorporeal Membrane Oxygenation as a Bridge to Heart Transplant in the Era of Left Ventricular Assist Devices *Christian A. Bermudez, MD*
4:18 p.m. – 4:30 p.m.	The Left Atrial Appendage: Should It Be Closed on Every Open Cardiac Surgery Case? *Nirav C. Patel, MD*	Mechanical Support in the Single Ventricle *Stephanie M. Fuller, MD*
4:30 p.m. – 4:40 p.m.	**Abstract I:** Predictors of Late Recurrence in Surgical Treatment of Atrial Fibrillation *Jenny Lourdes de Oliveira, MD* See page 80 for full abstract text	**Abstract I:** Long-Term Outcomes of Destination Therapy Left Ventricular Assist Devices *Nicolas Brozzi, MD* See page 99 for full abstract text
4:40 p.m. – 4:50 p.m.	**Abstract II:** Preoperative Atrial Fibrillation Is a Risk Factor for Concealed Impairment of Myocardial Function and Increased Postoperative Morbidity in Patients Undergoing Coronary Artery Bypass Grafting *Constanze Bening, MD* See page 79 for full abstract text	**Abstract II:** Taking Extracorporeal Membrane Oxygenation (ECMO) on the Road: Initial Experience With an ECMO Transport Team in Bogota, Colombia *Dario Andrade, MD* See page 153 for full abstract text
4:50 p.m. – 5:20 p.m.	Panel Discussion	Panel Discussion
7:00 p.m.	Reception	

Agenda and speakers are subject to change.

Day 2: Friday, November 16, 2018

7:00 a.m. – 8:00 a.m. Late-Breaking Trials Analysis: The Transcatheter Mitral Valve Revolution and Insights From COAPT and Other Related Mitral Trials

Moderator: *Joseph E. Bavaria, MD*

Panelists: *Vinod H. Thourani, MD, Juan P. Umana, MD, Steven F. Bolling, MD, Vadim Kotowicz, MD, Enrico R. Ferrari, MD, and Orjan Friberg, MD, PhD*

8:00 a.m. – 8:10 a.m. Opening Remarks

Parallel Sessions

Track V: Aortic Valve

Moderators: *Vinod H. Thourani, MD, Martin Grabenwoger, MD, and Vadim Kotowicz, MD*

8:10 a.m. – 8:22 a.m. Minimally Invasive Aortic Valve Replacement Options
Douglas R. Johnston, MD

8:22 a.m. – 8:34 a.m. Mechanical vs Bioprosthetic Aortic Valve Replacement: Time to Reconsider?
Christian C. Shults, MD

8:34 a.m. – 8:46 a.m. Are Heart Valve Referral Centers Feasible in Latin America?
Vadim Kotowicz, MD

8:46 a.m. – 8:58 a.m. Transcatheter or Surgical Aortic Valve Replacement – A Glimpse into the Future
Orjan Friberg, MD, PhD

8:58 a.m. – 9:10 a.m. The Role of Sutureless Valves in the Surgeon's Armamentarium
Malakh L. Shrestha, MD, PhD

9:10 a.m. – 9:20 a.m. **Abstract I:** Long-Term Hemodynamic Results of an Algorithmic Three-Pronged Approach to Bicuspid Aortic Valve Repair
Mary Siki, MD
See page 72 for full abstract text

Track VI: Congenital – Transposition of the Great Arteries

Moderators: *David J. Barron, MD and Marcelo B. Jatene, MD*

Are There Indications for Atrial Switch (or Atrial Inversion Surgery) in the 21st Century?
Marcelo B. Jatene, MD

Arterial Switch Operation and Complex Coronary Patterns
Marcelo B. Jatene, MD

Surgical Options for Transposition of the Great Arteries/Left Ventricular Outflow Tract Obstruction/Pulmonary Stenosis
Mark G. Hazekamp, MD, PhD

Indications and Outcomes of Double Switch for Corrected Transposition of Great Arteries
David J. Barron, MD

Long-Term Follow-Up of the Arterial Switch Operation: Not as Good as It Gets?
Gil Wernovsky, MD

Abstract I: Lead Extraction in Patients With Congenital Heart Disease
Roger Carrillo, MD
See page 22 for full abstract text

Conference Agenda

	Track V: Aortic Valve (Continued)	Track VI: Congenital – Transposition of the Great Arteries (Continued)
9:20 a.m. – 9:30 a.m.	**Abstract II:** Severe Asymptomatic Aortic Stenosis: Is Early Valvular Replacement Safe? *Juan Vrancic, MD* See page 68 for full abstract text	**Abstract II:** Fetal Hypoxemia Causes Abnormal Myocardial Development in a Preterm, Ex-Utero Fetal Ovine Model: Implications for Adult Cardiovascular Disease and Novel Fetal Therapy *Carlo Bartoli, MD* See page 138 for full abstract text
9:30 a.m. – 10:00 a.m.	Panel Discussion	Panel Discussion
10:00 a.m. – 10:40 a.m.	**Stump the Professor: Aortic Valve/Mitral Valve/Heart Failure** **Moderators:** *Jose L. Pomar, MD, PhD and Joseph E. Bavaria, MD* **Panelists:** *Steven F. Bolling, MD, Vinod H. Thourani, MD, Martin Grabenwoger, MD, and Juan P. Umana, MD*	**Stump the Professor: Congenital** **Moderators:** *Pedro J. del Nido, MD and Nestor F. Sandoval, MD* **Panelists:** *Christian Pizarro, MD, Stephanie M. Fuller, MD, Mark G. Hazekamp, MD, PhD, and David J. Barron, MD*
10:40 a.m. – 11:00 a.m.	BREAK	

Parallel Sessions	Track VII: Aorta/Aortic Arch/Neurologic Protections **Moderators:** *Enrico R. Ferrari, MD, Joseph E. Bavaria, MD, and Eduardo Turner, MD*	Track VIII: Congenital: Univentricular Heart **Moderators:** *Stephanie M. Fuller, MD, Christian Kreutzer, MD, and Jeffrey P. Jacobs, MD*
11:00 a.m. – 11:12 a.m.	**DEBATE:** Aggressive Resection/Reconstruction of the Aortic Arch in Type A Dissection **Pro:** *Martin Grabenwoger, MD*	AV Valve Insufficiency in Univentricular Hearts: When and How I Fix It *Pedro J. del Nido, MD*
11:12 a.m. – 11:24 a.m.	**DEBATE:** Aggressive Resection/Reconstruction of the Aortic Arch in Type A Dissection **Con:** *Thomas G. Gleason, MD*	Surgical Options in Fontan Failure *Stephanie M. Fuller, MD*
11:24 a.m. – 11:36 a.m.	Debranching and Extended Endografting vs Total Surgical Reconstruction of the Arch – What Is the Evidence? *Enrico R. Ferrari, MD*	Is One and a Half Better Than One? *David J. Barron, MD*
11:36 a.m. – 11:48 a.m.	Management of Malperfusion Syndrome in Type A Aortic Dissection *Eduardo Turner, MD*	Surgical and Interventional Management of Lymphatic Complications After Univentricular Heart Repair *Christian Kreutzer, MD*

Agenda and speakers are subject to change.

11:48 a.m. – 12:00 p.m. Cannulation Strategy in Type A Dissection: Order Out of Chaos
Thomas G. Gleason, MD

12:00 p.m. – 12:12 p.m.
Is the Availability of New Aortic Devices Going to Change Our Index Operation for Type A Dissection?
Joseph E. Bavaria, MD

12:12 p.m. – 12:22 p.m.
Abstract I: Open Repair of Acute Complicated Type B Dissection: Predictable Outcomes When Thoracic Endovascular Aortic Repair Is Ill-Advised
Matthew Wingo, MD
See page 35 for full abstract text

12:22 p.m. – 12:32 p.m.
Abstract II: Frozen Elephant Trunk Procedure in Patients With Type B Aortic Dissection and Concomitant Aortic Arch or Ascending Aortic Pathology
Eduard Charchyan, MD, PhD
See page 32 for full abstract text

12:32 p.m. – 12:50 p.m.
Panel Discussion

Interventional Management of Lymphatic Morbidity in Patients With Congenital Heart Disease
Maxim Itkin, MD

12:00 p.m. – 12:10 p.m.
Abstract I: Bidirectional Glenn in Resource-Limited Settings: How Safe Is the Off-Pump Option and Does It Reduce the Cost of Care?
William Novick, MD
See page 140 for full abstract text

12:10 p.m. – 12:20 p.m.
Abstract II: Univentricular Heart: A 10-Year Experience in Left Hypoplastic Heart Syndrome
Marisol Carreno, MD
See page 143 for full abstract text

12:20 p.m. – 12:50 p.m.
Panel Discussion

12:50 p.m. – 1:30 p.m. LUNCH

Parallel Sessions

Track IX: Tricuspid Valve/Heart Failure

Moderators: *Francis D. Pagani, MD, PhD, Alejandro M. Bertolotti, MD, and Ezequiel J. Molina, MD*

1:30 p.m. – 1:42 p.m. Surgical Options to Prevent and Treat Tricuspid Valve Regurgitation in Heart Transplant Recipients
Alejandro M. Bertolotti, MD

Track X: Aortic Root

Moderators: *Malakh L. Shrestha, MD, PhD, Eduardo Turner, MD, and Francisco da Costa, MD*

Options and Outcomes for Aortic Valve Plasty in Children and Young Adults
Mark G. Hazekamp, MD, PhD

Conference Agenda

	Track IX: Tricuspid Valve/Heart Failure (Continued)	Track X: Aortic Root (Continued)
1:42 p.m. – 1:54 p.m.	Current Surgical Strategies in the Management of Tricuspid Valve Endocarditis *Vadim Kotowicz, MD*	Long-Term Results of Valve-Sparing Aortic Root Replacement: Reimplantation Technique *Martin Grabenwoger, MD*
1:54 p.m. – 2:06 p.m.	Right Heart Failure in Left Ventricular Assist Device Patients: Prevention and Management *Christian A. Bermudez, MD*	Decellularization of Aortic Homografts: South American and European Current Experience *Francisco da Costa, MD*
2:06 p.m. – 2:18 p.m.	Percutaneous Technologies to Correct Tricuspid Regurgitation: Myth or Reality *Steven F. Bolling, MD*	To Do or Not to Do a Root in an Aortic Dissection *Joseph E. Bavaria, MD*
2:18 p.m. – 2:30 p.m.	Mitral Valve Surgery in the Low Ejection Fraction Patient Population: Is It Ever Too Late? *Francis D. Pagani, MD, PhD*	Aortic Root Replacement in Elderly Patients: Valve-Sparing Root Replacement, "Wheat Procedure," or Bentall? *Eduardo Turner, MD*
2:30 p.m. – 2:40 p.m.	**Abstract I:** Donation After Circulatory Death Heart Transplantation in Australia: A Solution to the Donor Shortage? *Sarah Scheuer, MD* See page 108 for full abstract text	**Abstract I:** Aortic Valve Preservation as a Routine and Durable Procedure for Aortic Root Disease and Valve Regurgitation: Initial Experience and Long-Term Follow-Up *Fernando Piccinni, MD* See page 42 for full abstract text
2:40 p.m. – 2:50 p.m.	**Abstract II:** Outcomes in Patients With Large Right Atrial Vegetations *Roger Carrillo, MD* See page 158 for full abstract text	**Abstract II:** Aortic Valve-Sparing Operations: Our 7-Year Experience *Lizeth Saldana, MD* See page 41 for full abstract text
2:50 p.m. – 3:20 p.m.	Panel Discussion	Panel Discussion
3:20 p.m. – 3:40 p.m.	BREAK	

Parallel Sessions	Track XI: Coronary Artery Disease **Moderators:** *Nirav C. Patel, MD, Daniel O. Navia, MD, and Jorge M. Balaguer, MD*	Track XII: Congenital – Neonatal and Early Surgery **Moderators:** *Christian Pizarro, MD, Mark G. Hazekamp, MD, PhD, and Christian Kreutzer, MD*
3:40 p.m. – 3:52 p.m.	Incremental Value of Multiple Arterial Conduits in Coronary Artery Bypass Grafting Surgery *Nirav C. Patel, MD*	Hypoplastic Left Heart Syndrome: How Far Have We Come? *Christian Pizarro, MD*

Agenda and speakers are subject to change.

3:52 p.m. – 4:04 p.m.	Coronary Artery Bypass Grafting Surgery in Diabetics: All Arterial or Hybrid? *Daniel O. Navia, MD*	New Strategies in the Intensive Care Unit: Management of Complex Neonatal Surgery *Gil Wernovsky, MD*
4:04 p.m. – 4:16 p.m.	Optimal Management Strategies in Ischemic Ventricular Septal Rupture *Juan P. Umana, MD*	Valve-Sparing Repair Techniques in Tetralogy of Fallot: Mid-term Results and Therapeutic Implications *Pedro J. del Nido, MD*
4:16 p.m. – 4:28 p.m.	Radial Artery as the Second Arterial Graft: A New Appraisal *Marco Oliveira, MD*	Ross Procedure in Neonates and Infants: The European Experience *Mark G. Hazekamp, MD, PhD*
4:28 p.m. – 4:40 p.m.	Off-Pump Coronary Artery Bypass Grafting Surgery: Perspectives After 2 Decades *Jorge M. Balaguer, MD*	Neurodevelopmental Outcomes in Children With Complex Congenital Heart Disease: How Can We Improve? *Gil Wernovsky, MD*
4:40 p.m. – 4:50 p.m.	**Abstract I:** Long-Term Graft Patency After Coronary Artery Bypass Grafting Surgery: Effects of Distal Anastomosis Angle *Grigore Tinica, MD* See page 86 for full abstract text	**Abstract I:** Global Postoperative Mortality in Critical Congenital Heart Disease: A Systematic Review *Pablo Sandoval, MD* See page 147 for full abstract text
4:50 p.m. – 5:00 p.m.	**Abstract II:** Impact of Diabetes on Survival Following Coronary Artery Bypass Surgery: 12-Year Follow-Up *Umar Imran Hamid, MD* See page 89 for full abstract text	**Abstract II:** 5 Years of Experience in Pulmonary Valve Replacement in Adults With Congenital Cardiopathy Corrected *Raquel Vega Hernandez, MD* See page 24 for full abstract text
5:00 p.m. – 5:30 p.m.	Panel Discussion	Panel Discussion
5:30 p.m. – 5:45 p.m.	Closing Comments	Closing Comments

Day 3: Saturday, November 17, 2018

8:00 a.m. – 9:00 a.m.	How Industry and Cardiothoracic Surgeons Work Together **Moderators:** *Juan P. Umana, MD and Vinod H. Thourani, MD* **Panelists:** *Joseph E. Bavaria, MD, Jose L. Pomar, MD, PhD, and Steven F. Bolling, MD*

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Scientific Abstracts

*Oral abstracts are notated with an asterisk (*). Presenting authors are listed in **bold**. Unless otherwise noted in this program or by the speakers, speakers have no commercial relationships to disclose and will be presenting information only on devices, products, or drugs that are US Food and Drug Administration approved for the purposes they are discussing.*

Abstract content appears as it was submitted; only titles have been edited for clarity and consistency. Abstracts are grouped by topic (Adult Congenital, Aorta and Aortic Arch, Aortic Root, Aortic Valve, Atrial Fibrillation, Coronary Artery Disease, Heart Failure, Mitral Valve, Pediatric Congenital, Quality and Outcomes Initiatives, and Tricuspid Valve).

Scientific Abstracts

ADULT CONGENITAL

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One-Time Surgical Correction of a 21-Year-Old Bicuspid Aortic Valve, Root Dilation, and Distal Aortic Coarctation

***Melvin Berroa**, Jose Iribarren, Octavio Gonzalez, Julius Leyba, Ricardo Perello, Brigida Aguerrevere*
Institution where study was performed: CEDIMAT, Dominican Republic

Purpose: The combination of aortic coarctation and aortic insuficiency and ascending aortic repair performed in one time procedure is a challenge for the surgical team, the surgeon should have experience in congenital surgery and surgical strategies should be planned ahead. In this case aortic coarctation could not be resolved percutaneously due to hypoplastic distal arch.

Methods: 21 year old male history of high intensity headaches and dizziness, arterial pressure: 190/90mmHg. Diastolic murmur in aortic area, absence of pulse in inferior limbs. Arterial pressure inferior limbs: 145/115mmHg. TEE: Bicuspid aortic valve (Fig. 1A), severe aortic regurgitation (Fig. 1B) CAT: Ascending aortic dilation 5.5 cm (Fig. 1C) with distal hypoplastic arch and severe aortic coarctation 6.6mm (Fig. 1D).

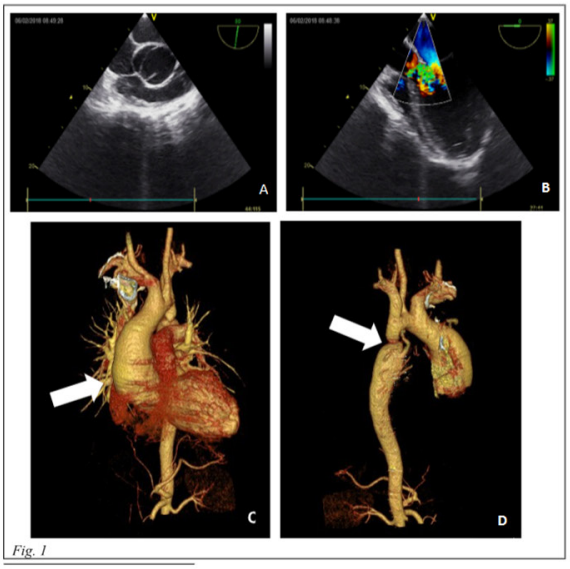

Fig. 1

Results: Under cardiopulmonary bypass with dual stage venous cannulation and aortic cannula at aorta (Fig. 2A), with beating heart and partial bypass 1/3 of the cardiac output at 34 ºC, distal coarctation was repaired (Fig. 2B) with a Dacron 25mm prosthesis, then the heart was arrested with a single dose of Del nido cardioplegia via both coronary ostiums and a Bentall Bono procedure was performed with a valve conduit On-x 25 mm (Fig. 2C, 2D). CPB time was 240 min and xclamp: 115 min. Both operations were performed under the same surgical procedure. Patient was discharged at day 8 with no complications a 3 month post-surgery CAT was performed (Fig. 3A, 3B) showing normal function of both prosthesis, patient remains asymptomatic.

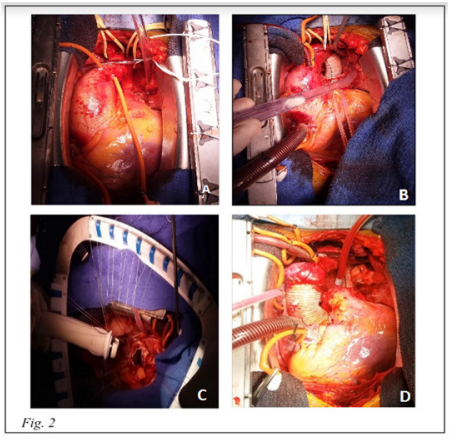

Fig. 2

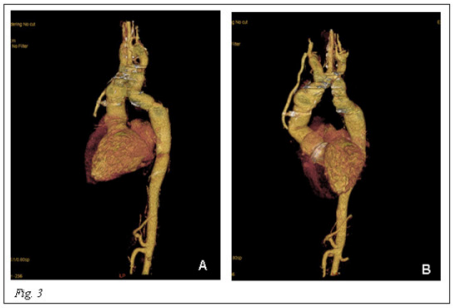

Fig. 3

Conclusion: The surgical team should be prepared to manage mix adult congenital diagnosis in the same time surgical procedure, mild hypothermia and partial support with CPB was helpful in the coarctation repair and congenital expertise from the surgeon is important.

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Surgical Closure of Atrial Septal Defects in Adults: Very Long-Term Results — Is the Age at the Time of Surgery Still Prognostic?

Juan Carlos Bahamondes[1], *Andres Diaz[1], Abelardo Silva[2], Ivan Lagos[1], Pablo San Martin[1]*
Institutions where study was performed: [1]Hospital Regional Temuco, Chile; [2]Hospital Dr. Hernan Henriquez Aravena, Chile

Purpose: Report the very long term results of ASD surgery in adult patients in southern Chile.

Methods: Descriptive study of 111 patients subjected to reparative surgery for ASD between 1991 to 2018. 106 patients presented with an ASD ostium secundum type and 5 with a sinus venous type. 27 patients presented with functional tricuspid insufficiency, 67 patients had moderate pulmonary hypertension, and it was severe in 34. The average left to right shunt was 3.2 ± 1.01.

Results: Mean age was 39.2 ± 11.34 years (15 – 73 years). 73 patients were female and 85 older than 40 years; 28 patients were in NYHA functional class (FC) II and 83 in FC III. 25 patients were operated through a mini sternotomy and 3 through a reduced thoracotomy. Closure of the ASD was performed with a dacron patch in 65 patients, autologous pericardium in 45 patients and direct closure was done in 1 patient. In our early series, functional tricuspid insufficiency was corrected with the De Vega annuloplasty in 3 patients and tricuspid replacement in 1. Later on tricuspid annuloplasty was performed in 23 patients using an incomplete ring. Post-operative mortality was 2.7%. 1 patient died because of a massive pulmonary thromboembolism, 1 patient died due to a cardiogenic shock and 2 patients. 7 patients had a paroxistic atrial fibrillation, 1 patient had a stroke, a tension pneumothorax requiring a chest tube, 1 patient had a AV blockage and 1 patient presented a pleural effusion. In the very long term follow up period 101 patients are in NHYA FC I and 2 in FC II. 5 patients died because of a respiratory failure in 3 and septic complications in 2. No patient died due to cardiac causes. Actuarial survival probability was 98% at 444 months, and the probability of freedom from cardiac arrythmias was 99% for the same period.

Conclusion: Surgical closure of ASD in adult patients provides a good symptomatic recovery even in those who are in the fifth decade of life and on, allowing them to have an excellent quality of life. The vast majority of patients remain in NHYA FC I having an excellent actuarial survival probability and a time-free of cardiovascular events in the very long term, demostrating that similar life expectancy can be achieved in patients older than 40 years of age with the surgical approach.

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Lead Extraction in Patients With Congenital Heart Disease

Roger Carrillo[1]*, Adryan Perez*[2]
Institutions where study was performed: [1]Palmetto General Hospital, United States; [2]University of Miami, United States

Purpose: Some patients with congenital heart disease require cardiac electrical devices which may fail or get infected. Currently, there is sparse data on this complex population. There are anatomical challenges associated in this population and the risk of lead extraction remains understudied.

Methods: Data for all patients undergoing lead extraction at a single tertiary cardiovascular referral center was gathered from January 2003 to July 2017, utilizing the institution's prospective registry. We identified patients with congenital heart defects. Using JMP Pro V13 (SAS, Cary, NC) for analysis, we generated summary statistics for the following variables: age, sex, device extracted, lead dwell time, indication for extraction, approach, major and minor complications as defined by the 2009 Heart Rhythm Society Consensus, procedural success, length of stay, and survival at discharge.

Results: Nineteen patients with congenital heart defects were identified: (7) tetralogy of Fallot, (4) D-transposition of the great arteries with atrial switch correction, (3) atrial/ventricular septal defect, (2) aortic stenosis requiring graft, (1) double-outlet right ventricle, (1) D-transposition of the great arteries with arterial switch correction, and (1) anomalous coronary artery. Summary statistics are reported in Table 1. Of note, 17 cases were extracted utilizing percutaneous methods and 2 cases necessitated the use of alternative, minimally invasive approaches.

Conclusion: Although anatomic abnormalities pose challenges, successful laser lead extraction can be safely accomplished in the congenital heart disease population.

Variables	Congenital Heart Disease Patients (n=19)
Age	37.9 (± 11.1)
Sex, Female	8 (42%)
Device Extracted	10 Defibrillators (53%), 6 Pacemakers (31%), 3 Cardiac Resynchronization Therapy-Defibrillators (16%)
Lead dwell time, Years	9.0 (± 9.6)
Indication for Extraction	16 (84%) Non-infectious, 3 (16%) Infectious
Approach	16 Subclavian (85%), 1 Internal Jugular (5%), 1 Transatrial (5%), 1 Left Thoracoscopy (5%)
Major complication	0 (0%)
Minor complication	0 (0%)
Procedural Success	19 (100%)
Length of Stay, Days	4.2 (± 2.3)
Discharged Alive	19 (100%)

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Impact of Surgical Treatment on Congenital Defects With Pulmonary Hypertension in Gray Area

***Victor Robles**, Yemmy Perez*
Institution where study was performed: Instituto Nacional Cardiovascular (INCOR) - EsSalud, Peru

Purpose: We present our experience in the surgical treatment of adult patients with congenital heart disease with pulmonary hypertension in the gray area (PVR> 4.6 UW). The study was conducted at the National Cardiovascular Institute (INCOR-ESSALUD) of Lima, Peru.

Methods: Four female patients with pulmonary hypertension in a gray area were operated on. A hemodynamic study was performed with right and left cardiac catheterization to quantify pulmonary hypertension. The patients were in functional class III - IV, receiving treatment with sildenafil orally. The surgery was performed from January 2016 to February 2018. The ages between 26 to 38 years. One patient with patent ductus arteriosus and three patients with atrial septal defect. The ductus arteriosus is partially occluded and the defects of the atrial septum are corrected with a fenestrated pericardium patch. All patients undergo lung biopsy.

Results: There was no hospital mortality. Patients were evaluated periodically with studies of echocardiography, functional capacity, and hemodynamic study with right cardiac catheterization. There is an improvement in functional capacity and decrease in pulmonary pressures. The patients are in functional class I - II. Pulmonary biosypsy studies show histological changes compatible with severe pulmonary hypertension.

Conclusion: Adult patients with congenital heart disease and pulmonary hypertension in the gray area are able to perform successful surgical treatment, confirmed in our study due to the favorable clinical evolution and hemodynamics. A long-term follow-up is required to confirm these findings and compare it with other therapies.

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5 Years of Experience in Pulmonary Valve Replacement in Adults With Corrected Congenital Cardiopathy

***Raquel Vega Hernandez**, Juan Jose Gonzalez Villasenor*
Institution where study was performed: Avenida Lincoln y Maria de Jesus Candia sin numero, Mexico

Purpose: 85% of children born with congenital heart disease (CHD) will survive to adulthood thanks to procedures performed in childhood. IP contributes to a number of late complications that include exercise limitations, right heart failure, arrhythmia, and sudden death. Adult CHD remains a challenge in the field of cardiac surgery.

Methods: We identified 48 patients operated on for pulmonary valve implantation (2014-2018) from 15 to 64 years of age, of which 34 patients underwent surgery in childhood to correct congenital heart disease; 25 patients (73.5%) underwent total correction of Tetralogy of Fallot, the remaining 9 patients (26.4%) were corrected for different congenital heart diseases (residual ventricular septal defect (VSD), pulmonary plasty, dysfunctional pulmonary prosthesis, endocarditis).

Results: The average age is 32.64 years. Fourteen patients were excluded, who underwent pulmonary prosthesis but did not have a history of correction of congenital heart disease in childhood. We included 34 reoperated patients for implantation of pulmonary prosthesis in functional class NYHA III - IV. Left ventricular ejection fraction (LVEF) pre-surgical of 65%. Reduction of the transverse diameter of the right ventricle 4-5mm. Improvement of the TAPSE + 3.5mm. 25 aortic bioprotesis were placed 27 EPIC ST JUDE (73.5%), 8 mitral bioprotesis in lung position 29 EPIC ST JUDE (23.5%), 1 mitral bioprosthesis in lung position 31 EPIC ST JUDE (3%). Average transvalvular mean gradients in prostheses 27 was 11.7mmHg, prosthesis 29 was 8.12mmHg, prosthesis 31 was 7mmHg. The mean time of stay in intensive care 2.5 days, the postoperative in-hospital stay was 10 days. The extracorporeal circulation time was 76 min, only aortic clamping was performed in 3 patients (8.82%).

Conclusion: Pulmonary valve replacement reduced the size of the right ventricle and improved its function in the first postoperative year. IP resolution is associated with improvement of the NYHA functional class and improvement in RV remodeling. Valvular bioprostheses number 27 are compatible for the placement of stent (valve in valve)

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Emergent Surgery for Acute Stanford Type A Aortic Dissections: Comparing Novel and Traditional Anticoagulants

***Eric Jeng**, Caleb Matthews, David Hall, Seyed Hossein Aalaei-Andabili, Yong Peng, Bruce Spiess, George Arnaoutakis, Tomas Martin, Thomas Beaver*
Institution where study was performed: University of Florida, United States

Purpose: Compare outcomes in patients presenting for acute Stanford Type A aortic dissection repair on novel oral anticoagulation (NOAC) and traditional anticoagulation (warfarin) with a matched cohort on no anticoagulation.

Methods: We reviewed 31 patients over one year (March 2016 to 2017) who underwent acute Stanford Type A aortic dissection repair. Four patients presented on NOAC, and five patients on warfarin (W). A cohort of five patients on no anticoagulation was selected as case-matched controls (C) (total n=14). Patients on NOAC received either Idarucizumab or Kcentra preoperatively. Data analyzed included blood product administration, cross clamp and cardiopulmonary bypass (CPB) time, mortality, stroke, hemorrhage, days on ventilatory support, ICU length of stay (LOS), and total LOS.

Results: The mean cross clamp and CPB times (minutes) for each group were 120.8 ± 18.81 and 216.8 ± 48.12 (C), 197.5 ± 53.85 and 306.4 ± 53.77 (W), and 104.5 ± 47.46 and 178.0 ± 42.72 (NOAC). The W group had significantly longer cross clamp and CPB times (W vs. C: p= 0.03, and p=0.02; W vs. NOAC: p=0.02 and p=0.004). There was no statistically significant difference in blood product utilization between groups however the W group trended toward higher pRBC and FFP utilization (Figure 1). Furthermore, the average Factor 7 dose utilization was greater in the W vs NOAC (p=0.04) analysis. Additionally, Table 1 summarizes in mortality, stroke, hemorrhage, days on ventilatory support, ICU LOS, and total LOS.

Conclusion: Patients that presented for emergent acute Stanford Type A dissection repair regardless of anticoagulation status had no statistically significant difference in blood product utilization, short term morbidity markers, or death. Thus, anticoagulation status (NOAC or traditional) alone should not prohibit surgical intervention for acute Type A dissections.

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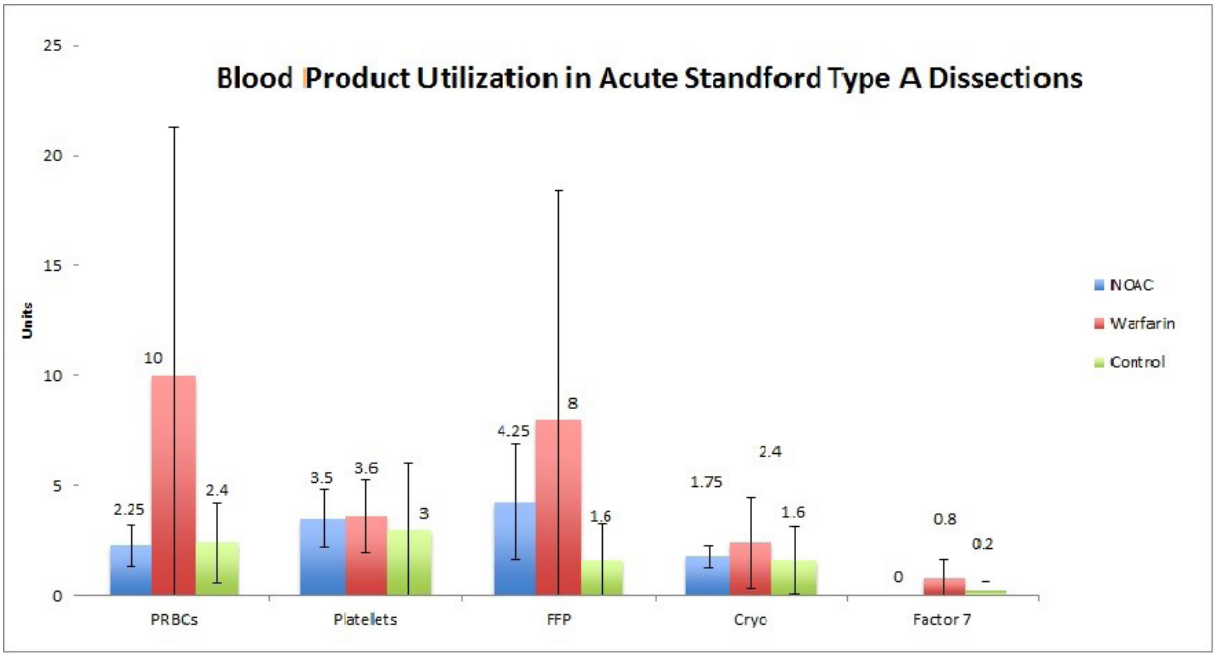

Figure 1. Intraoperative blood product utilization for patients that presented with Acute Stanford Type A Aortic Dissection: NOAC vs. Warfarin vs. Control. Error bars indicated by stand error of mean.

TABLE 1: Baseline Characteristics			
	Control	***NOAC***	***Coumadin***
Age > 65 yr	65.2 ± 9.10	71.0 ± 2.65	54.8 ± 19.63
Sex	40% (M); 60% (F)	50% (M); 50% (F)	40% (M); 60% (F)
CPB (Min)	216.8 ± 48.12	178.0 ± 42.72	306.4 ± 53.77
X-clamp (Min)	120.8 ± 18.81	104.5 ± 47.46	197.5 ± 53.85
Mortality	20%	0%	20%
CVA	20%	0%	20%
Hemorrhage	0%	0%	20%
Ventilatory Support (Hours)	42.7 ± 43.20	107.6 ± 142.86	29.9 ± 25.79
ICU LOS (Hours)	197.4 ± 195.62	223.4 ± 101.36	136.9 ± 30.23
Total LOS (Days)	12.6 ± 6.52	12.8 ± 2.76	9.0 ± 1.96

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Aortic Reinterventions After the Frozen Elephant Trunk Procedure

***Maximilian Kreibich**, Friedhelm Beyersdorf, Stoyan Kondov, Bartosz Rylski, Matthias Siepe, Martin Czerny, Zehang Chen, Tim Berger*
Institution where study was performed: Heart Center Freiburg University, Germany

Purpose: The frozen elephant trunk (FET) procedure has emerged as a potential single step treatment for the thoracic aorta. Aim of this study was to evaluate the need and outcomes of aortic reinterventions after previous FET implantation.

Methods: Between 03/2013 and 12/2017, n=107 patients were discharged after FET implantation. Patient characteristics and follow-up data were evaluated and compared between patients with aortic reinterventions (R+) and without aortic reintervention (R-). A competing risk regression model was analyzed to identify independent predictors of aortic reintervention and to predict the risk for reintervention.

Results: Reinterventions were performed in 35 patients (30%). There was no difference in the underlying pathology between patients with or without aortic reintervention. An endovascular reintervention was performed in 24 patients (69%), open surgery was performed in 7 patients (20%) and a hybrid approach was required in 4 patients (11%). No stroke and no permanent spinal cord injury were observed after the aortic reintervention. Five patients (14%) expired after aortic reintervention, but there was no difference in long-term survival after FET implantation between patients with or without aortic reintervention (log rank: 0.576). No risk factors for aortic reinterventions were identified in the competing risk model. The risk for aortic reintervention was 31% [95% CI: 21-42%], 49% [95% CI: 35-62%], and 64% [95% CI: 44-79%] after 12, 24, and 36 months respectively.

Conclusion: Aortic reinterventions are common and likely after FET implantation, but there are no independent predictors. Reinterventions are associated with low perioperative morbidity and mortality and there is no statistical difference in long-term survival. Close follow-up of all FET patients is paramount.

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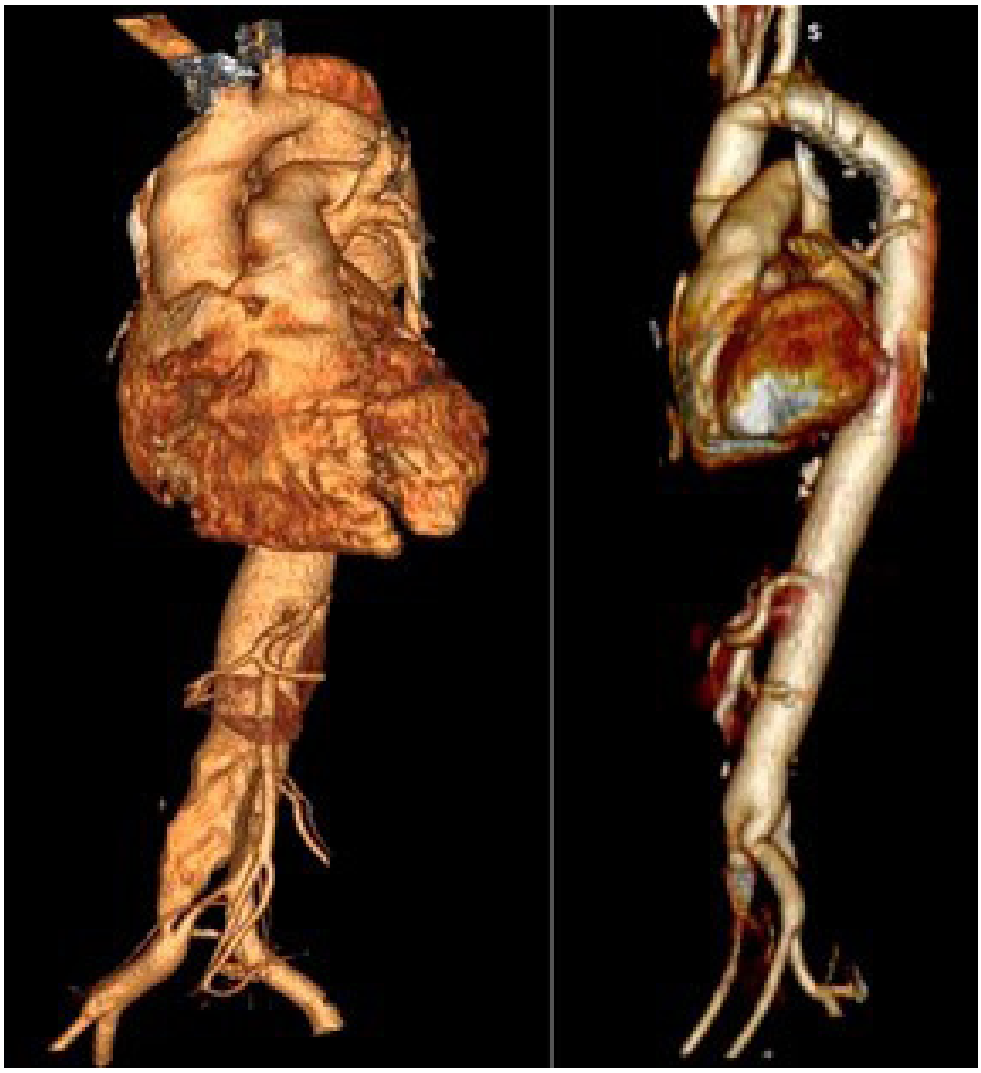
Total Aortic Replacement: Two-Stage Approach

***Alexey Skvortsov**, Eduard Charchyan, Yuriy Belov, Denis Breshenkov*
Institution where study was performed: B.V. Petrovsky Russian Research Center of Surgery, Russia

Purpose: We present our experience of staged repair of extensive aortic aneurysms

Methods: Between April 2015 and February 2018, 31 patients underwent staged replacement of the whole aorta. Twenty three patients underwent antegrade replacement of the aorta (from the aortic root to bifurcation) and eight patients - retrograde (in reversed order). Patients with antegrade replacement on the first stage underwent reconstruction on proximal aorta, and on the second stage - distal aorta.

Results: In 15 cases free-floating graft was placed from the aortic arch into the true lumen of descending aorta. Eight patients underwent the Frozen Elephant Trunk procedure at the first stage. In 23 operations for second-stage repair, 20 patients had thoracoabdominal aortic replacement, and three high-risk patient had hybrid approaches. In eight patients the thoracoabdominal aorta was repaired first, five of them underwent staged repair using the reversed elephant trunk. The average time of CPB during the first stage of surgical treatment was 134.6 ± 8.7 min, blood loss 1290 ± 370 ml, during the second stage – CPB - 82.7 ± 29.7 min, blood loss 1480 ± 540 ml. The interval between the first and second interventions was 6.2 ± 2.4 months. No case of hospital mortality was observed, one- and three-month survival after the second stage of treatment was 100%. On the CT-scans, no deformation or contrast leak was detected.



Conclusion: Staged replacement of the aorta is an effective method of surgical treatment with satisfactory early and mid-term results. An individual approach in determining the tactics of treatment in patients with extensive aortic pathology is a key point of the modern treatment.

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Prevalence of Incidentally Identified Thoracic Aortic Aneurysms: Insights for Screening Criteria

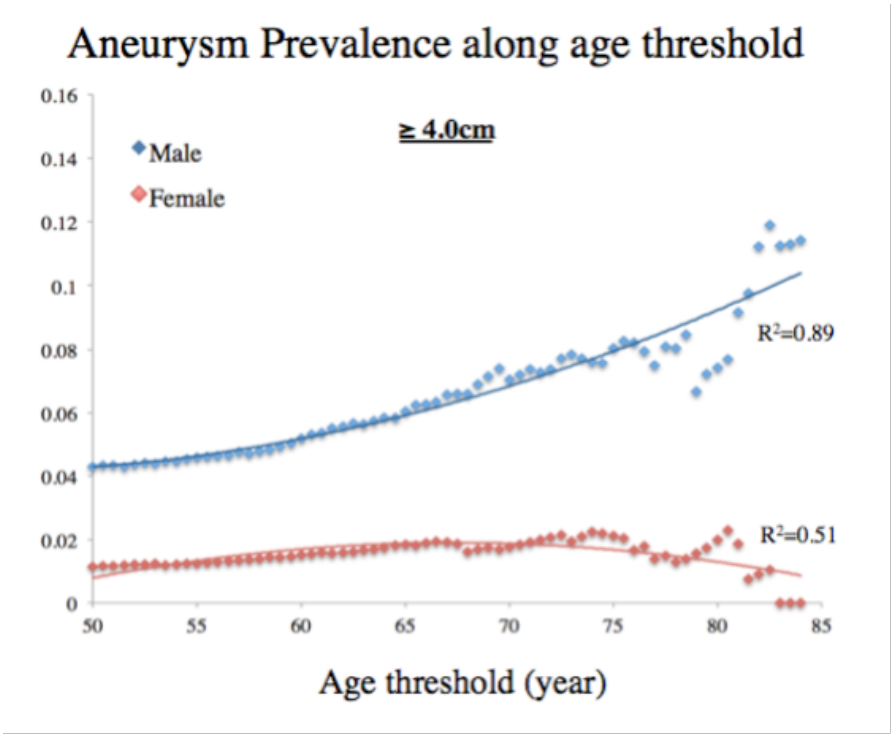
***Makoto Mori**, Arnar Geirsson, Kayoko Shioda, Syed Usman Bin Mahmood, John Elefteriades*
Institution where study was performed: Yale University School of Medicine, United States

Purpose: Screening guidelines by imaging for thoracic aortic aneurysms do not exist currently, and the prevalence and potential diagnostic yields are unknown. We aimed to evaluate the prevalence and patient characteristics of incidentally identified ascending thoracic aortic aneurysms.

Methods: A cross-sectional review of all CT chest scans obtained at tertiary care center for patients with age 18-85 years during 2016 was performed. Ascending thoracic aortic aneurysm (ATAA) was defined as thoracic aorta of diameter >3.5cm. The aneurysms were further characterized by height-indexing and size thresholds of 4.0cm, 4.25cm, and 4.5cm. Prevalence of ascending aneurysms was evaluated with stratification by age and sex. Potential diagnostic yield along the continuum of age threshold was calculated in male and female groups and the trend was evaluated by obtaining a quadratic fit to identify optimal age cutoff for screening.

Results: Of the 5,662 scans from unique patients, ATAA of size >3.5cm were detected in 134 (2.4%). Patients with aneurysms were significantly older (70.2 ± 10.0 vs. 58.3 ± 16.4 years, p < 0 .001), more likely to be male (77.6% vs. 54.3%, p < 0 .001), and more likely to be of Caucasian race (81.3% vs. 71.4%, p = 0.011). Within the population with age >50 years, the prevalence of aneurysm >3.5cm was 3.1% overall, 4.6% for males, and 1.5% for females. The diagnostic yield of aneurysm >4.5cm in females was low and the highest yield occurred at the threshold of age >73 years, with the yield of 0.5%. The highest diagnostic yield of aneurysm >4.5cm in males occurred at age >84, with the yield of 5.7%. In males, the diagnostic yield at threshold age of >50, >60, and >70 were 1.3%, 1.6%, and 2.2%, respectively.

Conclusion: ATAA was identified in 3.1% of individuals with age >50 years. In females, a clinically pertinent aneurysm was exceedingly uncommon. In males, there was an incremental increase in the diagnostic yield with age. Male patients with age >50 years may be an initial target population for CT-mediated screening.



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Minimally Invasive Aortic Arch Repair

***Denis Breshenkov**, Eduard Charchyan, Alexey Skvortsov, Yuriy Belov*
Institution where study was performed: B.V. Petrovsky Russian Research Center of Surgery, Russia

Purpose: Aortic arch surgery has undergone major changes due to the need to improve outcomes and reduce complications and mortality. New trends were introduced in the surgery of the thoracic aorta. Smaller incisions showed benefits like earlier extubation, reduced bleeding, transfusion. Our objective was to report our experience minimally invasive aortic arch repair.

Methods: We present a retrospective comparative study of surgical results minimally invasive technique (MIT) with conventional aortic arch repair. In a two-years period, 248 patients was performed aortic arch repair in our center, 21 of them through partial sternotomy, conventional group was present 134 patients. Criteria exclusion were previous surgery, concomitant surgery, high risk surgery and eldery patients. In MIT was performed 6-7 cm skin incision and J?shaped mini-sternotomy was performed in 4th right intercostal space with arterial cannulation via right subclavian artery. Venous cannulation was performed percutaneously via common femoral vein. A P value of less than 0.05 was considered significant.

Results: We used «distal first» technique with antegrade selective cerebral perfusion (ASCP): catheter is placed into left common carotid artery to obtain bilateral perfusion, allowing a mild to moderate hypothermic cardiopulmonary bypass (CPB). We included in the analysis these pathologies: acute/chronic Type I/III dissection with arch involvement, aortic arch aneurysms extending into the descending aorta. In table #1, we present pathology characteristics and perioperative data. Total arch replacement was performed in 7 cases (33,3%), FET procedure was performed in 13 (61,9%), in 1 case was performed aortic arch replacement after retrograde elephant trunk procedure. Hospital mortality was 1 patient (4,8%, p >0.05). Major complications were not observed, one patient requires re-exploration for bleeding (4,8%, p>0.05). ICU mean length of stay was 1.2±0.4 days(p =0.01). 1-years follow-up was 20 (95%, p > 0.05).

Conclusion: Minimally invasive approach is a safe and effective on pathology aortic arch. It provides reduction blood loss, ventilation time, shorter ICU stay, but increases CA and ASCP times. The early results of this strategy appear promising, but the number of patients treated so far is still limited to draw a final conclusion.

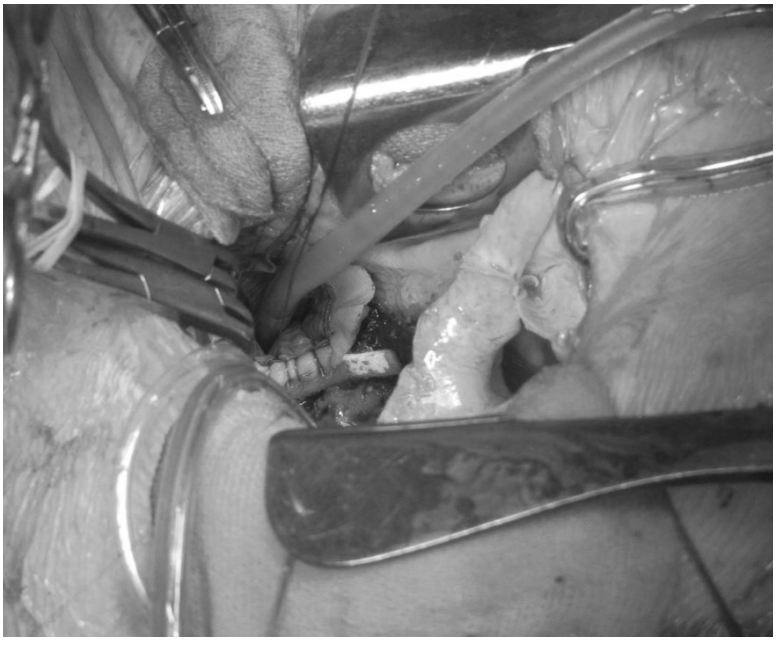

Table #1 Pathology characteristic / Perioperative data

Pathology characteristic / Perioperative data	Mini-group -21 (means ± SD/n (%)	Conventional group -134 (means ± SD/n (%)	p
Age	47±15	51,5±9,8	0.0731
Sex, male	10 [47,6%]	94 [70%]	0.0487
Body mass index, kg/m2	28,5 ± 5	26,7 ± 9	0.3730
Arterial hypertension	12 [57%]	68 [50,7%]	0.6439
Diabetes	5[23,8%]	12 [9%]	0.0580
Cardiopulmonary bypass time (min)	178 ± 38	171,4 ± 23	0.2712
Cross-clamp time (min)	116 ± 41	107 ± 17	0.0792
Antegrade selective cerebral perfusion (min)	48 ± 13	34,2 ± 7	0.0001*
Circulatory arrest (min)	53 ± 7	39,5 ± 12	0.0001*
Blood loss (ml)	900 ± 96	1158 ± 189	0.0001*
Ventilation time, h	4,3±1,9	10,2±1,3	0.0001*
Intensive care unit stay, d	1,2 ± 0,4	2,1 ± 0,8	0.0001*
In-hospital mortality	1[4,8%]	6 [4,4%]	1.0000
30-day survival	21[100%]	129 [96,2%]	1.0000
1-years follow-up	20[95%]	126 [98%]	1.0000

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Frozen Elephant Trunk Procedure in Patients With Type B Aortic Dissection and Concomitant Aortic Arch or Ascending Aortic Pathology

***Denis Breshenkov**, Eduard Charchyan, Alexey Skvortsov, Yuriy Belov*
Institution where study was performed: B.V. Petrovsky Russian Research Center of Surgery, Russia

Purpose: The choice of surgical approach for treatment extensive combined aortic lesion remains challenge. Type B aortic dissection with concomitant pathologies aortic arch or ascending aorta requires complex staged approach. We present our experience with hybrid approach using FET technique to treatment.

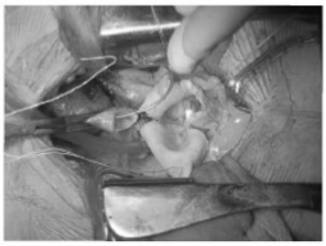
Methods: From January 2013 to June 2018, 61 patients have undergone frozen elephant trunk procedure. Of these, 16 patients had treatment for type B aortic dissection (with involvement aortic arch – 9, concomitant aneurysm ascending aorta or aortic root with AI < 2 – 13). Men age was 51,3±8,2 years, 12 patients with chronic dissection. All these patients had a median sternotomy approach, antegrade selective bilateral cerebral perfusion and circulatory arrest. Primary end points were hospital mortality, 1-year mortality. Secondary end points included complications, reintervention, and aortic remodeling.

Results: The hospital mortality was 0%, 1-year mortality was 0% and median length of stay intensive care was 15 days. Average time CPB is 166±27 min, aortic clump time – 93 ± 23 min, circulatory arrest time – 43 ± 11 min. Perioperative morbidity included one stroke, one subdural hematoma, two patients with re-exploration. Two patients required secondary aortic reintervention in follow-up time due to d SINE.

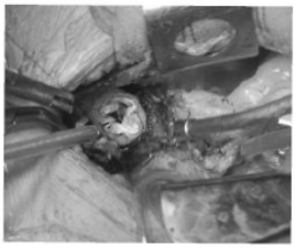
Conclusion: FET is alternative method for treatment combining the pathology of the proximal aorta with type B aortic dissection that allows one-stage radical correction. This procedure delays second stage or completely excludes it. Further monitoring of this group of patients and accumulation of experience are necessary to determine the optimal method

David procedure + FET E-Vita Open Plus 24 mm via J- ministernotomy

Aortic root aneurism

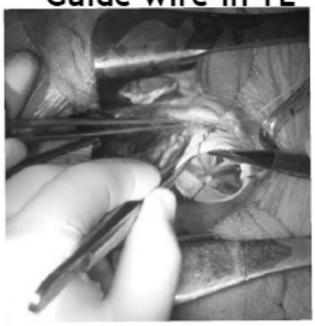


Guide wire in TL

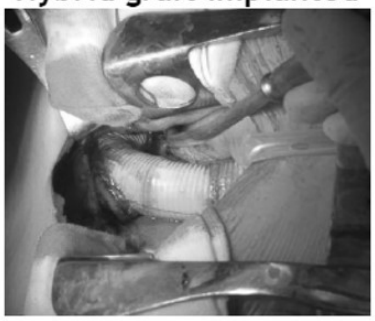


Hybrid graft implanted

Island technique



David procedure



After reconstruction

Cardiopulmonary bypass - **124 min**, Cross clamp - **107 min**
Circulatory arrest - **58 min**, MSACP time - **14 min**, BSACP time - **44 min**

Pathology characteristic / Perioperative data	**N = 16 (means ± SD/n (%)**
Age	51,3±8,2
Sex, male	11[68,5%]
IMH of ascending aorta	1 [6,3%]
Body mass index, kg/m2	28,5 ± 5
Aneurysm of ascending aorta/aortic root	13 [81,3%]
AR ≥ 3	9 [56,3%]
Arch aneurysm (d>45 mm)	9 [56,3%]
Cardiopulmonary bypass time (min)	166±27
Cross-clamp time (min)	93 ± 23
Antegrade selective cerebral perfusion (min)	38±7
Circulatory arrest (min)	43 ± 11
Blood loss (ml)	945±63
Acute renal insufficiency	2[12,5%]
Subarachnoid hematoma	1 [6,3%]
In-hospital mortality	0
30-day survival	16[100%]
1-years follow-up	16[100%]

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Evaluation of a Lidocaine-Based Whole Blood Cardioplegia Protocol in Complex Aortic Surgery Involving the Use of Deep Hypothermia and Circulatory Arrest

***Chris Rokkas**, David Joyce, Lyle Joyce, Paul Pearson*
Institution where study was performed: Medical College of Wisconsin, United States

Purpose: The purpose of this study was to retrospectively evaluate the use of a lidocaine-based whole blood cardioplegia protocol in patients undergoing complex aortic surgery involving the use of deep hypothermia and circulatory arrest and compare it to our conventional whole blood cardioplegia protocol (Table).

Methods: From May 2016 to May 2018 (24 months) we used a lidocaine-based whole blood cardioplegia protocol in 39 consecutive patients (Group I) compared with 31 patients (Group II) who received conventional whole blood cardioplegia in the preceding 28 months. Emergent operation for acute type A aortic dissection was performed in 21 Group I patients and 22 Group II patients (p = 0.144). Primary outcome measures assessed surrogate endpoints for myocardial protection: troponin release, return to spontaneous sinus rhythm and defibrillation requirements, ejection fraction, and inotropic requirements. Secondary outcome measures assessed safety and workflow by 30-day mortality, hospital stay, and transfusion requirements.

Results: Aortic root replacement and extensive aortic arch reconstruction were not significantly different in the two groups (18/33 vs 12/31, p=0.14 and 14/33 vs 5/31, p=0.8 respectively). The two groups were similar in myocardial ischemia time with 179±11 minutes (mean value ± standard error) (range: 71-300) in Group I vs 181±10 minutes (range: 90-294) in Group II (p=0.946). Circulatory arrest time was not significantly different with 56±5 minutes (range: 21-106) in Group I vs 42±3 minutes (range: 23-84) in Group II (p=0.053). Primary and secondary outcomes between the two groups were similar. Mortality was 4/33 (12.1%) in Group I and 4/31 (12.9%) in Group II (p=0.791). There was no difference in myocardial enzyme release, ejection fraction, before and after CPB between the two groups. No patient from either group required mechanical circulatory support. Return to spontaneous sinus rhythm was significantly more frequent (p < 0 .001) in Group

Conclusion: Expanding the use of a lidocaine-based whole blood cardioplegia to adult patients undergoing complex aortic surgery involving deep hypothermic circulatory arrest appears to be justified. Compared to conventional whole blood cardioplegia, it may improve workflow by utilizing fewer resources while providing safe and efficacious myocardial protection.

PROTOCOL:	STANDARD CONCENTRATE	DEL NIDO CONCENTRATE
ARREST AGENT: KCl	2 X 20 ml at 2.0 mEq/ml	2 X 20 ml at 2.0 mEq/ml
ADDITIVE AGENT	(48 ml syringe)	(60 ml syringe)
$MgSO_4$	48 ml at 0.125 gr/ml (6 gr)	6.6 ml at 50% (3.3 gr)
Mannitol		21.4 ml at 20% (5.35 gr)
$NaHCO_3$		20.6 ml at 1 mEq/ml (20.6 mEq)
Lidocaine		11.4 ml at 2% (228 mg)
ANTEGRADE INDUCTION	20 ml/kg, 1200 ml maximum	20 ml/kg, 1200 ml maximum
RETROGRADE INDUCTION	400-500 ml	400-500 ml
MAINTENANCE DOSE	10 ml/kg, 600 ml maximum	10 ml/kg, 600 ml maximum
MAINTENANCE INTERVAL	20-25 min	45-60 min
DELIVERY TEMPERATURE	4-8 °C	4-8 °C

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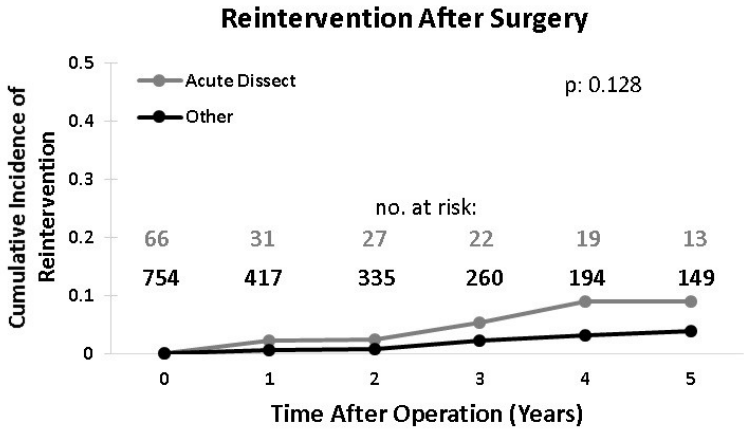
Open Repair of Acute Complicated Type B Dissection: Predictable Outcomes When Thoracic Endovascular Aortic Repair Is Ill-Advised

***Matt Wingo**, Leonard Girardi, Mario Gaudino, Jeremy Leonard, Christopher Lau, Ahmed Abhouarab, Erin Iannacone*
Institution where study was performed: Weill Cornell Medical Center, United States

Purpose: Open repair of acute complicated type B aortic dissection (ACTBAD) has been associated with significant morbidity and mortality. Thoracic endovascular aneurysm repair (TEVAR) is currently the preferred therapy. In some patients, however, complex anatomy discourages an endovascular approach. We analyzed our experience with open repair in this high-risk ACTBAD cohort.

Methods: Between May 1997 and May 2018, 820 consecutive patients underwent open repair of descending thoracic (DTA) or thoracoabdominal aneurysms (TAAA). 66 (8.04%) had open repair for ACTBAD. Outcomes for this cohort were compared to those having open repair outside the setting of ACTBAD. Logistic regression analysis was used to identify independent predictors of postoperative outcomes. Need for re-intervention and 5-year survival were calculated.



Cum. Incidence	3-Year (95% CI)	5-Year (95% CI)
Acute Dissect	5.7%(0.9-17.1%)	9.1%(2.2-22.1%)
Other	2.1%(1.0-3.9%)	3.9%(2.2-6.4%)

Results: Table 1 summarizes pre-, intra-, and postoperative results. Patients with ACTBAD were younger, had smaller aneurysms, and less involvement of the thoracoabdominal aorta. ACTBAD patients were more frequently in shock with more spinal cord ischemia upon presentation. Partial bypass was the primary surgical strategy (31/66, 46.9%). Operative mortality for ACTBAD was 7.57% (5/66) which was similar to the rest of the population 5.17% (39/754, p = 0.41). The most frequent major postoperative complications among ACTBAD patients were the need for tracheostomy (5/66, 7.6%) and new onset dialysis-dependent renal failure (2/66, 3.0%). The incidence of major adverse events (MAE) was similar between groups. Logistic regression identified female gender, urgent/emergent operation, and preoperative hemodialysis, but not ACTBAD, as independent predictors of postoperative adverse events. The need for re-intervention was 9.1% (95% CI=2.2-22.1%) at 5-years (Figure 1) and the 5-year actuarial survival was 54.3 % (95% CI 37.8-70.8%).

Conclusion: Open surgery for ACTBAD can be performed with outcomes comparable to TEVAR. The need for re-intervention and late survival both compare favorably with an endovascular approach. In patients with anatomy unsuitable for TEVAR, transfer to a high-volume open surgical aortic center should be considered.

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Preoperative Data	Acute Dissect (n=66)	Other (n=754)
Age (mean, std. dev.)*	61.9 ± 17.1	64.8 ± 14.3
Males	39 (59.1)	447 (59.3)
Smoking	50 (75.8)	574 (76.1)
Previous coronary revascularization	7 (10.6)	156 (20.7)
Hypertension	64 (97.0)	724 (96.0)
Chronic pulmonary disease	28 (42.4)	306 (40.6)
Previous stroke	10 (15.1)	118 (15.6)
Peripheral vascular disease	18 (27.3)	193 (25.6)
Diabetes	5 (7.6)	74 (9.8)
Family history of aneurysm	5 (7.6)	45 (6.0)
Renal failure	20 (30.3)	222 (29.4)
Previous cardiac surgery*	21 (31.8)	393 (52.1)
Aneurysm size, cm (mean, std. dev.)*	6.2 ± 1.4	6.9 ±1.5
Descending thoracic aneurysm*	29 (43.9)	225 (29.8)
Thoracoabdominal aneurysm*	37 (56.1)	529 (70.2)
Shock*	7 (10.6)	23 (3.1)
Emergent operation*	58 (87.9)	202 (26.8)
Preoperative spinal cord lesions*	3 (4.5)	8 (1.0)
Intraoperative Data		
Intercostal re-implantation*	17 (25.8)	320 (42.4)
Partial bypass*	31 (47.0)	199 (26.4)
Clamp and sew*	29 (43.9)	487 (64.6)
Circulatory arrest	6 (9.1)	62 (8.2)
Renal perfusion	8 (12.2)	164 (21.8)
Spinal drainage	56 (84.8)	639 (84.7)
Postoperative Data		
Operative mortality	5 (7.6)	39 (5.2)
Myocardial infarction	1 (1.5)	4 (0.5)
Stroke	0 (0.0)	6 (0.8)
Spinal cord ischemia	1 (1.5)	19 (2.5)
Tracheostomy	5 (7.6)	53 (7.1)
Renal failure requiring dialysis	2 (3.0)	40 (5.3)
Reoperation for bleeding	3 (4.5)	17 (2.3)
Logistic Regression Analysis	**OR (95% CI)**	**P Value**
Major postoperative adverse events		
Female	1.729 (1.014-2.689)	0.05
Preoperative hemodialysis	6.695 (2.195-20.594)	0.001
Aneurysm extent I	Reference	
Aneurysm extent II	2.094 (1.009-4.465)	0.039
Urgent/emergent operation	2.831 (1.286-3.941)	0.001
FEV1 ≤ 50	2.675 (1.531-4.909)	<.001
ACTBAD	0.548 (0.247-1.306)	0.223

Data presented as n (%), unless otherwise noted. OR; odds ratio, CI; confidence interval, ACTBAD; Acute complicated type-B aortic dissection
* p<.05

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Evaluating the Influence of Ascending Aortic Dilatation on Hemodynamics Using 4-Dimensional Flow MRI and Computational Fluid Dynamics

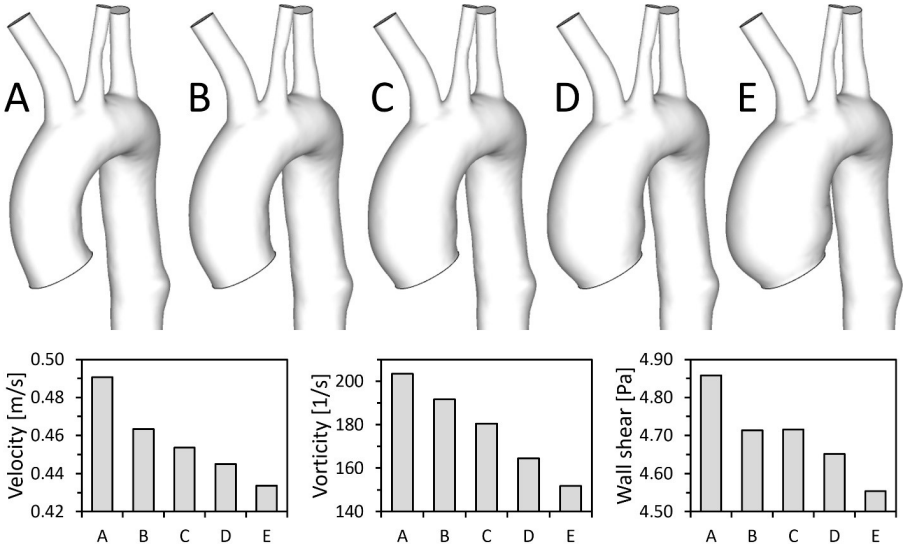
Matheus Guimaraes Carelli[1], *Sargon Gabriel*[1], *Paul Bannon*[2], *Stuart Grieve*[1], *Dmitry Shishmarev*[1], *Thomas Thong*[1], *Fraser Callaghan*[1], *David Fletcher*[3]

Institutions where study was performed: [1]Sydney Translational Imaging Laboratory, Heart Research Institute, Charles Perkins Center, University of Sydney, Australia; [2]Royal Prince Alfred Hospital, Camperdown, Australia; [3]The University of Sydney, Australia

Purpose: There is a need for better prediction of the complications of thoracic aortic aneurysms, since current markers of progressive dilation, rupture or dissection are poor. We evaluated the influence of aortic diameter on hemodynamics using MRI and computational fluid dynamics in order to identify novel flow-based biomarkers of risk.

Methods: 4D-flow and 3D-angiogram MRI datasets were acquired on a GE 3T 750W system, processed using an automated pipeline to extract: (i) an accurate personalised aortic surface, and (ii) a time-resolved aortic flow vector field measurement. Computational fluid dynamics (CFD) was performed using the vessel surface and measured inlet bulk flow for boundary conditions. The mid-ascending aorta was then progressive dilated using a scalar diffusion method to simulate enlargement over time, holding other parameters constant. CFD models were then run for each of the personalised models to measure the impact of dilatation on aortic wall shear stress (WSS), vorticity and velocity.

Results: Accuracy of the baseline CFD was confirmed by direct comparison with 4D-flow data, showing close concordance between local flow patterns and qualitative metrics. Panels A-E show the increasingly dilated appearance of the aorta, confirming the realistic outcome of our simulated progressive dilation approach. The diameter of the models increased from 30mm to 55mm in the most severe model. The bar plots illustrate the change in average hemodynamic measures. Average vorticity and velocity showed a linear decrease with increasing diameter. Velocity reduced from 49 to 43cm/s in the ascending aortic region of interest, while vorticity (a measure of structured flow) decreased by 25%. At baseline, WSS ranged from 0 to 10 Pa, with a peak systolic average of 4.8 Pa. Average systolic WSS decreased by 10% across the dilation models, however the WSS changes were complex, following a non-linear pattern and exhibiting an increasingly higher degree of spatial variation.



Conclusion: Our study validates a personalised model of aortic dilatation. Further work will generalize our approach in a larger cohort to test how baseline flow relates to the severity of haemodynamic changes following dilation. Isolation of baseline characteristics predictive of more severe flow patterns post-dilatation may relate to more rapid progression.

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Analysis and Correlation of the Expression of the Messenger RNA of the Genes of Fibrillin 1, TGFBR1, and TGFBR2 With the Aortic Diameter in a Study of Patients With Marfan Syndrome Operated in Aneurysm and/or Aortic Dissection

Myrlene Rodriguez*, Maria Elena Soto*
Institution where study was performed: Instituto Nacional de Cardiologia Ignacio Chavez, Mexico

Purpose: Deregulation in transcription of FBN1 contributes to explain the variability of the level of mRNA of FBN1 and clinical expression found in Marfan Syndrome in animal models. We investigate the expression of mRNA of the genes of FBN1, TGFBR1 and 2 in aortic tissue of Marfan patients operated due aortic syndrome.

Methods: Cohort of subjects with MS that met Ghent criteria without other connective tissue diseases, both sexes, without previous aortic surgery and candidates for aortic surgery due aortic syndrome. Controls: subjects operated of aortic pathology in which its resection included aortic tissue without connective tissue disease. Tissue was homogenized and the total RNA was extracted using the TripureTM reagent following the protocol of the “High Capacity cDNA Reverse Transcription” kit. The quantification of RNAm was evaluated in gene expression of human FBN1, human TGBR1, human TGBR2. Student’s T or Mann Whitney U were used according to the type of parametric distribution.

Results: 14 cases with MS and 10 C. All cases with> 2 criteria of Ghent, 100% with systemic score> 7/20 and 50% had hereditary family history (AHF) of the syndrome. The expression between SM subjects vs Controls of mRNA / FBN1, mRNA / TGFBR1 and mRNA / TGBR2 was (28.5) (4.9) (2.7) vs (17.84) (0.82) (2.2) respectively with p = 0.06, p = 0.03 and p = NS. The correlation of LDL with RNAmFBN1 levels was 0.62 and glucose 0.83. RNAmTGFBR2 with glucose 0.69. The correlation of mRNA levels of the three genes studied with the Systemic Score was moderate.

Conclusion: The mRNAs of the studied genes are increased in patients with MS aortic dilatation. According to the findings in aortic dilated patients it´s necessary to evaluate other possible routes, such the specific receptor for advanced glycation end products and oxysterols, evaluating their correlation with endothelial dysfunction and oxidative stress deregulation.

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Use of Open Hybrid Stent Graft Systems in Aortic Pathology: Changing Paradigms in Latin America

***Manuel Giraldo-Grueso**, Jaime Camacho, Ivonne Pineda-Rodriguez, Nestor Sandoval, Juan Umana*
Institution where study was performed: Fundacion Cardioinfantil - Instituto de Cardiologia, Colombia

Purpose: The use of open hybrid stent graft systems (E-VITA) has become an excellent option for the treatment of complex aortic aneurysm and aortic dissections. However, its use in Latin America is unpopular and the established practice is to perform just an ascending aorta limited repair.

Methods: Since February 2018, we began to use the E-VITA graft for the treatment of complex aortic aneurysms and aortic dissections at our institution. Previous to surgery, all patients were assessed by the institutional Heart Team. All the operations were performed by an experienced cardiac surgeon in a hybrid operating room using a technique of circulatory arrest, moderate hypothermia, and selective antegrade cerebral perfusion. Preoperative and postoperative variables were described according to the Society of Thoracic Surgeons database guidelines. Baseline demographics and clinical characteristics were summarized using descriptive statistics.

Results: Six patients were included in the study. Ages ranged between 66 and 67 years, five patients were male, all patients had arterial hypertension, and only one patient had diabetes mellitus. Two patients had a type A aortic dissection, and the other four had a complex ascending aortic aneurysm. Mean left ventricular ejection fraction was 54,7% (4,7). Median cross-clamp, antegrade cerebral perfusion, and cardiopulmonary bypass times were 116 (108-144), 39,2 (35-44), and 237 (224-248) respectively. After surgery, all patients were taken to the cardiac intensive care unit (CICU). Median CIUC length of stay was 6 (3-7) days and median hospital length of stay was 18 (16-23) days. No patients suffered renal failure, infection or needed reoperation during hospital stay. All patients were alive in the 30-day follow-up.

Conclusion: E-VITA grafts are safe, effective, and provides excellent short-term outcomes. Nevertheless, a bigger population is needed to make stronger conclusions. We encourage Latin American hospitals to follow this model and increase the use of E-VITA grafts for the management of complex aortic pathology.

Table 1. Preoperative, operative and post-operative variables.

Variable	n=6
Pre-Operative Variables	
Age, median (IQR)	65(66-67)
Gender, male n(%)	5 (83,3)
Arterial hypertension, n(%)	6 (100)
Diabetes Mellitus, n(%)	1 (16,7)
Type A Aortic Dissection, n(%)	2 (33,3)
NYHA >2, n(%)	1 (16,7)
EuroScore II %, mean (StD)	5,6 (7)
LVEF %, mean (StD)	54,7 (4,7)
Operative Variables	
Cardiopulmonary bypass (minutes), median (IQR)	237 (224-248)
Cerebral perfusion (minutes), mean (StD)	39,2 (35-44)
Cross clamp (minutes), median (IQR)	116 (108-144)
Post-Operative Variables	
Aricular Fibrilation, n(%)	3 (50)
CICU length stay (days), median (IQR)	6 (3-7)
Hospital length of stay (days), median (IQR)	18 (16-23)

CICU: Cardiac intensive care unit, IQR: interquartile range, LVEF: Left ventricular ejection fraction StD: Standard deviation.

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AORTIC ROOT

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Direct True Lumen Cannulation for Aortic Dissection: A Short Experience

***Syed Shahabuddin**, Shahid Sami*
Institution where study was performed: Aga Khan University Hospital, Pakistan

Purpose: Surgery for ascending aortic dissection has remained a challenge for cardiac surgeons. Various approaches have been used to achieve arterial flow including femoral, axillary and ascending aorta into false or true lumen. We share our experience of 10 cases where we adapted the technique of direct true lumen cannulation.

Methods: All patients undergoing surgical repair of Type-A Aortic Dissection by utilizing the technique of direct true lumen cannulation from January 2012 to-December 2018 were reviewed. Surgical Strategy After entering the chest and full heparinization right atrial cannulation was performed. CO2 was insufflated. Patient was put in trendlenberg position, heart drained to achieve transient hypotension. Ascending aorta was opened in the middle and true lumen identified. The aortic cannula, already connected and primed, inserted into true lumen under direct vision and snugged and secured.. Cardiopulmonary bypass established and cooling started. Rest of the procedure completed in routine fashion.

Results: There were 10 patients. The age range was 25 to 60 years. Six patients underwent Aortic root replacement three of them also required graft to right coronary. In four patients aortic valve was resuspended and ascending aorta was replaced. One of them required AVR for Aortic regurgitation on TOE after coming off bypass. The mean CPB, Aortic cross clamp and circulatory arrest time were 237, 142 and 35minutes respectively. One patient died. Nine patients discharged home without any neurological complications or significant morbidity and followed up in the outpatient clinic.

Conclusion: Direct true lumen cannulation ensures antegrade perfusion to brain and other organs through true lumen. It is a viable alternative to other methods and the expertise and experience with the procedure makes it as good as other options.

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Aortic Valve-Sparing Operations: Our 7-Year Experience

***Lizeth Saldana**, Alberto Quintero, Cesar Avalos, Jose Escobar Matallana, Juan Jaramillo, Juan Rendon*
Institution where study was performed: Clinica Cardiovid, Colombia

Purpose: Aortic valve sparing operation is an alternative to aortic valve replacement in patients with aortic root aneurysm almost normal aortic cusps. The objective is to analyze the early and long-term outcomes of aortic valve sparing operations.

Methods: Retrospective observational study that describes outcomes at 30-day outcomes and 7-year follow up. Between June 2010 to May 2017 a total of 73 patients (60 men; median age: 54 years) underwent aortic valve sparing operations: remodeling or reimplantation technique.

Results: The aortic root aneurysm was associated with Marfan syndrome in 5 (6.8%) patients; bicuspid aortic valve in 13 (17.8%) patients, type A aortic dissection in 16 (21.9%) patients, and with moderate to severe aortic regurgitation in 64 (87.7%) patients. Reimplantation technique was performed in 45 (61.6%), with replacement of aortic arch/hemiarch in 13 (17.8%). In 28 (38.4%) remodeling technique was performed. Median intensive care unit and hospital stays were 3 days and 12 days, respectively. Reinterventions due to bleeding 11 (15.1%). Nine (12.3%) patients had stroke or transient ischemic attacks. In-hospital mortality was seven deaths (9.59%) and one (1.4%) patient died during follow up. Mean follow up was 22 months, with a survival rate of 89.04% (65 of 73) survival. One (1.4%) patient, developed infective endocarditis of aortic and mitral valve native and underwent reoperation.

Aortic Valve Sparing Operations	N=73
Demographic Data	
Age (year, mean ± SD) range	54.45 ± 14.94 (14-82)
< 40 y, n (%)	10 (13.7)
40-60 y, n (%)	36 (49.3)
>60 y, n (%)	27 (36.9)
Male (n, %)	60 (82.2)
Operations performed	
**Aortic valve reimplantation, n (%)	45 (61.6%)
With Replacement of aortic arch/hemiarch	13 (17.8%)
Graft sixe, mm, mean ± SD	32 ± 2.2
**Remodeling of the aortic root, n (%)	28 (38.4)
- Aortic cusp plication, n (%)	2 (2.7)
- Resuspension of commissures, n (%)	13 (17.8)
- Replacement of the ascending aorta with a tubular Dacron graft (Supracoronary tube) isolated, n (%)	7 (9.6)
- Reconstruction of aortic sinuses, n (%)	6 (8.2)
Associated procedures	
* Mitral valve repair, n (%)	5 (6.84)
* Coronary artery bypass, n (%)	6 (8.21)

Conclusion: The aortic valve sparing operations has excellent clinical results. Young adults might benefit with this type of procedures. It reduces the complications associated with valvular replacement and produces a favorable impact on the lifestyle of patients.

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Aortic Valve Preservation as a Routine and Durable Procedure for Aortic Root Disease and Valve Regurgitation: Initial Experience and Long-Term Follow-Up

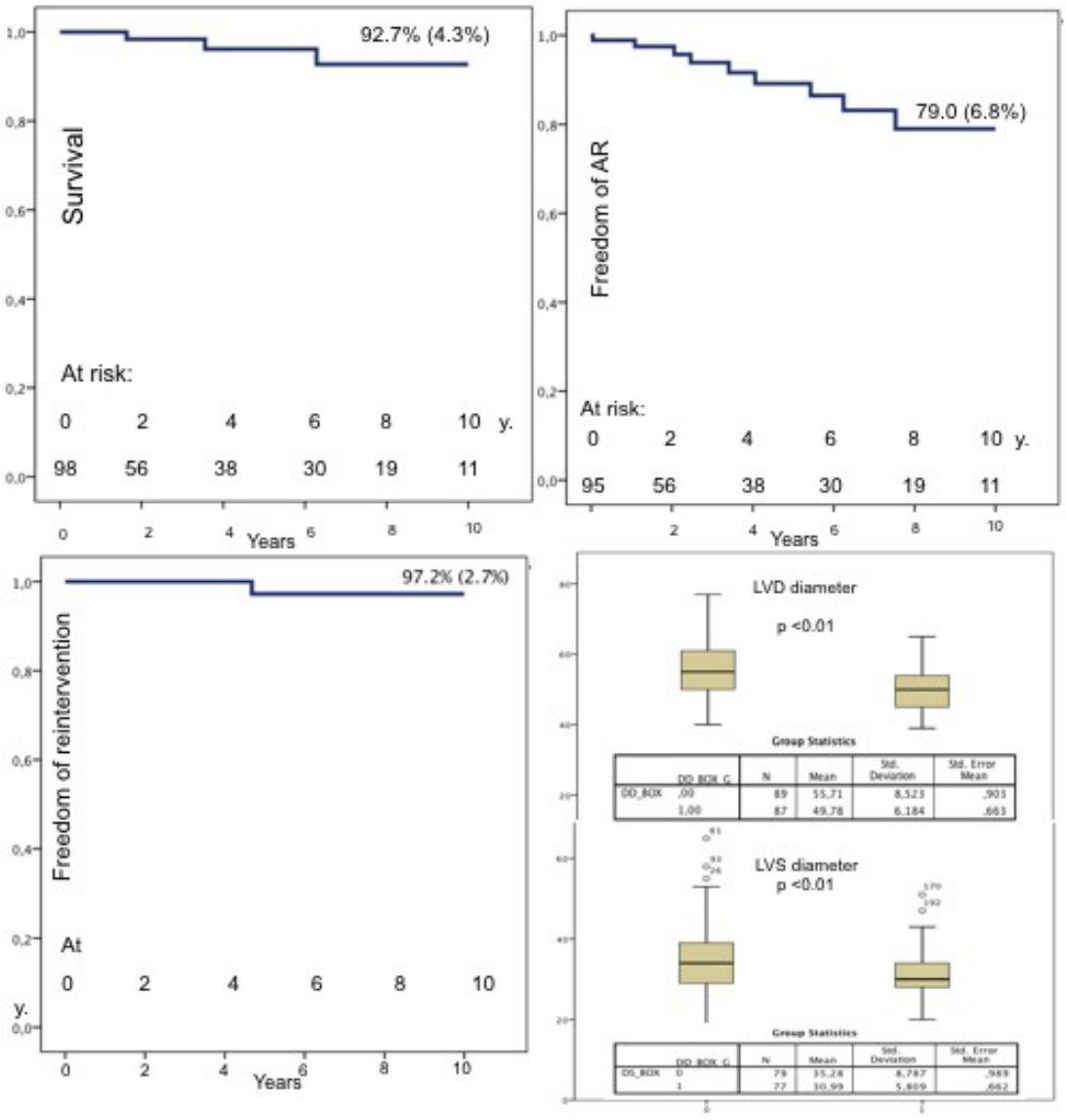
***Fernando Piccinini**, Adriana Aranda, Juan Vrancic, Mariano Camporrotondo, Juan Espinoza, Daniel Navia*
Institution where study was performed: Instituto Cardiovascular de Buenos Aires, Argentina

Purpose: Patients with aortic root aneurysm, independently of aortic valve compromise, are usually treated with a composite replacement of the aortic valve and ascending aorta with a conduit containing a valve, either tissue or mechanical. A review was conducted to determine the feasibility, safety and long-term effectiveness of aortic valve preservation techniques.

Methods: Between 2000 and 2017, 442 patients were referred to aortic surgery due to aortic aneurysm. Aortic stenosis or dissection, endocarditis and previous aortic surgery excluded, we enrolled 98 patients with aneurysm and variable aortic regurgitation in a valve preservation intention to treat group, previously evaluated with TEE and MSCT. Operative technique was selected based on ElKhoury´s classification: standardized Reimplantation or Remodeling procedures (initially to surgeon preferences, and lately based on aortic annulus diameter) were performed for Type Ib-Ic disease, and isolated aortic graft for Type Ia. Additional treatment of valve leaflets based on surgical finding, results assessed with introp TEE after correction defects. Prospective follow-up with clinical review and echo at discharged, 6 months and annually.

Results: Mean age 54 ± 15.5 years, male 71%, Marfan syndrome 8.2%, coronary disease 8.2 %. low ejection fraction 10%, median LVDD 55 ±8.5mm,LVSD 35± 8.8, median root diameter 49 ± 8.4 mm, median aorta diameter 53± 12 mm, bicuspid 25%, prolapse 26%, moderate/severe AR 78%.Reimplantation 67%, Remodelling 14.5%, Isolated graft 18.5%. Additional cusp repair 58% of cases,Clamp time 148 ±43 min, pump time 172 ± 47 min. Residual AR grade 0/1 91.8%, Grade 2/3 8.2%, conversion 3 %. Complications: AFib 19%, inotropes >24hs 18%, Bleeding Redo 3.2%, Pacemaker 3.2%, Stroke 1.1%, Mortality 1.1%.The mean follow-up was 1574 days (pc25-pc75, 407-2700),100% complete.There were 4 late death. Survival at 10 years was 92.7%. Moderate AR 6 patients, and severe in 4. Freedom from moderate or severe AR was 79% at 10 years. Identified predictors for progression were calcification degree and residual AR 2+. Reoperation, 2 patients.Freedom from Redo 97,2% at 10 years. LV diameters improved and all survivors in NYHA class 1, regardless AR degree.

Conclusion: Aortic valve preservation as treatment for patients with aortic aneurysm is feasible, and concomitant treatment of aortic valve itself may complement root correction. Procedure is safe and associated with excellent long-term survival and low rates of valve-related complications. Grade 2+ residual AR and valve calcification may influence late results.


92.7% (4.3%)
Survival
At risk:
0 2 4 6 8 10 y.
98 56 38 30 19 11
Years
79.0 (6.8%)
Freedom of AR
At risk:
0 2 4 6 8 10 y.
95 56 38 30 19 11
Years
97.2% (2.7%)
Freedom of reintervention
At
0 2 4 6 8 10
y.
Years
LVD diameter
p <0.01
Group Statistics
LVS diameter
p <0.01
Group Statistics

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Mini-Bentall With Central Cannulation: Are the Results Worth the Risks?

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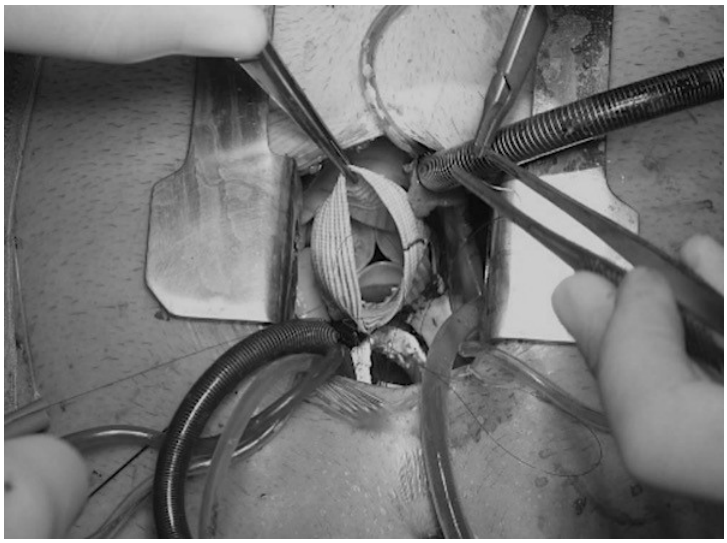
Purpose: Upper "j" ministernotormy has become a routine approach for surgical aortic valve replacement but it has been rarely used for complex aortic procedures. We describe our experience with the mini-Bentall procedure, using in most cases complete central cannulation through a very limited ministernotomy.

Methods: From January 2010 to June 2018, 83 patients (mean logistic EuroScore 9.06) underwent elective Bentall De Bono procedure for ascending aorta and aortic valve replacement through a minimally invasive upper "j" ministernotmy from the notch to the 3rd right intercostal space using a self-sewed bioconduit (aortic bioprostesis directly sutured using polypropylene running sutures to a Gelweave Valsalva graft - VascutekTerumo, Glasgow, Scotland, United Kingdom or Maquet Cardioroot - Maquet, Rastatt, Germany) or a standard mechanical conduit. Complete arterial and venous cannulation for CPB implantation were used in the majority of cases. Exclusion criteria: aortic valve active endocarditis, reoperation, acute type A dissection, and concomitant cardiac procedures.

Results: All patients underwent a successful mini-Bentall procedure with a self-sewed conduit or a standard mechanical one. No conversion to full sternotomy was required. Perioperative results: median cardiopulmonary bypass time 85 (73-103) min; median cross-clamp time 72 (61-89) min; prolonged mechanical ventilation (>96hrs) < 2 %; in-hospital stay 10,5 days; 30-days mortality 0%.



Conclusion: Our experience confirms that minimal invasiveness can be successfully achieved also in Bentall procedures. In high volume centers, a partial upper "J"-shaped sternotomy could be an attractive and safe alternative for selected patients affected by complex aortic root pathology.

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Use of del Nido Cardioplegia in Aortic Root Surgery: Safety and Efficacy Compared to Other Cardioplegia

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Purpose: To compare mortality and postoperative inotropic requirements in patients receiving different cardioplegia solutions for aortic root surgery at our institution between 2002 and 2017.

Methods: Patients undergoing aortic root surgery between 2002 and 2017 were divided according to the type of cardioplegia used (Histidine-Tryptophan-Ketoglutarate (HTK), Blood Cardioplegia (BC) and Del Nido (DNC)). Pre-, peri-, and post-operative data were analyzed using Kruskal Wallis, Chi square, and Fisher´s exact tests. A multinomial logistic regression analysis was performed to calculate the relative risk of mortality between groups while controlling for pre and intra-operative variables.

Results: 352 patients were included (Valve-sparing aortic root replacement n=91, modified Bentall n=261): 63 received DN, 80 HTK, and 209 BC. There were statistically significant differences between groups in preoperative variables for diabetes mellitus, previous cardiac procedures, pulmonary artery systolic pressure, presence of more than moderate aortic insufficiency and type of admission. Median cross-clamp times were 131 for HTK, 148 for BC and 151 for DNC (p=0.015). There was no statistically significant difference in mortality between DN group and BC group or BC + HTK when controlling for preoperative variables (p=0.92). There was a significant difference in the postoperative use of norepinephrine between DN and BC in the univariate analysis.

Conclusion: These results support our theory that DNC is as safe as BC and HTK in aortic root surgery, providing more convenient dosing intervals with no difference in mortality. Even in the presence of long cross-clamp times. Further prospective evidence is warranted.

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	HTK (n=80)	BC (n=209)	DNC (n=63)	p-value
Male, n (%)	65 (81.2)	173 (82.8)	52 (82.5)	0.954
Age, median (IQR)	58 (43-67)	58 (48-67)	59 (50-66)	0.812
Diabetes Mellitus, n (%)	1 (1.2)	7 (3.3)	7 (11.1)	0.012
Previous Cardiac Procedure, n (%)	11 (13.7)	20 (9.6)	14 (22.2)	0.03
Left Ventricular Ejection Fraction <50%, n (%)	28 (37.8)	64 (34.2)	28 (45.9)	0.26
Aortic Insufficiency > moderate, n (%)	51 (36.7)	157 (75.1)	38 (60.3)	0.032
Type of Admission, n (%)				0.027
Elective	35 (43.7)	88 (42.1)	18 (28.6)	
Urgent	29 (36.2)	99 (47.4)	33 (52.4)	
Emergent	16 (20)	22 (10.5)	11 (17.5)	
Salvage	0	0	1 (1.6)	
Procedure, n (%)				<0.0001
VSARR	8 (10)	75 (36)	8 (13)	
Bentall	72 (90)	134 (64)	55 (87)	
Cross Clamp time, n (%)	131 (118-157)	148 (127-169)	151 (124-185)	0.015
POP Stroke, n (%)	6 (7.5)	7 (3.3)	3 (4.8)	0.301
Noradrenaline hours, mean (SD)	22.5 (22)	10.5 (22)	15.6 (21.5)	0.004
30 day mortality	**RRR**	**Standard Error**	**p-value**	**95% CI**
DNC vs. HTK+BC	0.91	0.86	0.92	0.14-5.83

BC: Blood Cardioplegia, DNC: Del Nido Cardioplegia, HTK: Histidine-tryptophan-ketoglutarate Cardioplegia, IQR: Interquartile Range, POP: Postoperative, VSARR: Valve Sparing Aortic Root Replacement, CI: Confidence Interval, RRR: Relative Risk Ratio.

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Activation of Interstitial Cells and Remodeling of Extracellular Matrix in Aortic Valve Stenosis

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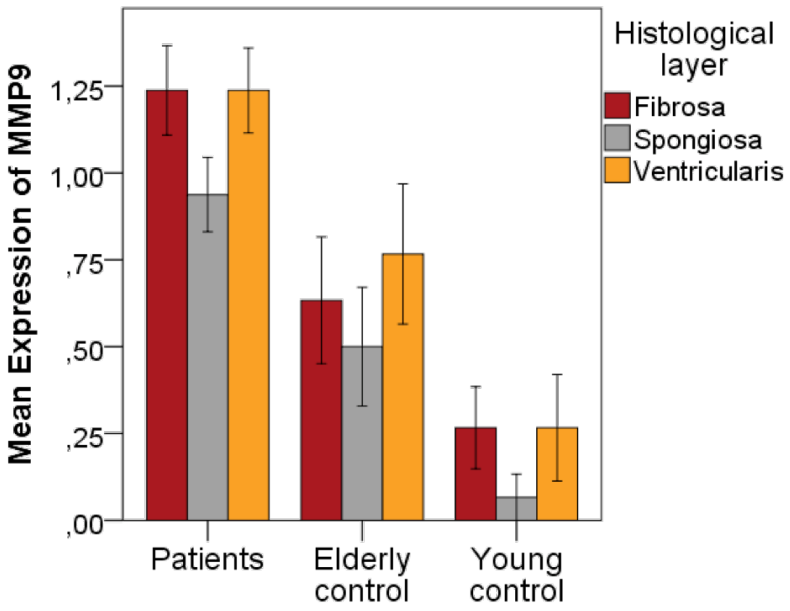
Purpose: Aortic stenosis is the most common cause of aortic valve replacement. The primary cell types in the aortic valve are valvular endothelial and interstitial cells (VICs). Abnormal aortic valve function likely results from extracellular matrix (ECM) remodeling associated with the disequilibrium between the synthesis of ECM components and their degradation.

Methods: 20 patients undergoing aortic valve replacement were selected and compared with 11 control samples. By immunohistochemistry we analyzed cell phenotypes, using antibodies to alpha smooth muscle actin (alpha-SMA) and CD34, and the expression of matrix metalloproteinase-9 (MMP-9). Semiquantitative estimation of immunopositive cells was performed.

Results: Expression of alpha-SMA by activated VIC was more prominent in stenotic valves compared with control valves ($p < 0.001$). CD34+ interstitial cells were found mainly in fibrosa and spongiosa layers. We observed progressive reduction of CD34 expression in the VIC in patients, compared to controls ($p < 0.001$). The expression of MMP-9 was more marked in stenotic valves compared with control valves ($p < 0.001$). We found that the source of the MMP-9 is activated VIC and mononuclear leukocytes.

Conclusion: Activated VICs express alpha-SMA as respond to pathology. Furthermore, in the ventricular layer the VICs possess greatest capacity to differentiate into myofibroblasts. The expression of MMP-9 by activated VICs and mononuclear leukocytes was increased in stenotic valves suggesting the contribution of ECM remodeling in the pathogenesis of aortic valve stenosis.



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Arterial Stiffness in Patients Undergoing General Anesthesia for Aortic Valve Replacement

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Purpose: Arterial stiffness (AS) has been proposed as a cardiovascular risk marker. However, little is known about the behavior of AS during general anesthesia. Hence, we described the changes of AS in patients who underwent an aortic valve replacement with general anesthesia at our institution.

Methods: From August 2017 to May 2018, we measured AS parameters (pulse wave velocity (PWV), aortic augmentation index (Aortic Aix), brachial augmentation index (Brachial Aix), and central systolic blood pressure (cSBP)) with an oscillometric method (Arteriograph®, Tensiomed) to patients with severe aortic stenosis. The measurements were recorded one day before surgery (preOP measurement) and 10 minutes after anesthetic induction (anesthesia measurement). All patients underwent general anesthesia with sevoflurane guided by mean alveolar concentration. Baseline demographics and clinical characteristics were summarized using descriptive statistics. With a Wilcoxon test, we compared preOP and anesthesia AS measurements. A significance level of 0.05 was used.

Results: Fifty patients were included in the study. Median age was 70 years (57-52). Forty (80%) patients had arterial hypertension and ten (20%) had diabetes mellitus. Peak gradient and mean gradient were 92 mmHg (78-102) and 53 mmHg (42-53) respectively. Median Euroscore was 2,08% (1,3-6,1). PreOP AS measurements were the following: PWV 10m/s (8,7-11), aortic aix 55% (51-66), brachial aix 39% (30-45), and cSPB 136mmHg (120-151). The AS anesthesia measurements were PWV 7,5m/s (6,1-8,3) (p = 0,002), aortic aix 22% (29-55) (p = 0,001), brachial aix 1,7% (-9-3,6) (p = 0,001), and cSPB 113 mmHg (100-149) (p = 0,006) (Table. Figure).

Conclusion: Pathological AS was found in patients with severe aortic stenosis. AS improved dramatically during general anesthesia, this behavior could be related to vascular health. These results could have great implications in the behavior of hemodynamic variables during perioperative and postoperative periods. Further investigation is needed to create stronger conclusions.

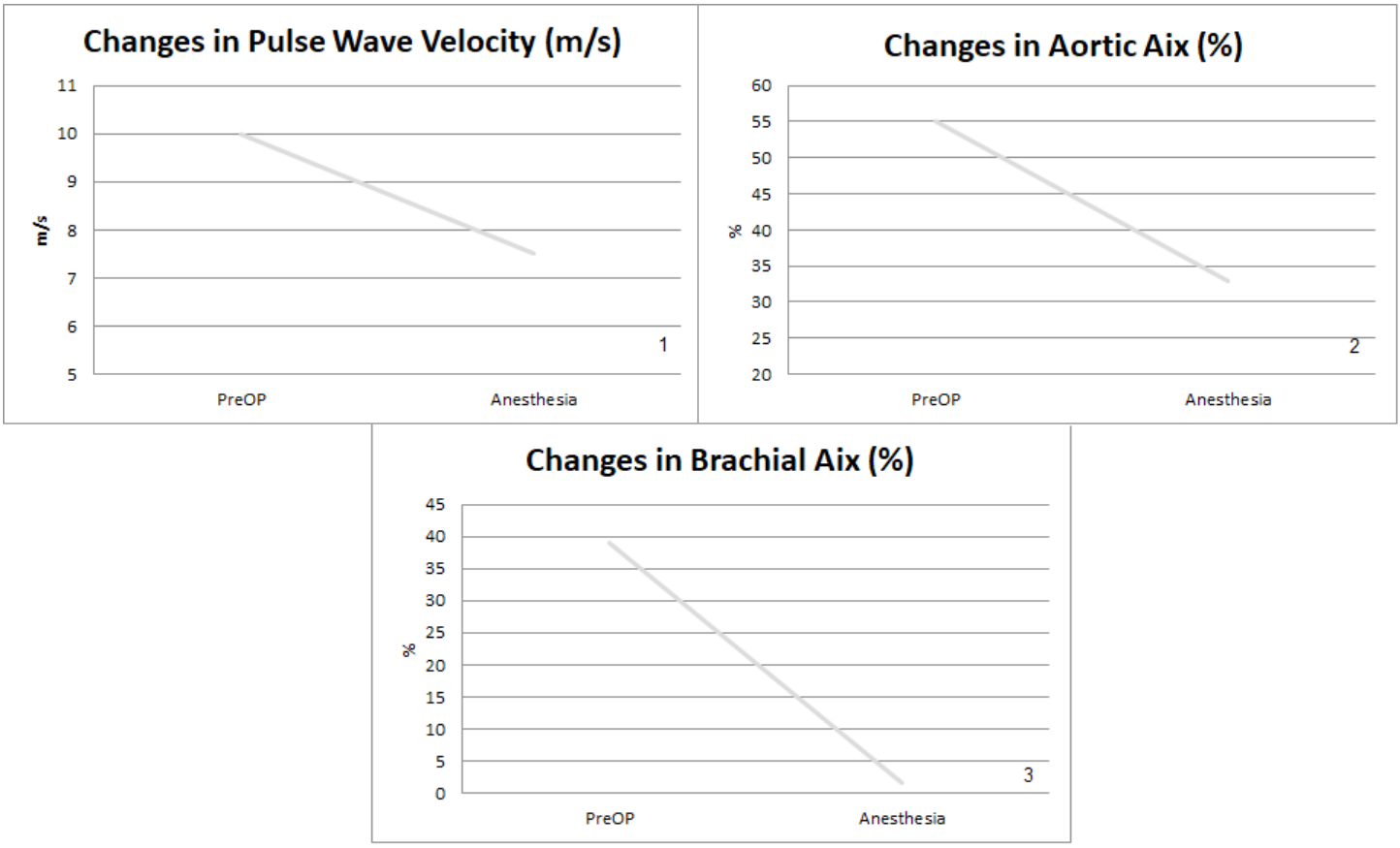

Figure. *Image 1.* Illustrates the changes in pulse wave velocity. *Image 2.* Illustrates the changes in brachial Aix. *Image 3.* Illustrates the changes in Aortic Aix.

Variable	PreOP	Anesthesia	*p*
Pulse Wave Velocity (m/s)	10 (8,7-11)	7,5 (6,1-8,3)	0,002
Aortic Aix (%)	55 (51-66)	33 (29-55)	0,001
Brachial Aix (%)	39 (30-45)	1,7 (-9-3,6)	0,001
Central Systolic Blood Pressure (mmHg)	136 (120-151)	113 (100-149)	0,006

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Does Arterial Stiffness Improve After Surgical and Percutaneous Management of Severe Aortic Stenosis?

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Purpose: Arterial stiffness (AS) is a cardiovascular risk marker and it has been described as an independent predictor of cardiovascular mortality. However, is still unknown if patients with severe aortic stenosis can improve AS parameters after a transcatheter aortic valve replacement (TAVR) or a surgical aortic valve replacement (SAVR).

Methods: From August 2017 to May 2018, we measured AS parameters (pulse wave velocity (PWV), aortic augmentation index (Aortic Aix), and brachial augmentation index (Brachial Aix)) with an oscillometric method (Arteriograph®, Tensiomed) to patients with severe aortic stenosis. AS measurements were recorded one day before intervention (pre-intervention) the day before hospital discharge (early post-intervention) and 3 months after the valve replacement procedure (late post-intervention). Baseline demographics and clinical characteristics were summarized using descriptive statistics. With a Friedmann test we compared AS measurements and with a t-test, we compared the AS values of TAVR and SAVR patients.

Results: Forty-two patients were included in the study. Seventeen (40%) underwent a TAVR and 25 (60%) a SAVR. Median age for all patients was of 72 years (62-82), ten (23,8%) patients had diabetes mellitus, and 32 (76,2%) had arterial hypertension. Pre-intervention PWV was 9,9 m/s (9,5-10,6), Aortic aix 57.3% (50-67,3), and Braquial aix 42.7% (28,8-67,3). Early post-intervention measurements were PWV 9,4 m/s (8,7-10,3), Aortic aix 28,4% (7,5-39,2), and Braqual aix -14,8% (-54,7-11,4). Late post-intervention measurements were PWV 8,8 m/s (8,2-9,9) (p = 0,009), Aortic aix 29,6% (20-52,4) (p = < 0,001), and Braqual aix -1,5% (-18,3-32,4) (p = < 0,001) (see Table). We compared SAVR vs. TAVR patients, were TAVR patients were older (p = 0,001), had less hospital infections (p = 0,029), and bleeding reoperations (p = 0,049). However, in both groups the AS parameters improve after the percutaneous or surgical interventions. No difference was found between groups in the matter of pre-intervention, early and late post-intervention AS measurements (see Figure).

Conclusion: To the best of our knowledge, these are amongst the first results in this area. AS improved after percutaneous and surgical interventions, this improvement could be related to a healthy vascular reserve. Is still unknown if post-intervention pathologic AS measurements could be link to inferior short and long-term outcomes.

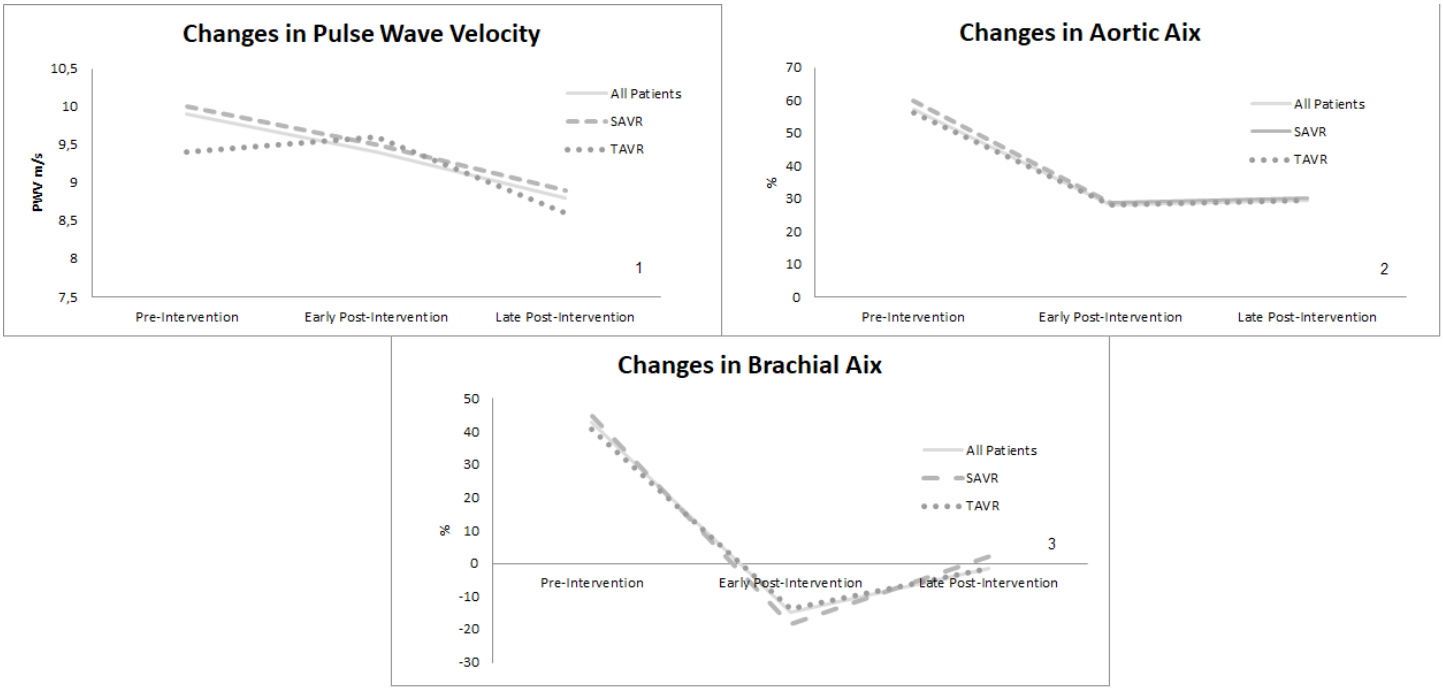

Figure 1.Image 1. Illustrates the changes in pulse wave velocity; all patients are shown with a continuous line, SAVR patients with a dashed line, and TAVR patients with a dotted line. **Image 2.** Illustrates the changes in aortic aix; all patients are shown with a continuous line, SAVR patients with a dashed line, and TAVR patients with a dotted line. **Image 3. I**llustrates the changes in brachial aix; all patients are shown with a continuous line, SAVR patients with a dashed line, and TAVR patients with a dotted line.

Table 1. Changes in arterial stiffness measurements.

Variables	Pre-Intervention	Early Post-Intervention	Late Post-Intervention	*p*-value
Systolic Arterial Pressure (mmHg)	135 (124-144)	114 (105-133)	130 (116-144)	**<0,001**
Diastolic Arterial Pressure (mmHg)	71,5 (66,7-80,2)	64 (54,2-75)	75 (67-83)	**<0,001**
Mean Arterial Pressure (mmHg)	93 (85-99,2)	85 (73,2-91)	94 (85-103)	**<0,001**
Pulse Pressure (mmHg)	63,5 (54,7-71,7)	55,5 (45,5-71)	58 (49-68)	0,446
Brachial Aix (%)	42,7 (28,8-61,2)	-14,8 (-54,7-11,4)	-1,5 (-18,3-32,4)	**<0,001**
Aortic Aix (%)	57,3 (50-67,3)	28,4 (7,5-39,2)	29,6 (20-52,4)	**<0,001**
Pulse Wave Velocity (m/s)	9,9 (8,5-10,6)	9,4 (8,7-10,3)	8,8 (8,2-9,9)	**0,009**
cSAPc (mmHg)	137 (123-146)	113,7 (99,9-125,9)	125,9 (114-150)	**<0,001**
cDAPc (mmHg)	65,4 (49,8-75,5)	52,1 (40-67,1)	59,4 (50,7-73)	**0,019**

cDAP: Central diastolic artery pressure.
cSAP: Central systolic artery pressure

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Transcatheter Aortic Valve Replacement in Patients With Low-Gradient Aortic Stenosis

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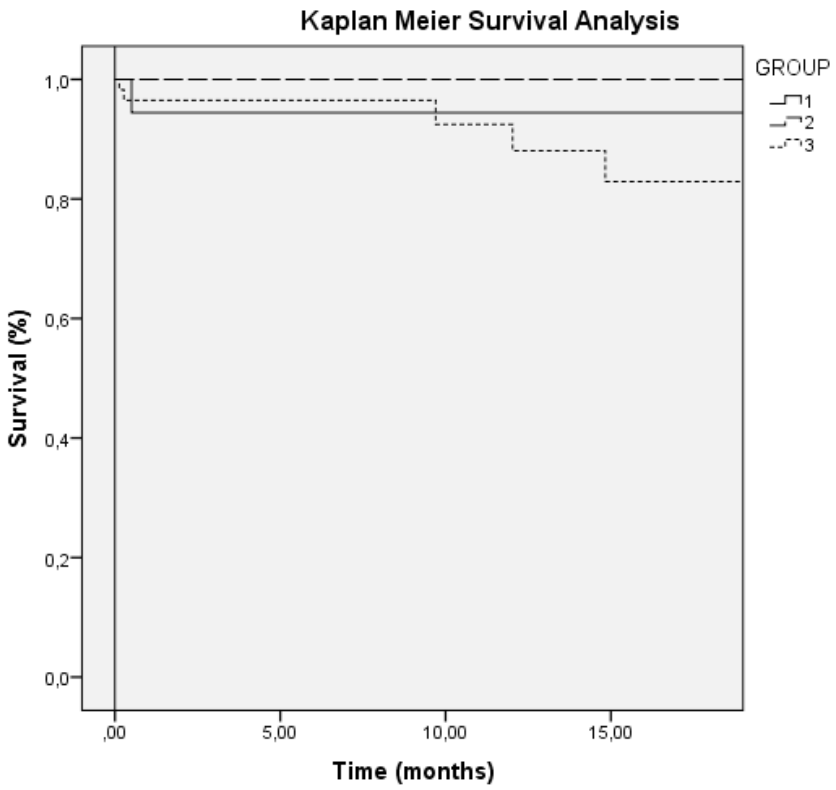
Purpose: Transcatheter aortic valve replacement (TAVR) is an acceptable alternative to surgery in patients with severe aortic stenosis. Studies have suggested that patients with a reduced left ventricular ejection fraction (LVEF) and low aortic valve gradient have worse short and long-term outcomes.

Methods: Between 2009 and 2017, 112 patients underwent a TAVR due to aortic stenosis at our institution. Patients were identified through an institutional cardiac surgery database. Previous to TAVR, all patients were assessed by the institutional Heart Team. Patients were classified into three groups according to the ESC/EACTS Valvular Guidelines. Group I (low gradient and LVEF 50%), and group III (high gradient). Endpoints assessed were short and long-term mortality, follow-up LVEF and aortic regurgitation (AR). A significance level of 0.05 was used throughout the analysis.

Results: Amongst all patients, 26 were categorized in group I, 18 in group II, and 68 in group III.. Mean age was 78.5 years and 56.6% of the patients were male. Statistical difference was found in pre-intervention variables such as atrial fibrillation (p = 0,036), previous valve replacement (p = 0,008), and renal failure (p = 0,04). Pre-intervention LVEF for group I was 33,3% (10,1) group II 57,8% (5,9) and group III 50,6% (12,5) (p = < 0,001). Valve prosthesis sizes for group I, II and III were 27,1 (2,5), 24,7 (1,8), and 25,8 (2,2) (p = 0,002) respectively. Only three patients died in the operating room, two from group III and one from group I. In the long-term follow-up, we found an improvement in LVEF, 47,4% (9,7) for group I, 59,4% (5,8) for group II, and 52,3% (13,6) for group III (p = 0,777). No differences were found regarding long-term mortality and AR (Table)



Conclusion: TAVR patients with low valve gradients and compromised LVEF are considered as high-risk. With effective and meticulous patient selection at our institution, we achieved results comparable to those reported worldwide. Clinical follow-up, effective patient selection, and the creation of an institutional Heart team, are key points in a TAVR program.

Table 1. Group variables.

Variables	Grup I n=26	Grup II n=18	Grup III n= 68	*p* value
Demographic Variables				
Age, mean (StD)	76,2 (10,3)	80,1 (8,4)	79,1 (7,5)	0,222
Weight kg, mean (StD)	74,2 (10,7)	69,6 (21,1)	65,2 (15,3)	**0,039**
Height cm, mean (StD)	166,1 (6,6)	158,4 (13,1)	161,8 (9,7)	**0,032**
Gender female n, (%)	9 (34,6)	9 (50)	31 (45,6)	0,532
Hypertension, n (%)	16 (61,5)	13 (72,2)	39 (57,4)	0,515
Use of pacemaker, n (%)	4 (11,5)	2 (5,6)	2 (2,9)	0,254
Coronary Artery Disease, n (%)	13 (50)	8 (44,4)	27 (39,7)	0,499
Number of vessels				0,861
1 vessel, n (%)	5 (19,2)	3 (16,7)	9 (13,2)	
2 vessels, n (%)	3 (11,5)	2 (11,1)	11 (16,2)	
3 vessels, n (%)	5 (19,2)	3 (16,7)	7 (10,3)	
Previous PCI, n (%)	9 (34,6)	4 (22,2)	16 (23,5)	0,508
Previous cardiac surgery, n (%)	5 (19,2)	6 (33,3)	11 (16,2)	0,265
Previous CABG, n (%)	5 (19,2)	4 (22,2)	9 (13,2)	0,576
Previous SAVR, n (%)	2 (7,7)	5 (27,8)	3 (4,4)	**0,008**
Previous Valvuloplasty, n (%)	2 (7,7)	0 (0,0)	1 (1,5)	0,184
Previous Stroke, n (%)	0 (0,0)	2 (11,1)	3 (4,4)	0,214
Peripheral vascular disease, n (%)	3 (11,5)	2 (11,1)	1 (1,5)	0,076
COPD, n (%)	8 (30,8)	5 (27,8)	22 (32,4)	0,931
Renal Failure in Dyalisis, n (%)	3 (11,5)	0 (0,0)	1 (1,5)	**0,04**
Risk Scores				
EuroScore	7,3 (4,9)	6,6 (5,2)	4,5 (4,0)	0,161
STS	6,4 (4,5)	5,7 (3,5)	6,1 (4,0)	0,834
Pre-TAVR Imaging				
Echography				
LVEF %, mean (StD)	33,3 (10,1)	57,8 (5,9)	50,6 (12,5)	**<0,001**
Peak gradient, mmHg, mean (StD))	53 (25,1)	54 (8,2)	87 (19,9)	**<0,001**
Mean gradient, mmHg, mean (StD)	29,9 (7,8)	33,4 (5,0)	54,1 (12,1)	**<0,001**
Valvular size, cm2, mean (StD)	0,82 (1,1)	0,54 (0,3)	0,54 (0,2)	0,103
Previous AR, n (%)				**0,037**
Trace	9 (34,6)	1 (5,6)	19 (27,9)	
Mild	6 (23,1)	5 (27,8)	18 (26,5)	
Moderate	2 (7,7)	6 (33,3)	4 (5,9)	
Severe	2 (7,7)	0 (0,0)	1 (1,5)	
Tomographic Variables				
Area, mm2	480,5 (94,3)	398 (71,3)	450,7 (98,4)	0,121
Perimeter, mm	78,8 (8,8)	72 (7,2)	74,2 (9,3)	0,143
Valsalva sinuses, mean diameter	34,4 (3,7)	32,1 (3,4)	32,9 (3,6)	0,227
Height of left coronary artery	11,8 (4,1)	13 (2,6)	14,1 (3,2)	0,288
Height of right coronary artery	15,1 (2,3)	13,5 (6,4)	15,2 (3,3)	0,771
Peri-Intervention Variables				
Type of Procedure, n (%)				0,153
Elective	6 (23,1)	5 (27,8)	29 (42,6)	
Emergency	19 (73,1)	13 (72,2)	39 (57,4)	
Urgency	1 (3,8)	0 (0,0)	0 (0,0)	
Valve in valve, n (%)	2 (7,7)	5 (27,8)	3 (4,4)	
Pure native AR, n (%)	2 (7,7)	1 (5,6)	0 (0,0)	
Access, n (%)				0,125
Transapical	0 (0,0)	1 (5,6)	0 (0,0)	
Subclavian	2 (7,7)	0 (0,0)	2 (2,9)	
Size of the prothesis	27,1 (2,5)	24,7 (1,8)	25,8 (2,2)	**0,002**
Length of procedure (min)	91,1 (38,6)	73,7 (46,8)	78,9 (50,1)	0,739
Contrast Amount (mL)	146,3 (24,3)	161,6 (56,4)	144,9 (63,0)	0,793
Brand of prothesis, n (%)				0,467
Sapien XT	17 (65,4)	14 (77,8)	44 (64,7)	
CoreValve	8 (30,8)	1 (5,6)	16 (23,5)	
Sapien 3	0 (0,0)	1 (5,6)	2 (2,9)	
EVOLUT	1 (3,8)	2 (11,1)	6 (8,8)	
30-day Outcomes				
Procedural Death, n (%)	1 (3,8)	0 (0,0)	2 (2,9)	0,723
Stroke, n (%)	0 (0,0)	0 (0,0)	1 (1,5)	0,721
In-hospital mortality, n (%)	2 (7,7)	0 (0,0)	4 (5,9)	0,513
Pacemaker, n (%)	4 (15,4)	1 (5,6)	12 (17,6)	0,445
ICU length of Stay, median (IQR)	2 (1-2,3)	1 (1-3)	1 (1-3)	0,595
PostOP ICU stay, median (IQR)	4 (2-16)	3,5 (3-9)	4 (3-9)	0,592
30-day Echography				
LVEF %, mean (StD)	39,1 (13,3)	56,7 (7,9)	54,5 (13,3)	**<0,001**
Peak gradient, mmHg, mean (StD)	16,1 (6,9)	23,1 (15,9)	18,5 (9,2)	0,313
Mean gradient, mmHg, mean (StD)	9,2 (3,1)	12 (8,4)	11,3 (8,1)	0,661
AR, n (%)				0,407
Trace	4 (15,4)	3 (16,7)	10 (14,7)	
Mild	4 (15,4)	4 (22,2)	4 (5,9)	
Moderate	2 (7,7)	0 (0,0)	3 (4,4)	
Severe	0 (0,0)	0 (0,0)	0 (0,0)	
Long-term Outcomes				
NYHA, mean (StD)	1,5 (0,7)	1,5 (0,5)	1,6 (0,9)	0,89
Global Death, n (%)	3 (11,5)	0 (0,0)	8 (11,8)	0,278
Cardiac death, n (%)	1 (3,8)	0 (0,0)	1 (1,5)	0,705
LVEF %, mean (StD)	47,4 (9,7)	59,4 (5,8)	52,3 (13,6)	0,777
AR, n (%)				0,845
Trace	6 (23,1)	2 (11,2)	10 (14,7)	
Mild	1 (3,8)	2 (11,2)	3 (4,4)	
Moderate	1 (3,8)	1 (5,6)	3 (4,4)	
Severe	0 (0,0)	0 (0,0)	0 (0,0)	

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5-Year Results With the Trifecta Aortic Valve in Older Patients in Southern Chile

Juan Carlos Bahamondes[1]*, Abelardo Silva*[2]*, Ivan Lagos*[1]*, Pablo San Martin*[1]*, Mauricio Pena*[2]
Institutions where study was performed: [1]Hospital Regional Temuco, Chile; [2]Hospital Dr. Hernan Henriquez Aravena, Chile

Purpose: Report the results obtained with the Trifecta pericardial bioprosthesis in patients aging 60 years and older submitted to aortic valve replacement surgery

Methods: The Trifecta bioprosthesis was implanted in 95 patients between 2014 and 2018 at our center. The mean age of the population was 70.5 ± 9.0 years (60-88 years), 52 (54.7%) were male and 43 (45.3%) were female. Indications for aortic valve replacement surgery included stenosis in 52 patients (54.7%), regurgitation in 15 patients (15.7%), and mixed pathology in 28 patients (29.6%).

Results: In 53 patients a 19 mm valve was implanted (55.8%), 21 mm in 29 patients (30.5%), 23 mm in 10 patients (10.5%) and 25 mm in 5 patients (5.2%). Early mortality occurred in 4 patients (4.2%) due to cardiogenic shock, and there were 3 late deaths (3.1%) due to respiratory failure and sepsis. There was 1 early stroke with reversible neurologic damage. There were 9 (9.4%) paroxistic atrial fibrillation, 4 AV blockages (4.2%) requiring definitive pacemaker, 6 reoperations for bleeding (6.3%) and 2 acute reversible renal injuries (2.1%). There were no instances of early valve thrombosis, endocarditis, or clinically significant hemolysis. There were no late thromboembolic events and no late valve explants because of structural deterioration. Overall, freedom from valve explant was 100% at 4.5 years. At the time of discharge, average mean gradients ranged from 9.3 to 4.1 mm Hg and effective orifice area ranged from 1.58 to 2.50 cm2 for valve sizes 19 to 25 mm, respectively. Kaplan-Meier survival at 1 and 4.5 years was 95.3% ± 1.3% and 92.7% ± 1.4%.

Conclusion: The Trifecta pericardial valve provide excellent hemodynamic performance while providing ease of implantation with low early postoperative gradients after implantation, not observing significant transvalvular regurgitation. Thus providing good life expectancy, quality of life and time free from thromboembolic events in older patients even with a small annulus. Long-term follow-up studies are needed to confirm these results of this innovative bioprosthesis.

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Rapid Deployment Aortic Valves in Elderly Patients: Age Is Not Just a Number

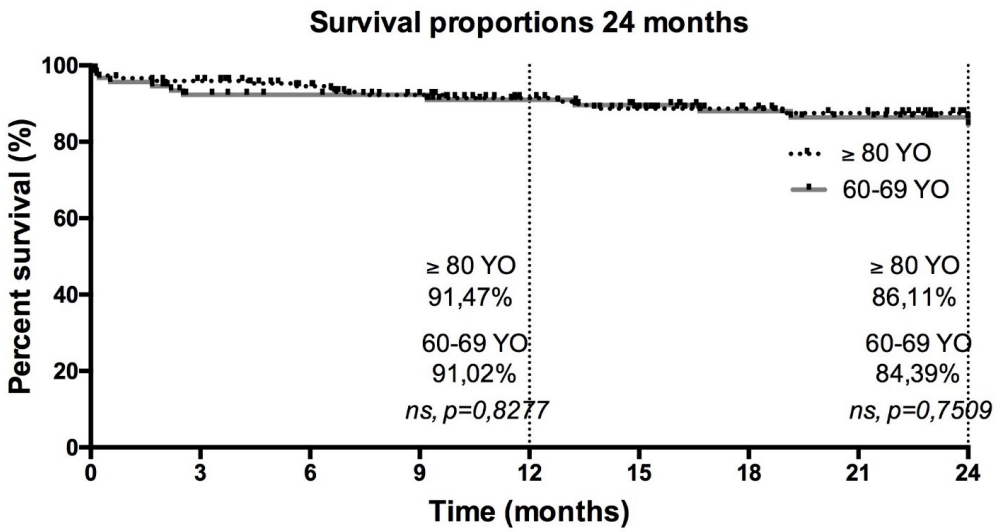
***Tiago Velho**, Nuno Carvalho Guerra, Hugo Ferreira, Andre Sena, Ricardo Ferreira, Angelo Nobre*
Institution where study was performed: University Hospital Santa Maria, Portugal

Purpose: Aortic valve stenosis (AS) is the most common valvular pathology in the elderly and surgery (AVR) remains the gold-standard. However, emerging transcatheter aortic valve replacement (TAVI) has become an increasing alternative to surgery. In a recent survey from the European Society of Cardiology, 9,4% stated that age was the main reason to propose for TAVI.

Methods: Single-center retrospective study including 353 patients (149 patients over 80 years-old, compared to 204 patients between 60-69 years-old) submitted to AVR between January 1, 2013, and December 31, 2016. Primary endpoint was survival. Secondary outcomes included the rate of complications after surgery. Clinical data was collected and assessed from clinical files in all patients. Long-term survival was determined by Kaplan-Meier survival analysis. Continuous variables were analyzed with t-test and linear regression and categorical variables with chi-square or Fisher.

Results: The demographic and clinical characteristics were similar between the two groups (P>0,05). There were no significant differences in the survival between the two groups at 30 days (96,57% 60-69yo vs. 96,64% >80yo), 12 months (89,57% 60-69yo vs. 93,51% >80yo) and 24 months (85,92% 60-69yo vs. 87,62% >80yo) P>0,05. Cross-clamp time was lower in >80yo group, correlated with the higher percentage of rapid deployment valves (20,1% vs 4.9% in 60-69yo). The postoperative complication rates were similar between the two groups, excluding the rate of post-operative atrial fibrillation, higher in >80yo group (29,06% vs. 17,28%, p=0,0147). In all patients, cross-clamp time was directly related to ventilation time (p=0,025) and chest drainage (p=0,0015), but not with ICU length os stay (p=0,0950). However, cross-clamp time relation with ventilation time and ICU length of stay was only significant in >80yo patients (ventilation: p=0,0077 vs p=0,09 in 60-69yo; ICU length stay p=0,049 vs p=0,38 in 60-69yo).

Conclusion: No significant differences were observed between the two groups at 30days, 12 and 24months. Cross-clamp time is directly correlated with ventilation time and bleeding, with a stronger correlation in patients over 80yo.Rapid-deployment valves reduce cross-clamp times, so its use in elderly may improve surgery outcome. Should age be an indication for rapid-deployment valves?



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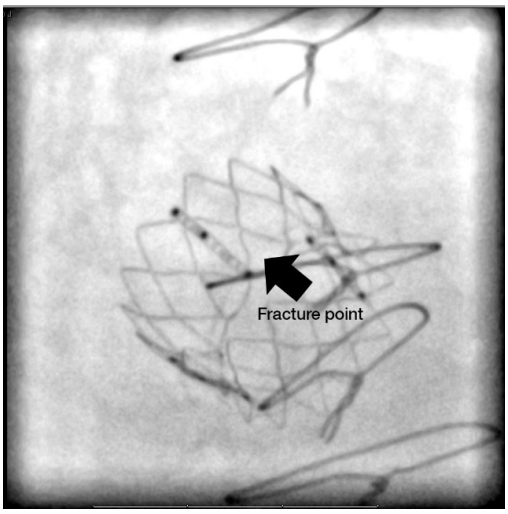
Cardiopulmonary Bypass as a Safety Net for Aortic Bioprosthetic Valve Fracturing After Valve-in-Valve Implantation: Case Report

***Davi Freitas Tenorio**, Leonardo Paim, Flavio Tarasoutchi, Roney Sampaio, Luiz Felipe Moreira, Romullo Santos, Henrique Ribeiro, Fabio Jatene, Honorio Palma, Pablo Pomerantzeff*
Institution where study was performed: Instituto do Coracao do Hospital das Clinicas da Faculdade de Medicina da Universidade de Sao Paulo, Brazil

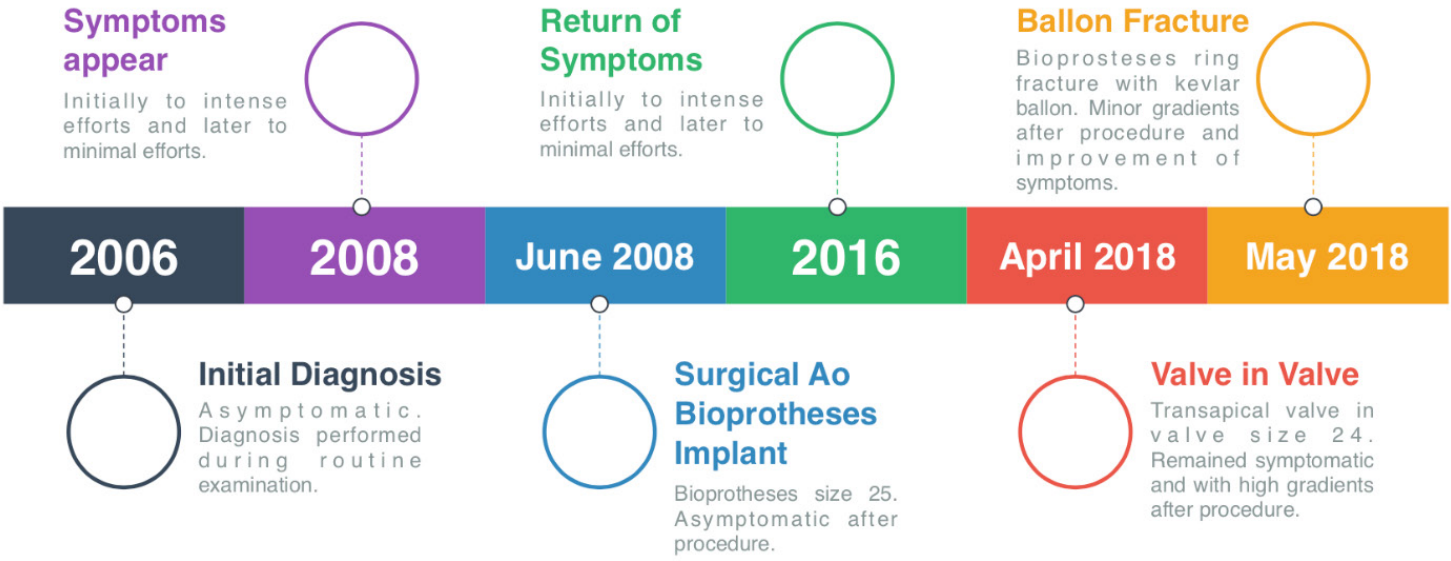
Purpose: Valve-in-valve isn't offered to patients with small bioprostheses due to further narrowing of effective orifice. Fracturing the bioprostheses is an alternative for expansion, however this can be worrisome in fragile patients due to hemodynamic instability during expansion. We report a case of fracturing bioprostheses by balloon dilatation during femoral CPB.



Methods: We present a case report of a 69-year-old male presenting with dyspnea, with history of aortic insufficiency. He was submitted to a successful bio-prosthetic valve implantation (size 25) in 2008. Symptoms returned in 2016 and stenosis of degenerated aortic valve bioprostheses was diagnosed. Patient considered too fragile for new surgical valve replacement and transapical valve-in-valve implantation was performed on April 2018. However, the patient remained symptomatic, with a gradient of 40mmHg and control echocardiography showed small EOA (1,1cm2). Case was discussed by the Heart Team and decided to attempt balloon valve fracturing.

Results: Since patient had EF of 30%, the Heart Team decided to install femoral CPB as hemodynamic assistance during valve ballooning. Right femoral artery punctured with 12Fr introducer and kevlar balloon catheter size 24 placed through aortic prosthesis. Femoral vein punctured for temporary pacemaker implantation. CPB circuit installed through left femoral vessels. Ventricular overdrive at 160bpm, BP lowered with CPB, and balloon inflated up to a pressure of 12atm, with satisfactory valve-in-valve opening and rupture of the surgical prosthesis metallic ring. Measurements of LV-Ao peak gradients: Pre-dilation 40mmHg, Post-dilation 10mmHg. Echocardiographic control without periprosthetic leak, leaflets of the prosthesis intact with good mobility. Echocardiographic LV-AO gradients of 26 maximum and medium 15. CPB discontinued after 8 minutes. Procedure accomplished without complications, no vasoactive drugs needed, patient extubated in OR. Patient progressed without symptoms, minor gradients and mild valve insufficiency. Patient discharged four days later.

Conclusion: Femoral CPB is a viable alternative to avoid catastrophic consequences of hemodynamic instability during balloon fracturing of degenerated valves and impaired left ventricles. This novel treatment concept is a promising alternative to surgical valve replacement in patients with small failing bioprosthesis and fragile clinical status.


Symptoms appear
Initially to intense efforts and later to minimal efforts.
Return of Symptoms
Initially to intense efforts and later to minimal efforts.
Ballon Fracture
Bioprosteses ring fracture with kevlar ballon. Minor gradients after procedure and improvement of symptoms.
2006
2008
June 2008
2016
April 2018
May 2018
Initial Diagnosis
Asymptomatic. Diagnosis performed during routine examination.
Surgical Ao Bioprotheses Implant
Bioprotheses size 25. Asymptomatic after procedure.
Valve in Valve
Transapical valve in valve size 24. Remained symptomatic and with high gradients after procedure.

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Bicuspid Aortic Valve: Is Aortic Wall Thickness a Predictor of Histological Abnormalities? Implications for the Surgical Strategy

***Manuel Cervetti**, Daniel Navia, Miguel Chiappe, Mario Acosta, Julian Benavides, Juan Vrancic, Fernando Piccinini*
Institution where study was performed: Instituto Cardiovascular de Buenos Aires, Argentina

Purpose: The purpose of the present study was to evaluate the association between histologic abnormalities and the aortic wall thickness in patients with BAV undergoing aortic valve replacement.

Methods: We retrospectively identified 105 patients who had undergone aortic valve replacement between 2009 and 2017. In this study were included all patients with BAV and valvular dysfunction who were surgically treated. We excluded patients with Marfan syndrome and those in whom replacement of the ascending aorta was performed. Samples from the aortic wall were removed during surgery, the wall thickness was measured and the histological damage was classified according to the Larson and Edwards criteria: grade 0, no lesions; grade 1, lesions involved 1–10% of the medial tissue; grade 2, 11–25%; grade 3, 26–50%; and grade 4, 51–100%.

Results: In the total group of 105 patients, the histological alteration of the aortic wall according to the classification of Larson and Edward was: 2.9% presented grade 0, grade 1: 8.6%, grade 2: 31.4%, grade 3: 33.3% and grade 4: 23.8%. The mean thickness of the aortic wall was calculated in each degree of histopathological involvement. A statistically significant difference (p = 0.017) was found in the average aortic parietal thickness between degrees of anatomopathological lesion. It was observed that greater histological damage had greater parietal thickness, except in group 0 (n = 3). 88% of patients had aortic stenosis, within this group prevailed grade 2 and 3. In contrast, in patients with aortic insufficiency, 82% had grade 3 and 4.

Conclusion: The consecutive and retrospective pathological anatomical study of aortic wall biopsies in patients operated on with BAV demonstrated a direct relationship between the greater histological damage and the greater thickness of the aortic wall. This observation may have implications for the surgical strategy to be performed.

Table 1: Mean Thickness of the Aortic Wall and Grade of Lesion.

Grade	N	Mean	SD	Median
0	3	1,8667	,14572	1.8500
1	9	1,4878	,37036	1.2900
2	33	1,8473	,49246	1.8200
3	35	2,0309	,73595	2.0000
4	25	2,2544	,88842	2.0000
Total	105	1,9751	,70048	1.9000

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Hematocrit and Leukocyte Count Predict Postoperative Delirium After Aortic Valve Replacement

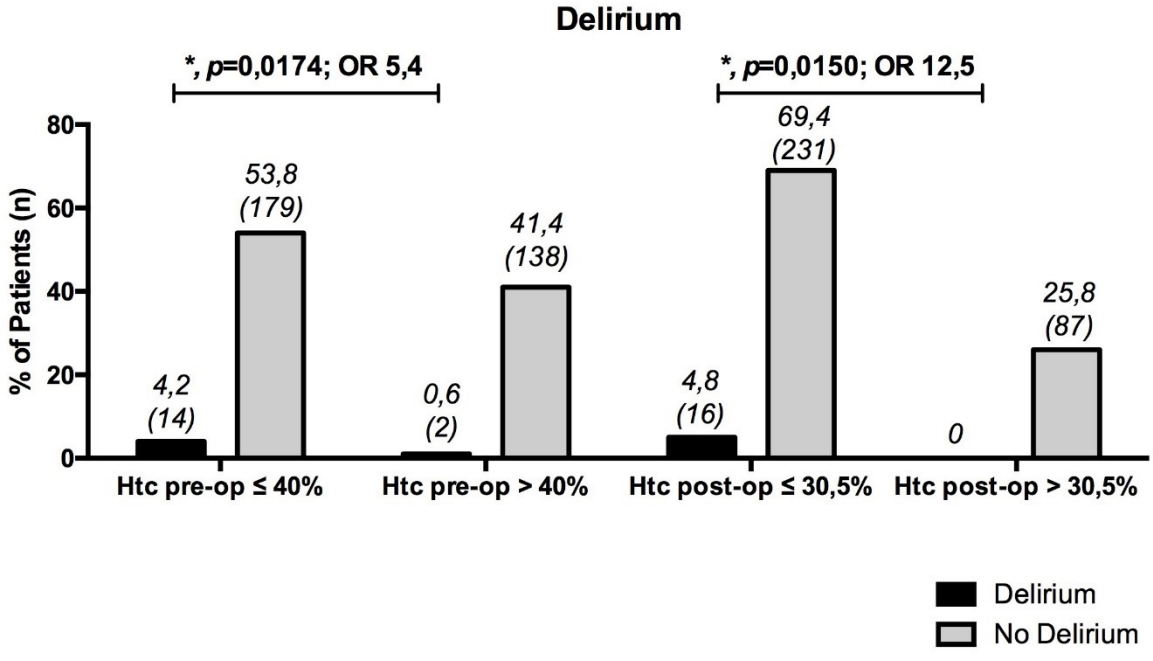
***Tiago Velho**, Nuno Carvalho Guerra, Hugo Ferreira, Andre Sena, Rafael Pereira, Ricardo Ferreira, Angelo Nobre*
Institution where study was performed: University Hospital Santa Maria, Portugal

Purpose: Gelatine as priming for aortic valve surgery has been associated with higher risk of post-op acute kidney injury (AKI).However, few studies correlate the priming solution with levels of hematocrit(Ht),leukocytes(WBC) and outcomes. Here, we pretend to 1) compare outcomes of patients with gelatin or saline solution as priming,2)evaluate the influence of WBC and Ht in outcomes.

Methods: Single-center retrospective study including 333 patients (264 with gelatin as priming and 69 with saline solution) submitted to aortic valve replacement surgery between 2016 and 2017. Primary endpoint was the rate of complications after surgery, such as incidence of AKI, atrial fibrillation, infection and delirium. Continuous variables were analyzed with t-test and linear regression and categorical variables with chi-square or Fisher.

Results: There were no significant differences between the patients. Considering priming with gelofusine or saline solution, there were no differences in invasive ventilation time, chest tube drainage, incidence of AKI (gelatin 31,1% vs 34,8% saline solution, p=0,5639), delirium or atrial fibrillation. Considering all patients, pre-operative Ht ≤ 40% increases 5,4 times (p=0,0174, OR 5,4) and WBC <10x109 reduces 6,4 times (p=0,0047, OR 6,4) the risk of post-op delirium. Post-operative Ht ≤ 30,5% increases 12,5 times (p=0,015, OR 12,5) the risk of delirium and 1,75 times (p=0,0476, OR 1,75) the risk of post-operative atrial fibrillation.

Conclusion: In our patients submitted to aortic valve replacement surgery gelofusine did not increased the incidence of AKI, with similar outcomes using either gelofusine or saline solution as priming. Hematocrit and leukocytes levels can be valuable tools predicting outcomes and new studies must be conducted to evaluate their prognostic value in cardiac surgery.



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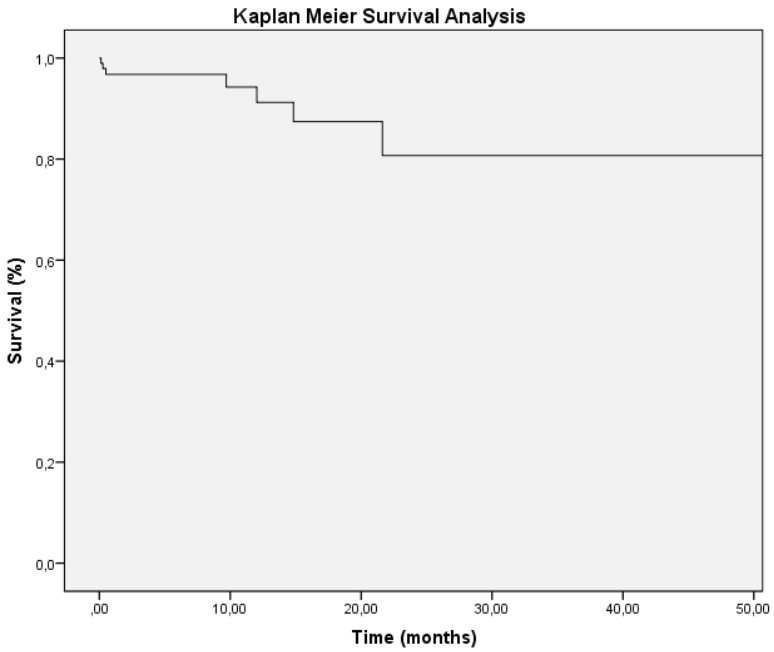
Short- and Long-Term Results of Transcatheter Aortic Valve Replacement: A Single-Center Experience in Latin America

***Manuel Giraldo-Grueso**, Dario Echeverri, Catalina Vargas-Acevedo, Jaime Cabrales, Jaime Camacho*
Institution where study was performed: Fundacion Cardioinfantil - Instituto de Cardiologia, Colombia

Purpose: Transcatheter aortic valve replacement (TAVR) is a global acceptable alternative to surgery in patients with severe aortic stenosis. However, short and long-term TAVR results in Latin America remain unknown.

Methods: Between 2009 and 2017, 112 patients underwent a TAVR due to severe aortic stenosis at our institution. Patients were identified through an institutional cardiac surgery database. Previous to TAVR, all patients were assessed by the institutional Heart Team. Endpoints assessed were short and long-term mortality, follow-up left ventricular ejection fraction (LVEF) and aortic regurgitation (AR). Baseline demographics and clinical characteristics were summarized using descriptive statistics, survival was analyzed through the Kaplan-Meier method. A significance level of 0.05 was used throughout the analysis.

Results: Fourteen TAVR per year were performed at our institution. Mean age was 78,6 years (8,42), 68 (60,7%) of them had arterial hypertension, 19 (17%) dyslipidemia, 27 (24,1%) diabetes mellitus, and 46 (41,1%) severe coronary artery disease. Pre-intervention LVEF was 51% (26-50) and three patients (2,7%) had severe AR. Forty patients (35,7%) underwent an elective TAVR, the most common vascular access was transfemoral (95,5%), and the median prosthesis size was 26 (23-29). Three patients (2,7%) died during the procedure, and three (2,7%) died in the intensive care unit. Mean follow-up time was 1,2 years. In the 30-day outcomes, we found a median LVEF, peak gradient, and mean gradient of 55% (40,5-31,8), 16 mmHg (12-24), and 9 mmHg (7-12), respectively. At the last follow-up (mean time of 1,2 years) only two patients had died of cardiac-related diseases, median LVEF was 55% (45-60) and most patients had none or trivial AR.



Conclusion: This study suggests that TAVR is safe and the recurrence of severe AR is rare. We showed that a Latin American center can achieve results comparable to those reported worldwide. Effective patient selection, an experienced heart team, and clinical follow-up are key factors in a TAVR program.

Table 1. Variables of TAVR patients.

Variables	TAVR n=112
Demographic Variables	
Age, mean (StD)	78,6 (8,42)
Weight kg, mean (StD)	69 (15,8)
Height cm, mean (StD)	162,3 (9,9)
Gender female n, (%)	49 (43,8)
Hypertension, n (%)	68 (60,7)
Use of pacemaker, n (%)	6 (5,4)
Coronary Artery Disease, n (%)	46 (41,1)
Number of vessels	
1 vessel, n (%)	17 (15,2)
2 vessels, n (%)	16 (14,3)
3 vessels, n (%)	15 (13,4)
Previous PCI , n (%)	22 (19,6)
Previous cardiac surgery, n (%)	22 (19,6)
Previous CABG, n (%)	18 (16,1)
Previous SAVR, n (%)	10 (8,9)
Previous Valvuloplasty, n (%)	3 (2,7)
Previous Stroke, n (%)	5 (4,5)
Peripheral vascular disease, n (%)	6 (5,4)
COPD, n (%)	35 (31,3)
Renal Failure in Dyalisis, n (%)	4 (3,6)
Risk Scores	
EuroScore	6,08 (4,4)
STS	6,08 (4,0)
Pre-TAVR Imaging	
Ecographic Variables	
LVEF %, median (IQR)	51 (26-50)
Peak gradient, mmHg, median (IQR)	69,5 (59-37)
Mean gradient, mmHg, median (IQR)	44,5 (36,0-55,0)
Valvular size, cm2, median (IQR)	0,60 (0,41-0,77)
Previous AR , n (%)	
Trace	29 (25,9)
Mild	29 (25,9)
Moderate	12 (10,7)
Severe	3 (2,70)
Tomographic Variables	
Area, mm2, median (IQR)	441 (383-507)
Perimeter, mm, median (IQR)	76 (69,0-81,0)
Valsalva sinuses, mean diameter, median (IQR)	33 (31,0-35,0)
Height of left coronary artery, median (IQR)	13 (12,0-15,0)
Height of right coronary artery, median (IQR)	15 (14,0-17,0)
Peri-Intervention Variables	
Type of Procedure, n (%)	
Elective	40 (35,7)
Emergency	71 (63,4)
Urgency	1,0 (0,90)
Valve in valve, n (%)	9,00 (8,00)
Pure native AR, n (%)	3,00 (2,70)
Vascular Access, n (%)	
Transfemoral	107 (95,5)
Transapical	1,00 (0,90)
Subclavian	4,00 (3,60)
Size of the prosthesis, median (IQR)	26 (23-29)
Length of procedure (min) median (IQR)	65 (50,0-87,5)
Brand of the prosthesis, n (%)	
Sapien XT	75 (67,0)
CoreValve	25 (23,3)
Sapien 3	3,0 (2,70)
EVOLUT	9,0 (8,00)
30-day Outcomes	
Procedural Death, n (%)	3,0 (2,70)
Stroke, n (%)	1,0 (0,90)
In-hospital mortality, n (%)	3 (2,7)
Pacemaker, n (%)	17 (15,2)
ICU length of Stay, median (IQR)	1,0 (1,0 - 3,0)
PostOP ICU stay, median (IQR)	4,0 (3,0 - 10,8)
30-day Echography	
LVEF %, median (IQR)	55 (40,5-31,8)
Peak gradient, mmHg, median (IQR)	16 (12,0-24,0)
Mean gradient, mmHg, median (IQR)	9,0 (7,0-12,0)
AR , n (%)	
Trace	17 (15,2)
Mild	12 (10,7)
Moderate	5 (4,50)
Severe	----
Long-term Outcomes	
NYHA, mean (StD)	1,5 (0,7)
Global Death, n (%)	11 (9,80)
Cardiac death, n (%)	2,0 (1,78)
LVEF %, median (IQR)	55 (45-60)
AR, n (%)	
Trace	18 (16,10)
Mild	6,0 (5,40)
Moderate	5,0 (4,50)
Severe	----

AR: Aortic Regurgitation, CABG: Coronary artery bypass graft, COPD
ICU: Intensive care unit, IQR: Interquartile range, NYHA: New York
ventricular ejection fraction, PCI: Percutaneous coronary interventic
replacement, StD: Standard deviation, TAVR: Transcatheter aortic val

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Minimally Invasive Aortic Valve Replacement Using Right Minithoracotomy: Our 7-Year Experience

***Lizeth Saldana**, Alberto Quintero, Cesar Avalos, Jose Escobar Matallana, Juan Jaramillo, Juan Rendon*
Institution where study was performed: Clinica Cardiovid, Colombia

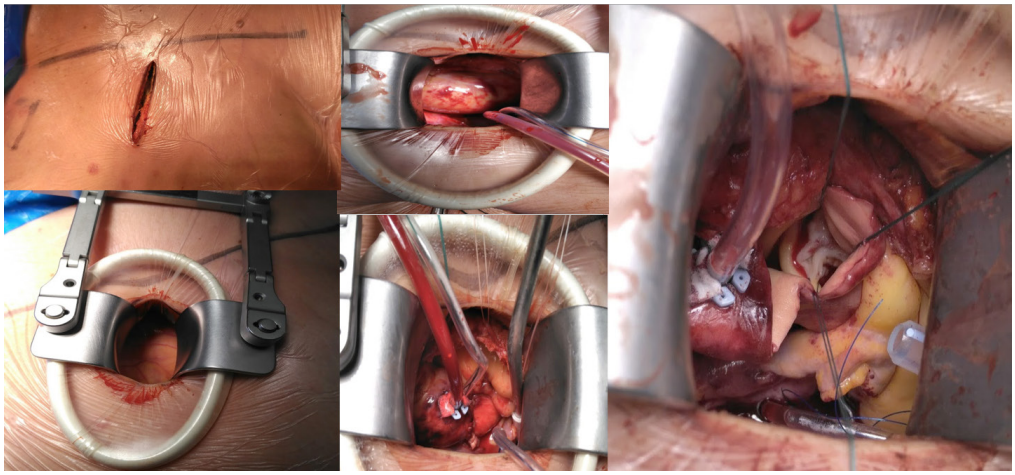
Purpose: Minimally invasive aortic valve replacement using right minithoracotomy has become a routine procedure in our institution. The objective of this study is to analyze the early and long-term outcomes of patients undergoing this procedure in the last 7 years.

Methods: This retrospective observational study describes 30-day outcomes and the 7-year follow up after minimally invasive aortic valve replacement using right minithoracotomy, from November 2010 to December 2017.

Results: 297 minimally invasive aortic valve replacement through of right minithoracotomy were performed. 184 men, the median age was 62 years. Bicuspid aortic valve in 111 patients (37.4%). 279 (93.9%) were isolated aortic valve replacement. 18 patients had combined valvular procedures. Biological prosthesis in 278 patients (93.6%) were used. Mean aortic cross-clamping and perfusion time were 88.5 ± 29.7 minutes and 125.6 ± 49.2 minutes, respectively. Median intensive care unit and hospital stay were 2 and 7 days, respectively. 250 (84.2%) patiens had less than 24 hours of mechanical ventilation. Reinterventions due to bleeding in 23 (7.7%) patients. 4 patiens required conversion to sternotomy. 30-day postoperative mortality in isolated aortic valve replacement was 9 (3.2%) patient. During the follow-up, the survival rate was 94.95% (282 of 297); 2/297 patients (0.7%) died from non-cardiac causes and 1/297 patient (0.3%) was reoperated for acute aortic dissection.

Conclusion: Aortic valve replacement by right minithoracotomy is a safe option for patiens without increasing surgery times or increasing complications. Early and long-term outcomes in these patients are acceptable and comparable with other centers.

You can think:
Minimally Invasive AVR using Right Minithoracotomy
"It's not a friendly surgery"



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Rapid Deployment Valve Implantation 3-Year Follow-Up: A Single-Center Study

Javier Maldonado Escalante*, Jennifer Sanchez, Maria Alejandra Castillo, Maria-Alejandra Molina*
Institution where study was performed: Clinica Universitaria Colombia, Colombia

Purpose: The rapid deployment valve (RDV) is an effective and recently introduced alternative for the treatment of severe aortic valve stenosis. The experience of this procedure in Latin America is limited. We describe the clinical and echocardiographic outcomes during a 3 years follow-up in RDV at Clinica Universitaria Colombia

Methods: From September 2015 to June 2018, 35 patients underwent implantation of RDV in CUC. The preoperative and operative data of the patients were collected during hospitalization. The patients were followed up in-hospital trans thoracic echoardiography and at 3, 6 and 12 months after surgery. A quality of life survey was done by phone during the three year period. A descriptive analysis was performed with clinical variables and a Kaplan- Meier model was used for mid-term survival analysis.

Results: Mean age was 78,0 (95%CI: 74,7 - 81,3), 19 (54,2%) patients were female. Mean EuroScore was 7,71% (95% CI: 5,12 - 10,30). Minimally invasive approach was performed in 16 (45,7%) patients. 4 (11,42%) patients died in-hospital; 1 (3,5%) of them by cardiovascular causes. The mean follow up was 15,4 (95% CI: 6,50 - 24,35) months. No other deaths occurred after discharge. The in-hospital postoperative mean transprosthetic gradient was 6,7 (95% CI 3,90 - 9,50) mmHg and the peak gradient was 12, 9 (95% CI 8,1- 17,9) mmHg and it did not change during the follow up (p). The self-reported mean score of quality of health (EQ-5D-5L) was 82,7 (95% CI 76,6- 88,7).

Conclusion: The overall mortality was higher than the EuroScore, reflecting the high operative risk of our patients. The prosthesis is performing very well hemodinamically, and inspite of the high operative riks, the patients reported a high score of quality of health score.

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Transcatheter Aortic Valve Implantation 6-Year Follow-Up: A Single-Center Study

Javier Maldonado Escalante*, Jennifer Sanchez, Maria Alejandra Castillo, Maria-Alejandra Molina*
Institution where study was performed: Clinica Universitaria Colombia, Colombia

Purpose: Transcatheter aortic valve implantation (TAVI) is an alternative of treatment of patients with severe aortic stenosis with very high risk or inoperability with conventional surgery. We describe the clinical and echocardiographic outcomes during a 6 years follow-up with TAVI at Clinica Universitaria Colombia (CUC).

Methods: From June 2012 to June 2018, 35 patients underwent TAVI in CUC. The preoperative and operative data of the patients were collected during hospitalization. The patients were followed up with in-hospital trans thoracic echoardiography and at 3, 6 and 12 months after surgery. A quality of life survey was done by phone during the three year follow up. A descriptive analysis with the clinical variables and a Kaplan- Meier model was used for mid term survival analysis.

Results: Mean age was 81,82 (95%CI: 74,8- 86,7), 21 (60%) patients were female. Mean EuroScore was 14,5% (95% CI: 11,2 - 17,8). Transapical and transfemoral approach was performed in 14 (40%) and in 21 (60%) patients respectively. 3 (8,5%) patients died in-hospital. The mean follow up was 21,6 (95% CI: 16,1 - 27,2) months. 2 (5,7%) deaths occurred during follow up. At discharge, the mean transprosthetic gradient was 13,5 (95% CI 9,9 - 17,1) mmHg and the peak gradient was 24,9 (95% CI 18,5- 31,4) mmHg. The self reported mean score of quality of health (EQ-5D-5L) was 74,2 (95% CI 69,0- 79,4).

Conclusion: TAVI is a safe procedure in high risk patients. EUROSCORE was not very high because we had other indications like porcelain aorta or patent coronary grafts. The postoperative echocardiographic findings are excellent but there is no correlation with the quality of health perceived by the patients.

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Transcatheter Aortic Valve Implantation vs Rapid Deployment Valve Implantation in High-Risk Patients in Bogota, Colombia

Javier Maldonado Escalante*, Maria-Alejandra Molina, Jennifer Sanchez, Maria Alejandra Castillo*
Institution where study was performed: Clinica Universitaria Colombia, Colombia

Purpose: Transcatheter aortic valve implantation (TAVI) and rapid deployment valve (RDV) implantation are surgical treatment alternatives for aortic valve stenosis (AS). The aim of this study is to compare the clinical and echocardiographic outcomes between these two surgical procedures at Clinica Universitaria Colombia (CUC) in Bogotá.

Methods: From June 2012 to June 2018, 35 patients underwent TAVI (50%) and 35 RDV implants (50%) in CUC. The preoperative and operative data of the patients were collected during hospitalization. The patients were followed up with in-hospital trans thoracic echoardiography and at 3, 6 and 12 months after surgery. A quality of life survey was done by phone during follow up. A bivariate analysis was made to compare the two procedures and a Kaplan- Meier model was used for survival analysis.

Results: The operative and overall mortality was similar between the two groups (p= 0,722 and p= 0,65). Although the EUROSCORE was significantly higher for TAVI (p = 0, 005), the postoperative left ventricular ejection fraction (LVEF) was similar between the groups (p= 0,121). Both the medium and peak tranprothesic gradient were higher for TAVI (p = 0, 006) but the incidence of paravalvular leak (PVL) was similar between the groups (TAVI= 17,1%, RDV=22,8 p= 0,36). The quality of health perception was significantly higher in the RVD group (p= 0,002).

Conclusion: RDV was associated with better prosthesis performance and better quality of health perception. The mortality and the incidence of PVL was the same in both groups although EUROSCORE was higher for TAVI.

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Minimally Invasive Aortic Valve Replacement: 10 Years of Clinical Experience in Bogota, Colombia

Javier Maldonado Escalante*, Francisco Rincon, Maria-Alejandra Molina*
Institution where study was performed: Clinica Universitaria Colombia, Colombia

Purpose: Over the decades surgical aortic valve replacement has been established as the best treatment for severe aortic stenosis, but recently minimally invasive procedures have been shown excellent results. We present the experience in minimally invasive aortic valve replacement during a 10 year period (2008- 2018) at Clinica Universitaria Colombia.

Methods: From July 2008 to February 2018, 128 patients underwent minimally invasive aortic valve replacement in Clinica Universitaria Colombia. The preoperative and operative data of the patients were saved in a database while they had been inpatient. A descriptive analysis was performed to show the clinical variables of our population and a bivariate analysis is performed to identify differences between two groups, low and high risk patients.

Results: Mean patient age was 69,8 years (95% IC 67,69 – 71,08 years). 64 were female (52,3%). Two study groups were defined by EUROSCORE II: group 1 with a score less or equal to 6 (n= 91) and group 2 with a score higher than 6 (n= 37) to compare the outcomes. There was no statistically difference between the two groups, except for age (p= 0,001) in the preoperative variables. The total operative mortality was 3,1%. 1 patient died in group 1 (mortality 1,1%) and 4 patients died in Group 2 (mortality 11,1%) (p= 0,015). The postoperative creatinine (p= 0,014), infection (p= 0,013), and bleeding (p= 0,01) are significantly higher in group 2.

Conclusion: Our results are similar to those reported in the world literature, in spite of having a small sample size and the beginning of the learning curve. Although the EUROSCORE is a good predictor in high risk patients, in moderate and low risk patients it clearly overestimates the operative risk.

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Aortic Valve Replacement With Mechanical vs Biological Prostheses in Patients Between 50 and 70 Years: An Analysis of the Incidence of Long-Term Events

***Juan Vrancic**, Mariano Camporrotondo, Manuel Cervetti, Mario Acosta, Julian Benavides, Daniel Navia, Juan Espinoza*
Institution where study was performed: Instituto Cardiovascular de Buenos Aires, Argentina

Purpose: There are no clear recomendations for using mechanical or biological valves for aortic valve replacement in patiens between 50 to 70 years. We aimed to evaluate late mortality and need for re-intervention of the implant of biological versus mechanical prostheses in patients between 50 and 70 years.

Methods: Retrospective study of cases-controls between 2000-2017. We included all patients between 50 and 70 years of age who underwent aortic valve replacement with or without myocardial revascularization, concomitantly (n = 876). The cases group consisted of patients with a biological valve (BG n = 365) while the controls were mechanical implants (MG n = 511). Patients in BG were older (p < 0 .001), more hypertensive (p = 0.04) and more smokers (p = 0.02). Risk-adjusted analysis (propensity score) was used to adjust for confounders achieving a comparable population (n = 498). A level of statistical significance was established as p < 0 .05.

Results: Mortality (< 3 0 days) was 3.9% non-different between both groups (p = 0.953) and 3.4% in the risk-adjusted study with no difference between groups (p = 0.459). The 10-year survival rate was significantly higher for the Mechanical Group (Biological vs. Mechanical: 75.1% ± 4.1% vs. 79.4 ± 2.5%, p log rank 0.04), but there was no significant difference after adjusting for significant confounders (70% ± 5.2% vs 74.4% ± 3.8%, p = 0.113). Regarding freedom from reintervention, there was a benefit in favor of mechanical implant for both the entire population (85.6% ± 4.6% vs 98.2% ± 0.8%, p log rank < 0 .001) and for the risk-adjusted sample (87.0% ± 5.5% vs. 98.9% ± 1.0%, p < 0 .001).

Conclusion: Biological aortic valve implantation was associated with a greater need for reoperation, but with a similar survival at 10 years of follow-up in patients between 50 and 70 years.

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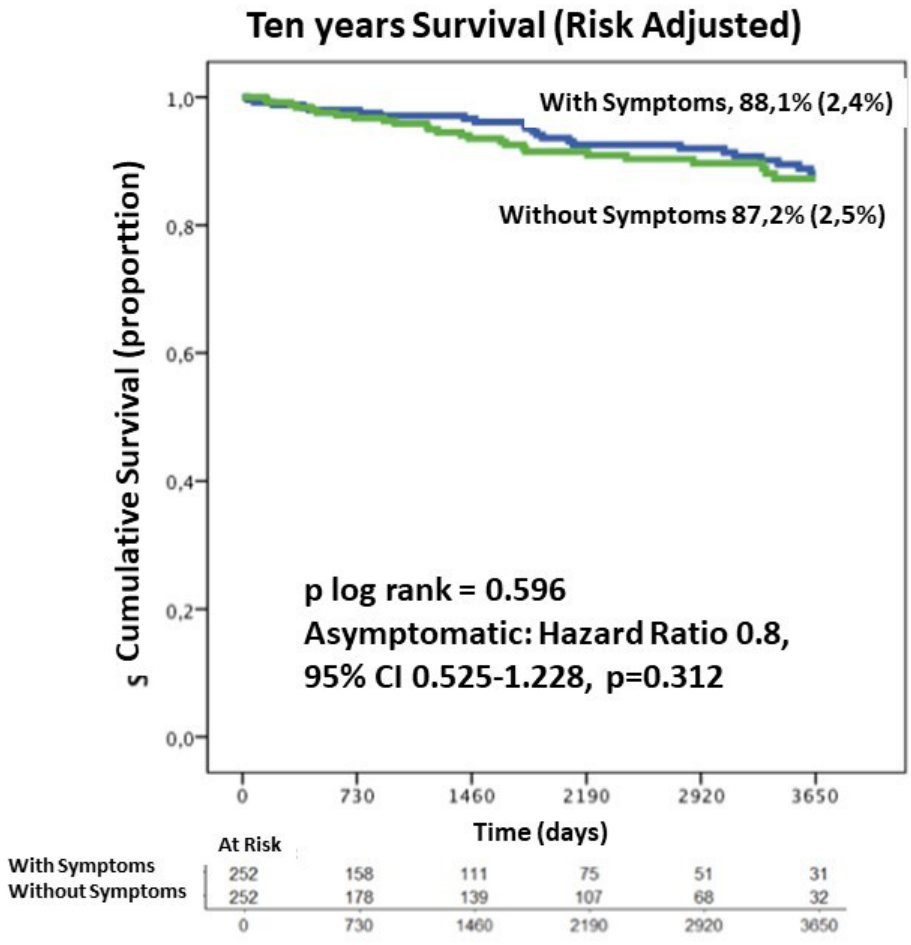
Severe Asymptomatic Aortic Stenosis: Is Early Valvular Replacement Safe?

***Juan Vrancic**, Mariano Camporrotondo, Leonardo Seoane, Mariano Benzadon, Daniel Navia, Juan Espinoza*
Institution where study was performed: Instituto Cardiovascular de Buenos Aires, Argentina

Purpose: There is controversy about the best therapeutic strategy in severe asymptomatic aortic stenosis given the risk involved with cardiac surgery. However, the risk has not been thoroughly assessed. The objective was to evaluate early (30 days) and 10 years morbidity-mortality of valve replacement in the presence of symptoms or not

Methods: Retrospective single center case-control study, between 2003-2018 (n = 1269). Consecutive patients underwent elective isolated aortic valve replacement were included, stratifying them according to the presence of symptoms (Control Group, n = 1012) or not (Cases Group, n = 257). Primary endpoint was 30-day and 10-years morbidity-mortality. Because groups were different, 3 statistical adjustment methods were performed: propensity score matching (parametric analysis, n = 504), multivariate proportional regression of Cox (parametric, n = 1269), and a random survival forest (nonparametric analysis, bootstrap 36% on 5000 classification trees, n = 1269). Time-event analysis was performed according Kaplan-Meier. Statistical significance was p:0,05

Results: 30-day mortality was not different between groups (Control 3.3% vs Cases 1.6%, p=0.214). Furthermore in risk-adjusted sample (propensity score matched) there was no significant difference (3.6% vs 1.6%, p=0.261). Ten-years survival was significantly different between groups (Control 84.3%± 1.3% vs Cases 87.4±2.4%, p log rank 0.006), but after adjusting for important confounders there was no significant difference (88.1%±2.4% vs 87.2%±2.5%, p = 0.596). Cox regression model identified age (p 0.045), followed by the CPB time (Vimp~0.01), and preoperative anemia (Vimp~0.005). The presence or absence of symptoms at the time of surgery had no impact on late survival (Vimp < 0 .00003).



Conclusion: Aortic valve replacement for aortic stenosis in asymptomatic patients is safe in terms of early mortality (~ 1.6%) and distant survival (> 87% at 10 years) which is similar to those with symptoms at the time of surgery.

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Right Anterior Minithoracotomy for Surgical Aortic Valve Replacement as a Standard of Care

***Matteo Saccocci*[1], *Elisa Mikus*[2], *Mauro del Giglio*[1], *Jose Luis Zulueta*[1], *Carla Beggino*[1], *Marco Paris*[1], *Liborio Mammana*[1], *Gabriele Tamagnini*[1], *Marianna Nardozza*[1]**

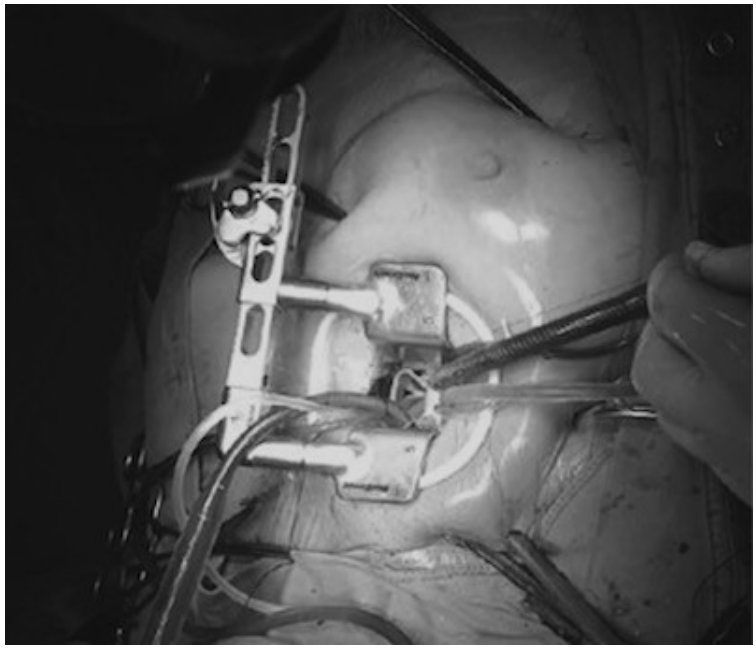
Institutions where study was performed: [1]Istituto Clinico San Rocco - Gruppo San Donato, Italy; [2]Maria Cecilia Hospital, Milan, Italy

Purpose: Right Anterior Minithoracotomy (RAT) for SAVR has proven to be feasible and safe assuring excellent outcomes. Nevertheless, it is not yet become the standard of care in many surgical centers, with this study we want to show our experience using RAT as standard approach for more than 600 consecutive aortic valve

Methods: From January 2010 to June 2018, a total of 607 adult patients underwent isolated surgical aortic valve replacement (SAVR) through a right anterior minithoracotomy (RAT) by a single team of Cardiac Surgeons. Minimally invasive aortic valve replacement was performed through a 4 to 6 cm long RAT at the third intercostal space without rib avulsion or ligation of the RIMA, after native valve removal a prosthetic valve was implanted using a three 2-0 prolene running sutures. Only left pneumectomy and concomitant cardiac procedures have been considered as a priori exclusion criteria for this approach, preoperative CT-scan evaluation was not compulsory.

Results: All patients underwent successful minimally invasive aortic valve replacement (median prosthesis diameter 23 mm). Complete central cannulation (arterial = distal ascending aorta, vein = atrial appendage) has been used in more than 500 cases. Population data: male 346 (57,38%); mean age of 72.3 ± 11.7 yrs (range 16-93); BMI mean 26.7 ± 4.9 kg/m2 (range 17.3-52.7); mean Logistic EuroSCORE about 6.3 ± 4.2 (range 0.8-34.5). Perioperative results: overall mean cardiopulmonary bypass 60.1 ± 19.9 minutes; aortic cross-clamping 43.8 ± 18.1 minutes; median ventilation time 7hrs ± 2; Median ICU stays 1.7 days; In-hospital mortality was 1.4%.

Conclusion: Our results show that with an appropriate minimally invasive surgical training, the right anterior thoracotomy can become the standard approach for surgical aortic valve replacement in most centers. Complete central cannulation is feasible and safe also in this settings avoiding the risk of peripheral CPB implantation with no impact on perioperative mortality.



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Bicuspid Aortic Valve Repair in Valve-Sparing Aortic Root Replacement: Respecting the Native Leaflet Geometry Through Two Different Geometric Orientations for Aortic Neoroot Creation

***Mary Siki**, Andreas Habertheuer, Joseph Bavaria, Caroline Komlo, Melanie Freas, Rita Milewski, Nimesh Desai, Wilson Szeto, Prashanth Vallabhajosyula*
Institution where study was performed: Hospital of the University of Pennsylvania, United States

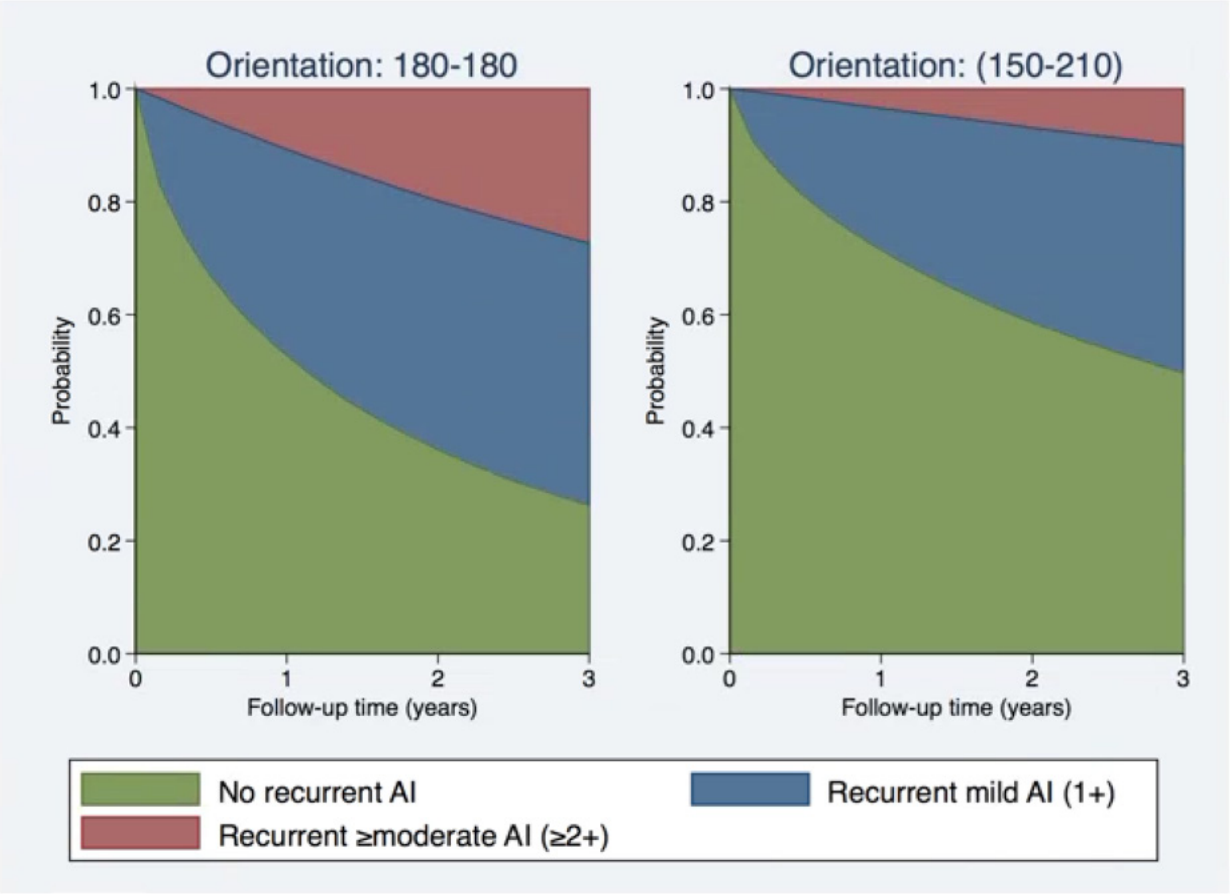
Purpose: At our institution, we have taken the approach of respecting the native geometric orientation of the repaired bicuspid aortic valve (BAV) leaflets when creating the aortic neoroot during valve sparing root reimplantation (VSRR) procedure. We investigated midterm outcomes with this two-prong approach for VSRR in BAV syndrome.

Methods: Of 72 patients in a prospectively maintained BAV repair database, 68 met inclusion criteria: 36 patients had 180°/180° neoroot geometry and 32 patients had 150°/210° orientation. Transition state probability model was generated to compare recurrent aortic insufficiency (AI) between the two groups. Multivariate cox regression analysis was performed to study parameters associated with composite long term outcome of mortality, aortic reoperation, or recurrent AI>2+.

Results: Preoperative parameters were similar between 180°/180° versus 150°/210° groups, except for higher AI in the latter (1.6+1.2 vs. 2.9+1.3; p 1+ showed similar probability distribution in both groups (p=0.72). Multivariate cox regression showed that neoroot orientation was not associated with composite outcome of death, reoperation, and recurrent AI>2+ (p=0.34).

Conclusion: Respecting the BAV geometry for VSRR neoroot creation yields excellent midterm outcomes, and this approach may minimize conjoint cusp leaflet stress that may occur in “forcing” a 150°/210° oriented type I BAV into a 180°/180° neoroot.

Transition State Model for Recurrent AI > 1+



Multivariable Cox proportional-hazards regression.			
Variables	**Hazard Ratio**	**95% CI**	**P value**
Geometric Orientation (150°/ 210° vs. 180°/ 180°)	2.3	0.4-12.7	0.34
Age	0.9	0.9-1.0	0.11
Male Gender	0.3	0.0-1.6	0.14
Hypertension	0.7	0.1-3.7	0.63
Coronary Artery Disease	4.1	0.3-59.8	0.30
Smoking History	0.6	0.1-3.7	0.57
Preoperative AI≥3+	0.3	0.0-2.1	0.24
Data presented as Hazard ratio with 95% confidence interval (CI)			

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Long-Term Hemodynamic Results of an Algorithmic Three-Pronged Approach to Bicuspid Aortic Valve Repair

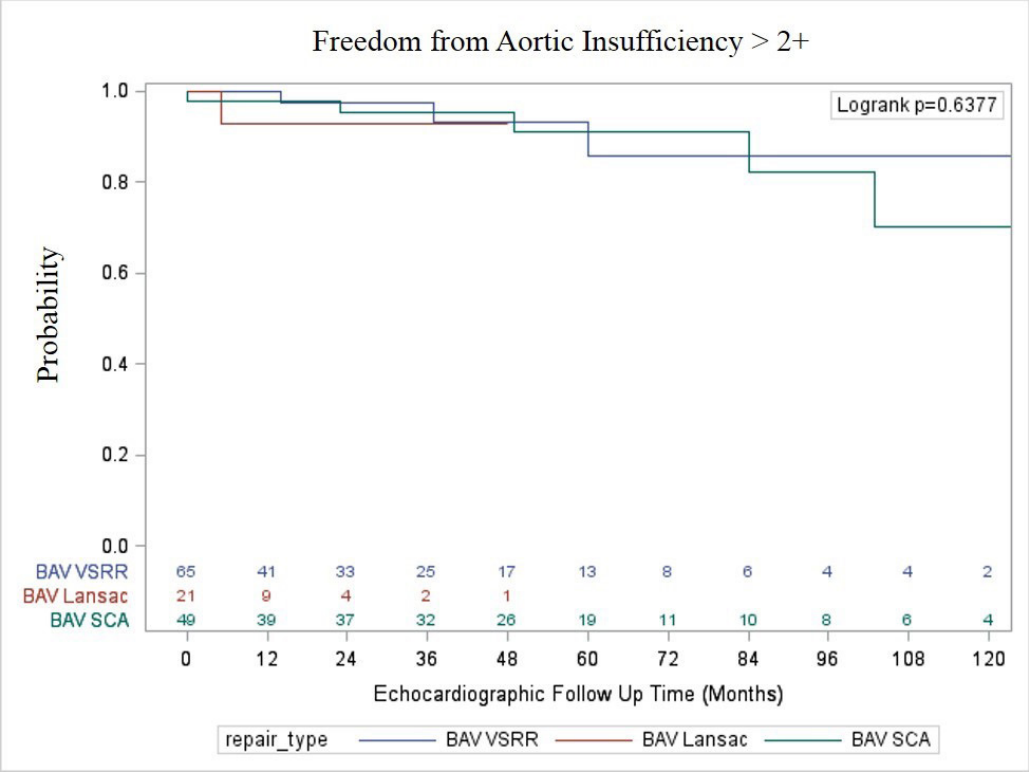
***Mary Siki**, Andreas Habertheuer, Prashanth Vallabhajosyula, Caroline Komlo, Melanie Freas, Rita Milewski, Nimesh Desai, Wilson Szeto, Joseph Bavaria*
Institution where study was performed: Hospital of the University of Pennsylvania, United States

Purpose: Decisions to repair Bicuspid Aortic Valves (BAV) and treat the associated aortopathy are nuanced and complex. Our study intends to show the results of a single center's algorithmic approach to BAV repair using three techniques: valve sparing root reimplantation (VSRR), external subannular aortic ring (ESAR), and subcommissural annuloplasty (SCA).

Methods: A retrospective review was performed of 143 patients with BAV undergoing primary valve repair from 2004 to 2018. VSRR (n=70) was performed in patients with aneurysmal aortic roots with or without aortic insufficiency (AI). ESAR (n=22) was performed in patients with AI and aortic annulus >27mm without aortic root dilatation. SCA was performed in patients with AI and aortic annulus 2+ was analyzed using Kaplan-Meier analysis.

Results: Preoperative characteristics were similar among groups. VSRR group had increased root diameters compared to ESAR and SCA (p 2+ at 4 years was 93.1% in VSRR group, 92.3% in ESAR group, and 95.4% in SCA group, and did not significantly differ among groups out to 10 years (Figure 1, p=0.6).

Conclusion: Following an algorithmic approach to BAV repair yields excellent long term results in valve repair durability and clinical outcomes. Preoperative echocardiographic imaging and intraoperative sizing and analysis help inform which repair type will be suitable for each patient to provide the most durable repair.



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Aortic Valve Replacement Through Partial Sternotomy: A Local Chilean Experience

***Sebastian Iturra**, Gabriel Olivares, Cesar Paulsen, Eduardo Turner*
Institution where study was performed: Clinica Santa Maria, Chile

Purpose: Minimally invasive aortic valve replacement through an partial upper sternotomy was introduced 20 years ago. Despite the instinctive advantages, it has not become the gold standard. The aim of this study is to report operative outcome of minimally invasive aortic valve replacement done trought a partial upper sternotomy

Methods: From November 2013 all patients (N=257) referred for isolated aortic valve replacement to the authors at two institutions in Chile, had an aortic valve replacement done through a partial upper sternotomy down to the fourth intercostal space. The only exclusion was absence of transesophageal echocardiogram. Data was obtained from a custom registry in prospective fashion.

Results: Operative mortality was 1/257 (0.4%). Cross clamp/Cardiopulmonary Bypass time were 59± 13,2 min/70,4 ± 22,7 min. Conversion to full sternotomy was 1.9%, reoperation for bleeding 1.5%, postoperative atrial fibrillation 19% and permanent pacemaker 0.3%. Postoperative stay was a median of 5 days.

Conclusion: Minimally invasive aortic valve replacement can be performed with satisfactory results and comparable to the conventional full sternotomy strategy.

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Aortic Valve Replacement With Low Ejection Fraction: Clinical Outcomes at Instituto Nacional de Cardiologia Ignacio Chavez

Luis Jimenez Hernandez*, Victor Sainz Escarrega, Ivan Hernandez, Omar Victorica*
Institution where study was performed: Instituto Nacional de Cardiologia Ignacio Chavez, Mexico

Purpose: We intended to document the clinical outcomes; Intraoperative survival, 30 days survival, Mayor adverse cardiovascular events, mediastinitis and early extubation of patients with low ejection fraction ? 40%, who underwent aortic vave replacement at our institute, which is one of the reference centers in Mexico for the aortic valve disease.

Methods: We conducted a retrospective review of the cardiovascular surgery department, identifyng patients with isolated aortic valve disease, and focusing on the clinical outcomes of patients from Instituto Nacional de Cardiologia “Dr. Ignacio Chavez” with low LVEF who underwent AVR from October 2017-June 2018. We selected patients who had severe AS and/or AR requiring AVR, and left ventricular ejection fraction ? 40%. We described patient demographics, urgency of operation, preoperative and operative characteristics and early postoperative outcomes described above.

Results: Out of the 14 described patients we found 21% were female, 10 patients of 14 had comorbidities, 14.28% had metabolic syndrome with 36% being urgency and 9 patients had elective surgery. Mean LVEF 26.85%. Mean age was 56.9 years, it is important to notice that patients who underwent AVR with a biological prothesis (10 of 14) had mean age 60.9 vs 40.7 years of the mechanical prosthesis implanted. Of all the subjects AVR was secondary to AS 5 (36%) combined AS/AR 7 (50%) AR 2 (14%). for the clinical outcomes we had 100% Intraoperative survival, 92.8% had a 30 days survival, one patient had a mayor adverse cardiovascular event wich represent 7%, 7% rate of mediastinitis (1/14) and 43% had early extubation (6/14).

Conclusion: Although there is a significant limitation reporting results of a single center, the present study underscores the positive outcomes in this small subgroup of patients with a compromised ventricular function and increased surgical risk so AVR is safe and it may be considered in a population with isolated aortic valve disease.

PATIENT DEMOGRAPHICS

VARIABLE	AORTIC VALVE REPLACEMENT (N=14) (%)
Age (years,mean ± SD)	56.9 ± 13.82
Female gender	3 (21.4)
SURGERY	
Elective	5 (35.7)
Urgency	9 (64.3)
LVEF (% mean ± SD)	26.85 ± 7.16
Euroscore (median, IQR)	3.03 (0.9 - 6.9)
CO-MORBILITIES	
Diabetes Mellitus	2 (14.3)
Hypertension	2 (14.3)
Obesity	3 (21.4)
Dislypidemia	1 (7.1)
Metabolic Syndrome	2 (14.3)
None	4 (28.6)
AORTIC VALVE LESION	
Aortic Stenosis	5 (36)
Aortic regurgitation	2 (14)
Aortic stenosis and aortic regurgitation	7 (50)

SD, standar deviation.
LVEF, Left ventricular ejection fraction

POST OPERATIVE RESULTS

VARIABLE	Aortic Valve Replacement (N=14)
Ventilation time (h, median, IQR)	48 (6 - 528*)
Atrioventricular Block	1 (7.14%)
Acute kidney injury	0
Re-operation for bleeding	1 (7.14%)
Cerebrovascular accident	0
Thirty-day mortality	1 (7.14%)

IQR, interquartile range.
*Re-intubation for nosocomial pneumonia

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Transcatheter Aortic Valve Replacement for Degenerative Bioprosthetic Surgical Valves: Early Outcomes From the Greek Valve-in-Valve Registry

Christophoros Kotoulas[1]*, Konstantinos Toutouzas*[1]*, Vasileios Voudris*[2]*, Panagiotis Dardas*[3]*, Antonios Pitsis*[3]*, Lambros Michalis*[4]*, Vassilios Gulielmos*[5]*, Konstantinos Spargias*[6]

Institutions where study was performed: [1]Army General Hospital of Athens, Greece; [2]Onassis Cardiac Center, Greece; [3]Saint Loukas Hospital, Greece, [4]Ioannina Medical School, Greece; [5]Geniki Kliniki of Thesaloniki, Greece; [6]Hygeia Hospital of Athens, Greece

Purpose: Over the past decade, there has been a dramatic shift toward the use of bioprosthetic over mechanical valves for SAVR. A significant number will require re-intervention fo structural valve degeneration. We present the early outcomes of the ViV-TAVI Greek registry, as a less invasive alternative.

Methods:

Retrospective study

- Period 2013-2017
- Greek registry
- Hospitals 8
- High risk patients 52

The primary endpoint was a risk-adjusted composite that included

- Operative mortality
- Readmission
- New atrial fibrillation
- New permanent pacemaker (PPM)
- Renal failure
- Stroke
- Vascular complications
- Major or life-threatening bleeding

Patients

- 52 out of 1596 total Greek cases
- M:F ratio 31:21
- Age (ys) 78,043 (61-90)
- Logistic Euroscore 28,93 (4,8 – 56,5)

Valves

- Stented 42
- Stentless 10
- Valve size (mm)
  - 19 7
  - 21 5
  - 23 22
  - 25 7
  - 27 3
  - 29 8

Mechanism of valve failure

- Stenosis 25
- Regurgitation 20
- Both 7

Results:

Approach

- Transfemoral 38
- Transapical 6
- Transaortic 4
- Trans-subclavian 4

Anaesthesia

- Local 11
- General 41

THV (mm) (Medtronic – Edwards – Abbott)

- 23 26
- 26 13
- 29 11
- 34 2

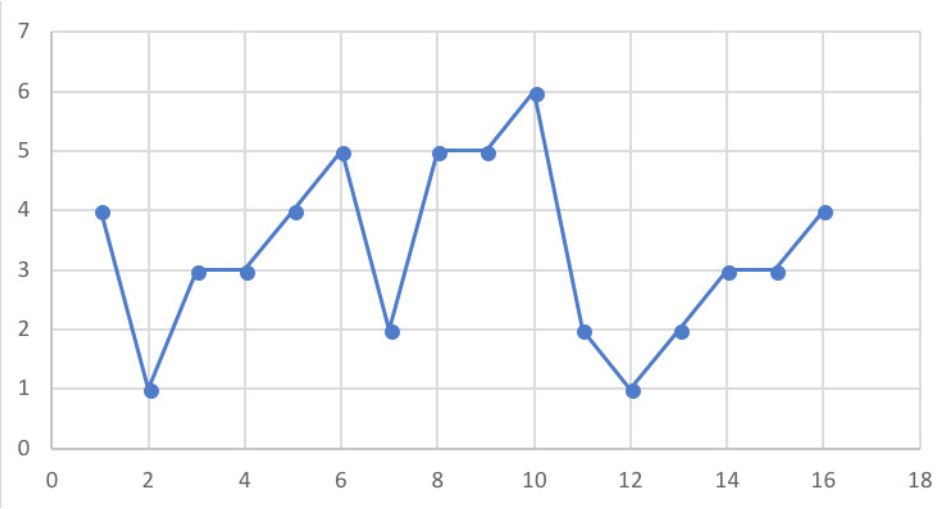
Mean hospital stay 7,7 d (4-16)

Paravalvular leak

- No or +1 51
- >3+ 1
- PPM or stenosis 0

Complications

- PPM 4
- New AF 4
- Vascular 3
- Major bleeding 1
- Renal Failure 3
- Stroke 1
- Mortality 3,84%



Conclusion: ViV TAVI for failed SAVR bioprostheses can be performed safely with a high success rate and minimal early mortality and it may be compelling, especially, for redoSAVR of high risk patients. ViV-TAVI is a viable, less invasive alternative to standard redo surgical AVR, even in cases of 19mm bioprosthetic valves.

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Minimally Invasive Aortic Valve Surgery in an Underserved Population in Southern Chile: Can We Achieve the Same Long-Term Results in a Developing Country?

***Juan Carlos Bahamondes**, Andres Diaz, Abelardo Silva, Mauricio Pena*
Institution where study was performed: Hospital Regional Temuco, Chile

Purpose: Aortic valve surgery can be performed through a reduced ministernotomy with less surgical trauma, improved cosmetics, faster recovery and excellent long-term results. Objective: To report the long-term results obtained with the minimally invasive approach technique in underserved population of the poorest region in our country

Methods: Retrospective cohort study of 286 patients operated with the less invasive technique compared to 1161 patients operated through full sternotomy subjected to valve replacement surgery for aortic valve disease between 2004 and 2018. a mean age of 52±6,4 years Arterial and venous cannulation was performed with small cannulas. Mean extracorporeal circulation flow was 4.5 L/min. Cold blood cardioplegia was infused through the antegrade and retrograde fashion. Statistical Analysis: Descriptive statistics with measures of central tendency and dispersion, categorical variables were compared with the X2 test and actuarial survival rate was calculated through Kaplan Meier method with Stata 14 package.

Results: There was no difference in 30 day mortality between both groups, similar findings for arrhythmias, cerebral complications and AV blockage requiring pacemaker. There were significant statistical differences related to reoperation for bleeding, days of stay at the ICU and at the hospital. Mean follow up time was 101 ± 4 (1- 169 months). All patients are in FC I and free from cardiac events and reoperation. In the postoperative period echocardiographic assessment was done in 86% of patients with excellent results. Actuarial survival probability was 97% and probability of freedom from cardiac events was 93% at 156 months of follow up.

Conclusion: Ministernotomy is an excellent approach for aortic valve surgery which can be performed with excellent results as the full sternotomy even in underserved cardiac patients, thus simplifying the surgical technique, reducing local hospital costs and health disparities in this population.

Postoperative Results			
	Mini sternotomy (n: 286)	Full sternotomy (n:1161)	p value
Mortality < 30 days	4 (1,4%)	14 (1,21%)	0,4
Arrythmias	45 (15,7%)	279 (24%)	0,38
Cerebral complications	5 (1,7%)	23 (2%)	0,52
AV blockage/pacemaker	23 (8%)	151 (13%)	0,06
Reop for bleeding	9 (3%)	65 (5,6%)	0,03
UCI stay (mean days)	2,2 ± 1,4	3,8 ± 2,6	0,04
Hospital stay (mean days)	4,2 ± 1,7	6,7 ± 1,4	0,05

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Preoperative Atrial Fibrillation Is a Risk Factor for Concealed Impairment of Myocardial Function and Increased Postoperative Morbidity in Patients Undergoing Coronary Artery Bypass Grafting Surgery

***Constanze Bening**, Jonathan Yaqub, Aura Mazalu, Khaled Alhussini, Khaled Hamouda, Ina Schade, Christoph Schimmer, Rainer Leyh*
Institution where study was performed: University of Wurzburg, Germany

Purpose: Up to 6% of patients scheduled for CABG present with preoperative atrial fibrillation (Afib). Afib is associated with increased perioperative morbidity and mortality. EuroSCORE II omits Afib as a modifier of potential risk, leaving the impact of preoperative Afib on postoperative mortality unaccounted for. The link between Afib and contractility remains unspecified.

Methods: After obtaining their informed consent, we included n=215 patients scheduled for elective CABG between 08/2016 – 03/2018. Patients were divided into two groups according to their preoperative heart rhythm: SR group; n=191 patients in preoperative sinus rhythm. Afib group; n=24 patients with preoperative Afib. Medical history as well as preop echo and intra- and postoperative data were collected. Contractility was measured with left and right atrial auricular myofilaments using the “skinned fiber” method and calcium induced force development. We used 12 calcium concentrations, starting at low concentrations over the physiological range up to supranormal concentrations (pCa 7.0 to 5.5).

Results: Patients presenting with preoperative Afib and scheduled for elective CABG procedure (compared to patients with preoperative SR) - are significantly older (73±7.4 versus 67±9.81 Jahre, p 0.001) - have less female sex (12 % versus 17%, p 0.04) - have higher sPAP values (30.8±6.7 versus 27.9±4.6 mmHg) - have lower TAPSE values (18.6±3.9 versus 23.3±3.7 mm) - have larger RA areas (21.8±8.7 versus 15.1±4.1cm^2) - have larger LA areas (27.9±7.2 versus 19.4±4.9 cm^2) - higher preoperatrive NT-ProBNP (1621±456 versus 934±256 pg/ml) - longer hospital stay (13.2± 3.4 versus 11.2±2.1 days) - calcium induced force development of left atrial myofilaments was significantly lower at all steps of calcium concentrations (p > 0.04) - calcium induced force development of right atrial myofilaments was significantly decreased only at higher calcium concentrations (pCa 4.5, 4.75 and 5.0)

Conclusion: We conclude that: 1. preoperative Afib in patients undergoing CABG is associated with - a weakened right and left atrial contraction - a higher postoperative morbidity - a significantly longer in-hospital stay 2. Risk prediction scores for cardiac surgery should include preoperative Afib as an independent risk modifier 3.- Larger studies are necessary to verify these results

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Predictors of Late Recurrence in Surgical Treatment of Atrial Fibrillation

Jenny Lourdes de Oliveira[1], *Oscar Bomfim*[1], *Luiz Carlos Bento De Souza*[2], *David Le Bihan*[1], *Marina Bond*[1], *Magaly Arrais Dos Santos*[1]

Institutions where study was performed: [1]Instituto Dante Pazzanese de Cardiologia, Brazil, [2]Hospital do Coracao-ASS, Brazil

Purpose: The surgical treatment of atrial fibrillation(AF) failure rates are associated with pre,per and postoperative factors.The aim of this study was to identify the predictors of late recurrence of AF after radiofrequency ablation of patients with persistent atrial fibrillation who underwent mitral and / or tricuspid valve surgery

Methods: Prospective observational cohort study with cross-sectional analysis of predictors of atrial fibrillation recurrence in the preoperative, immediate postoperative and postoperative periods of 6 months and 4 years. From January 2008 to December 2015, 174 patients with persistent AF underwent the Cox-Maze IV procedure with monopolar irrigated radiofrequency and concomitant mitral valve and / or tricuspid surgery, of these 87 (51.79%) patients were in sinus rhythm at hospital discharge, mean age was 56.72 ± 13.11 years, 52 (59.80%) patients were women, with a follow-up of 96.67% of patients in the mean time of 4.04 ± 2.04 years (median, 3.72 years).

Results: Of the 87 patients discharged with sinus rhythm,58(66.67%) maintained this at the mean follow-up time of 4.04 years.The factors associated with recurrence of late AF were the preoperative left atrial volume(LAV)(odds ratio[OR]1.01 95% confidence interval [CI]0.99 to 1.03,P = 0.05);AF before hospital discharge(P < 0 .001);in the mean postoperative 6.49±5 months,left atrial diameter(LAD)(OR 1.08, CI 95% 1.01 to 1.13, P = 0.01),pulmonary hypertension (PH)(OR 1.07, 95% CI 1.02 to 1.13, P = 0003),and in the mean postoperative 3.29±2.02 years,LAV(OR 1.06, 95% CI 1.01 to 1.11,P = 0.01), LAD (OR 1.14, 95% CI 1.02to1.27, P = 0.01),left ventricular end-diastolic diameter (LVEDD)(OR 1.13, CI 95% 1.01to1.28;P = 0.03),left ventricular end-diastolic volume (LVEDV)(OR 1.02, 95% CI 1.0to1.04, P = 0.04),PH (OR 4 95%, CI 0.09to16.36, P = 0.04),major tricuspid valve regurgitation (OR 7, 95% CI 0.95to1.45,P = 0.006), and left ventricle ejection fraction (LVEF) (OR 0.89, 95% CI 0.83to0.96,P = 0.006). In relation to the behavior in time, only the LAD, LVEDD and LVEDV variables showed a significant difference with P = 0.03; P = 0.01 and P = 0.01 respectively.

Conclusion: In patients with persistent AF undergoing surgical ablation and mitral and/or tricuspid valve surgery, higher preoperative LAV, AF episode before hospital discharge, higher postoperative LAV, LAD, LVEDV, LVEDD, presence of PH, tricuspid valve regurgitation and lower postoperative LVEF were the main predictors of recurrence of AF in the late follow-up.

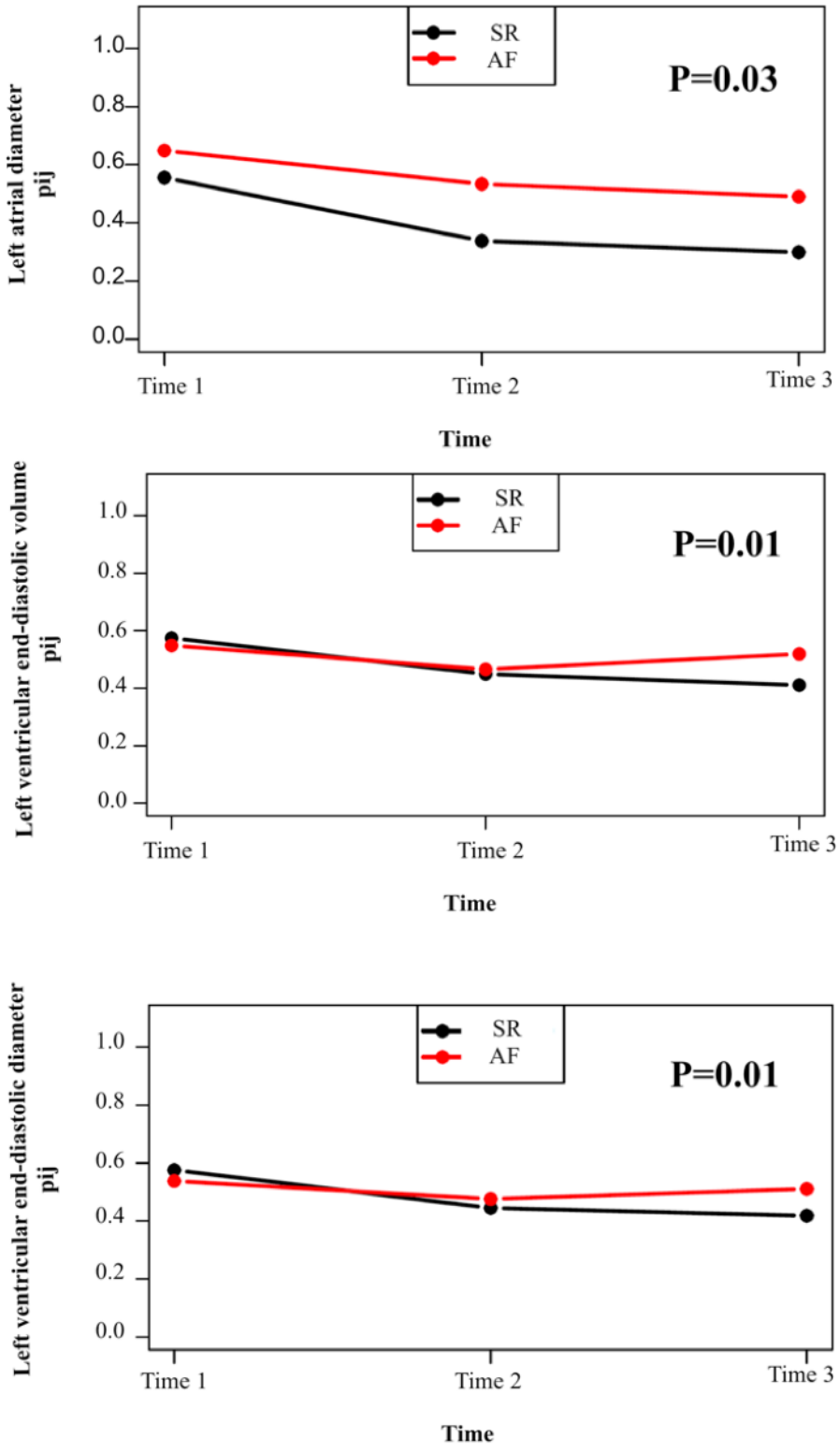

Figure 1. Graph of interactions between the group with sinus rhythm (SR) and group with recurrence of AF(AF) in relation to the diameter of the left atrium, the left ventricular end diastolic diameter and the left ventricular end diastolic volume .

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Table 1. Preoperative clinical characteristics of the patients

Variables		Total (n=174 patients)	Total (n=87 patients) SR at hospital discharge
Age, years		57.16±12.47	56.72±13.11
Gender	Female	114(65.52%)	52(59.80%)
BMI, kg/m2		26.06±4.60	25.65±3.77
SH		105(60.34%)	52(59.80%)
DM		29(16.67%)	16(18.40%)
Rheumatic fever		51(29.31%)	25(5.70%)
CKD		9(5.17%)	5(5.70%)
Dyslipidemia		42(24.14%)	21(24.10%)
Peripheral arterial disease		11(6.32%)	7(8.00%)
COPD		12(6.90%)	5(5.70%)
Stroke		24(13.79%)	13(14.90%)
Smoker		26(14.94%)	15(17.20%)
Prior heart surgery		46(26.44%)	22(25.30%)
PBMV		25(14.37%)	12(13.80%)
NYHA	II	91(52.30%)	47(54.00%)
	III	58(33.33%)	27(31.00%)
EuroScore II		3.61±3.35%	3.23±3.02%
LVEF		60±8.52%	60.31±8.55%
PH> 40 mmHg		133(76.44%)	83(95.4%)
LAD (mm)		57.39±8.66	57.38±8.15
LAV (mL/m^2)		86.46±34.19	90.44±35.34
LVEDD (mm)		54.35±8.23	55.16±8.05
LVEDV (mL)		149.39±51.65	153.03±50.87
Tricuspid valvular insufficiency	Moderate	48(27.59%)	21(24.13%)
	Severe	36(20.69%)	10(11.49%)
Mitral valvular insufficiency	Moderate	3(1.72%)	1(1.14%)
	Severe	63(36.20%)	35(40.22%)
Mitral valvular stenosis	Moderate	3(1.72%)	3(3.45%)
	Severe	31(17.82%)	16(18.39%)

SR=sinus rhythm; BMI=body mass index; SH=systemic hipertension; DM=diabetes mellitus; CKD=chronic kidney disease; COPD=chronic obstructive pulmonary disease; PBMV=percutaneous balloon mitral valvuloplasty; NYHA=New York Heart Association ;LVEF==left ventricular ejection fraction; PH=pulmonar hypertension; LAD=left atrial diameter; LAV=left atrial volume ; LVEDD=left ventricular end-diastolic diameter; LVEDV=left ventricular end-diastolic volume

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Surgical Ablation of Atrial Fibrillation: A Multidisciplinary Approach

***Carolina Rodrigues**, Rui Cerejo, Manuela Silva, Rui Rodrigues, Nuno Silva, Jose Fragata*
Institution where study was performed: Hospital de Santa Marta, Portugal

Purpose: Maze surgery is a time consuming invasive procedure. Catheter ablation presents with highly variable rates of success. Surgical ablation of atrial fibrillation by totally thoracoscopic approach, using radiofrequency, is a recent alternative. It is a treatment that has to be supported by a multidisciplinary team- the so called arrythmia team.

Methods: It is relevant an evaluation of our preliminary results. We performed a descriptive analyses of the 11 patients that have been submitted to surgical ablation of atrial fibrillation and occlusion of the left appendage by a totally thoracoscopic approach, since November 2017. We describe the surgical technique and, of course, our results, including duration of surgery, hospital stay, complications and conversion to sinus rhythm immediately after surgery, at one month and at 6 months of follow-up.

Results: Of the 11 patients, with ages between 39 and 75 years old, 45,5% are male. The mean time since the diagnosis of atrial fibrillation was 5 years. Seven patients had paroxysmal atrial fibrillation. Almost all (n=10) had been submitted to prior catheter ablation (mean of 2 attempts). In only one patient we had to convert to a median sternotomy. Conversion to sinus rhythm and left atrial occlusion was obtained in all patients. Pacemaker implantation was needed in one patient. The mean hospital stay was 4,8 days. At one month and at six month follow-up, all except one were in sinus rhythm. This surgical approach requires a multidisciplinary team, with arrhythmologists, cardiac surgeons and anesthesiologist working together. Arrhythmologists are indispensable in the post-operative management of this patients and anesthesiologist are crucial during surgery, ensuring the hemodynamic stability and complete closure of left atrial appendage by transesophageal echocardiogram.

Conclusion: At one year, with an event monitoring report, we will discuss, in arrhythmia team, the termination of anti-arrythmic/ anti-coagulation drugs. This approach is minimally invasive, safe, reproducible and a benefit for patients with multiple catheter ablations but not possible without a multidisciplinary team.

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Minimally Invasive Approach to Reoperative Coronary Artery Bypass Grafting Surgery Utilizing the da Vinci Robot

Arthur Martella, *Jane Cichelli*
Institution where study was performed: Our Lady of Lourdes Medical Center, United States

Purpose: Re-operative CABG continues to have significant morbidity and mortality. Off-pump techniques combined with a non-sternotomy approach provides a potentially safe alternative to redo sternotomy. The Davinci robot allows for non-sternotomy approach for mammary artery harvesting and dissection of adhesions.

Methods: Since 2011, we have utilized non-sternotomy approaches to coronary disease utilizing the Davinci robot. A retrospective review was performed of all patients undergoing re-operative coronary artery bypass grafting from January 1, 2015 to June 1, 2018.

Results: 432 robotic assisted MIDcab procedures were completed at our institution of which 28(6%) were re-operative procedures. Median age was 66 years old (range 32 to 79) and 21 were male (75%). A LIMA was utilized in 22 and a RIMA in 6 patients. There were four groups of patients: 1) LIMA not utilized (19 patients), 2) LIMA occluded (3 patients), 3) LIMA patent with distal disease (4 patients), and 4) LIMA patent with other disease (2 patients). There were no 30-day mortalities. Mean length of stay was 4.5 days. 15 patients required at least one unit of PRBCs.

Conclusion: Use of minimally invasive techniques with the DaVinci robot allows for a non-sternotomy approach for re-operative coronary surgery. This approach provides a safe alternative to redo sternotomy in selected cases.

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Activation of Hypothalamic Oxytocin Neurons Increases Parasympathetic Cardiac Activity and Reduces the Incidence of Arrhythmias in an Animal Model of Myocardial Infarction

Jeffrey Panting, *Kyongjune Lee, Grant Kowalik, Jhansi Dyavanapalli, Xin Wang, John Schloen, Olga Dervacheva, Matthew Kay, David Mendelowitz, Gregory Trachiotis, Sheena Chen*
Institution where study was performed: George Washington University, United States

Purpose: Studies have shown that increased sympathetic activity after acute coronary syndrome is arrhythmogenic and results in higher mortality rates. Conversely, parasympathetic activity has proven to be cardioprotective. We hypothesize activation of hypothalamic oxytocin neurons and downstream parasympathetic networks decreases the incidence of arrhythmias after induced myocardial infarction (MI) in rats.

Methods: Excitatory Designer Receptors Exclusively Activated by Designer Drugs (DREADDs) were selectively expressed in hypothalamic paraventricular oxytocin neurons using a combination of two vectors microinjected into the paraventricular nucleus (PVN). Telemetry devices were implanted to record the resting electrocardiograms in 24-hour sessions. Labchart was used to scan through the telemetry recordings and detect arrhythmias. A selective ligand for DREADDs, clozapine n-oxide, was given daily to treatment animals to activate DREADDs in the PVN oxytocin neurons beginning immediately post left anterior descending (LAD) artery ligation. Animals in the control group received saline. Groups were double-blinded and randomized.

Results: There were no events of ventricular tachycardia (VT) or ventricular fibrillation (VF) pre-LAD ligation in either group. Episodes of VF and VT occurred frequently in the control group (13.75 ± 13.75 and 10.50 ± 10.52, respectively) as compared to the treatment group (0 and 0.33 ± 0.47) immediately post LAD ligation. The incidence of premature ventricular contractions (PVCs) was similar in the treatment group (208.67 ± 146.16) versus the control group (209.0 ± 56.91) immediately post-ligation. However, there was a significantly decreased incidence of PVCs in the treatment group (15.67 ± 15.62) versus control (47.0 ± 44.63) 5 days post LAD ligation.

TABLE: Mean arrhythmic events during 24-hour telemetry

	Arrhythmia Types (Mean Number of Events)	Treatment (n = 3)	Control (n = 4)
Before Ligation	PVC	1.67 ± 0.47	3.75 ± 3.70
	VF	0	0
	VT	0	0
Immediately After Ligation	PVC	208.67 ± 146.16	209.0 ± 56.91
	VF	0	13.75 ± 13.75
	VT	0.33 ± 0.47	10.50 ± 10.52
5 Days After Ligation	PVC	15.67 ± 15.62	47.0 ± 44.63
	VF	0	0
	VT	0	0

PVC: Premature ventricular contractions
VF: Ventricular Fibrillation
VT: Ventricular Tachycardia

Conclusion: Our data show an inverse correlation between excitation of hypothalamic PVN oxytocin neurons and downstream parasympathetic pathways and the incidence PVCs, VF, and VT immediately, and 5 days after MI in the rodent animal model. This novel treatment has a high translational potential for reducing potentially fatal arrhythmias post-MI.

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Long-Term Graft Patency After Coronary Artery Bypass Grafting Surgery: Effects of Distal Anastomosis Angle

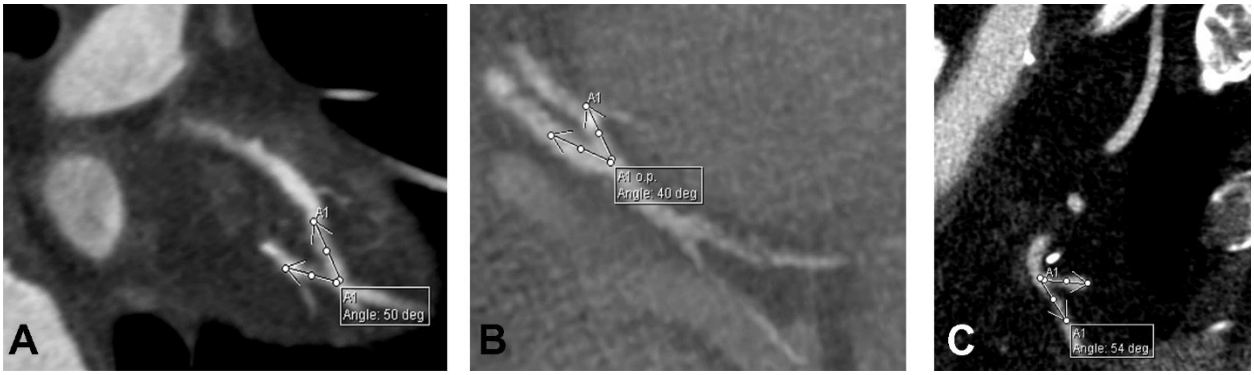
***Grigore Tinica**, Raluca Chistol, Cristina Furnica, Mihail Enache*
Institution where study was performed: Cardiovascular Institute, Romania

Purpose: Several researches investigated coronary flow in various coronary artery bypass grafting (CABG) models by using numerical simulations but no in vivo analysis was performed up to date. The aim of the current study was to identify surgical factors associated with long-term patency of CABG grafts on coronary computed tomography angiography

Methods: We analyzed the data of 127 patients who underwent CABG at our institute from 2000 to 2006 and presented for ambulatory examination and coronary computed tomography angiography evaluation of graft patency at 139.78 ±36.64 months post-CABG. The 127 patients received 340 grafts (2.68 grafts/patient) and 399 distal anastomoses (3.14 anastomoses/patient), 220 (55.14%) with arterial grafts and 179 (44.86%) with saphenous vein grafts.

Results: Graft patency varied according to coronary territory, proximal anastomosis type (in situ graft, composite graft, graft anastomosed to the ascending aorta), Y anastomosis angle (47.21o for patent arterial grafts vs. 56o for occluded), and distal anastomosis angle (in sequential anastomoses irrespective to graft type, 48.60o for patent side-to-side anastomosis vs. 53.97o for occluded, 65.12o for patent end-to-side anastomosis vs. 90.80o for occluded; in single end-to-side anastomosis of arterial grafts, 39.46o for patent and 44.94o for occluded). A single end-to-side anastomosis angle of 60o or greater was associated with a 5.149 occlusion odds ratio (OR) ($p < 0$ .001) for arterial grafts. Venous grafts were not sensitive to single end-to-side anastomosis angle.

Conclusion: In conclusion, a small anastomosis angle for proximal Y and distal anastomoses is associated with higher long-term patency of the free arterial graft. The current study is the first to prove in situ the effect of distal anastomosis angle on graft patency and a potential start point for multi-institutional research.



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The Effect of Perioperative Tranexamic Acid on Immediate Postoperative Chest Tube Output in Patients Undergoing Elective Coronary Artery Bypass Grafting Surgery

***Mohammad Pervez**, Yasir Khan, Hasanat Sharif, Shiraz Hashmi, Saulat Fatimi, Shahid Sami, Syed Shahabuddin*
Institution where study was performed: Aga Khan University Hospital, Pakistan

Purpose: Our study focused on assessing the benefit of routinely using low dose intravenous prophylactic Tranexamic Acid in reducing postoperative chest tube output in elective coronary artery bypass grafting surgery to address the feasibility of applying it as a standardized bleeding reduction measure in elective coronary artery bypass grafting procedures.

Methods: A retrospective analytical chart review was conducted from January 2013 to December 2017 employing random sampling. Two groups were studied as follows: Group A patients received Tranexamic Acid at 2mg/kg IV as infusion following a bolus upon induction that was stopped at 2 hours postoperatively while Group B patients did not receive any Tranexamic Acid. Trimmed mean output in milliliters for the first 24 hours from the time of chest closure was analyzed using Student's t-test.

Results: Fifty patients from the Tranexamic Acid Group (Group A) were compared to 146 from the group not receiving Tranexamic Acid (Group B). There was no statistically significant difference in chest-tube output over the first 24 hours: 597.1 ± 396.5 ml (Group A) vs 688.7 ± 446.2 ml (Group B) (p = 0.180). ICU stay (3.4 ± 2.3 vs 2.4 ± 1.7 days p=0.025), postoperative creatinine (1.7 ± 1.0 vs 1.4 ± 0.7 mg/dl (p=0.043), cross clamp time (96.4 ± 23.8 vs 59.2 ± 22.0 mins p=0.001) and pump time (130.6 ± 25.2 vs 101.4 ± 80.3 mins p=0.008) were all greater in the Tranexamic Acid group. More patients remained completely transfusion free in the Tranexamic Acid group at 24% vs 7% (p=0.019). However the patients in the Tranexamic Acid group required a greater amount of blood when transfusion was needed at 1.8 ± 1.1 vs 1.4 ± 0.8 units (p=0.047).

Variable	Tranexamic Acid Group A n=56	No Tranexamic Acid Group B n=146	p valve
Age (years)	61.9 ± 11.1	60.3 ± 10.1	0.325
Gender	48 (85.7)	120 (82.2)	0.676
BMI (kg/m²)	27.3 ± 3.2	27.4 ± 4.1	0.975
Ejection Fraction %	49.4 ± 13.5	51.6 ± 11.5	0.258
PreOp Sr. Creatinine (mg/dl)	1.2 ± 0.9	1.0 ± 0.3	0.059
PostOp Sr. Creatinine (mg/dl)	1.7 ± 1	1.4 ± 0.7	0.043
Perfusion time (min)	130.6 ± 25.2	101.4 ± 80.3	0.008
Cross Clamp time (min)	96.4 ± 23.8	59.2 ± 22.0	0.001
Prolonged Ventilation	3 (5.4)	5 (3.4)	0.528
PRBC required	19 (33.9)	68 (48.6)	0.019
Intraop Blood Products	26 (46.4)	77 (52.7)	0.422
ReOpen for any reason	1 (1.8)	5 (3.4)	0.539
Surgical Site Infection	0 (0)	2 (1.4)	0.379
Length of stay 14 days	54 (96.4)	142 (97.3)	0.755
Mortality (30 Day)	1 (1.8)	4 (2.7)	0.696

Conclusion: The routine use of Tranexamic Acid in elective Coronary Artery Bypass Grafting grants no benefit in reducing postoperative bleeding and may lead to detrimental outcomes like increased acute kidney injury and postoperative ICU stay. Future studies should focus on renal function and ICU length-of- stay in addition to bleeding outcomes.

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Coronary Artery Bypass Grafting Surgery With Bilateral Internal Mammary Artery: Medium-Term Results

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Institution where study was performed: Instituto Nacional Cardiovascular (INCOR) - EsSalud, Peru

Purpose: Coronary artery bypass graft (CABG) surgery remains the gold standard in the treatment of multivessel coronary disease. Several studies have shown that CABG with bilateral internal mammary arteries (BIMA) has better results in long-term survival. We describe our surgical experience in CABG with BIMA.

Methods: We conducted a retrospective investigation in CABG surgeries with BIMA performed from January 2012 to June 2018 in the National Cardiovascular Institute, INCOR, EsSalud. The objectives were determine the mortality and major cardiovascular events at 30 days and in 24 months of follow up on average.

Results: 121 patients were submitted to CABG surgery with BIMA (“skeletonized technique” in all patients). 30-day mortality was 0%, major cardiovascular events occurred in 1.65% of patients (Stroke 0%, postoperative myocardial infarction 1.65%, need of new coronary intervention 0%). The incidence of mediastinitis and/or sternal reconstruction was 0.8% (1/121). 09 patients (7.4%) had wound superficial infection. In an average follow-up of 24 months, mortality was 0.8% (1/125), major cardiovascular events ocurred in 4.95% of patients (Stroke 0%, postoperative myocardial infarction 1.65%, need of new coronary intervention 3.3%). Survival free of reinterventions was 96.7%.

Conclusion: CABG surgery with BIMA is a safe procedure, with low rates of mortality and major cardiovascular events.

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Impact of Diabetes on Survival Following Coronary Artery Bypass Grafting Surgery: 12-Year Follow-Up

***Umar Imran Hamid**, Wael Awad, Georgios Sotiropoulos*
Institution where study was performed: St Bartholomew's Hospital, United Kingdom of Great Britain and Northern Ireland

Purpose: The prevalence of diabetes in patients undergoing CABG is high and insulin-dependent diabetic patients have a higher operative mortality. There is little data, however, on the long-term survival of diabetic patients. Our objective was to evaluate the impact of all types of diabetes on long term survival following CABG.

Methods: We analyzed prospectively collected data from all patients who underwent isolated first time CABG in our centre over a 2-year period, between January 2006 and December 2007. Patient characteristics and post-operative survival (in-hospital and late) were compared between 4 patient groups: non diabetic (ND), diabetic on diet control (DD), diabetic on oral medications (OD) and diabetic on insulin (ID). All-cause mortality following CABG was ascertained from the NHS Spine Portal. Kaplan-Meier curves were used to calculate actuarial survival. Log-rank test was used to calculate the P-value.

Results: A total of 1095 patients underwent isolated first time CABG. 636 (58.1%), at 12 year follow-up patients had diabetes (mean age 66±9 years; 77 % male; 41% had impaired LV function) and 459 (41.9%) patients were non diabetic (mean age 68.2± 9 years; 79% male; 37% had impaired LV function). 211 (33.2%) of the 636 diabetic patients were ID, 331 (52%) were OD and 94 (14.8%) were DD. In-hospital mortality was 5/459 (1.1%) in the non-diabetic and 5/636 (0.8%) in the diabetic patients (p= 0.74). At 12 years follow-up, there was a significant difference in survival between the non-diabetic (66% survival) and the insulin dependent patients (46% survival) (p= < 0.0001) (Figure 2). However, there was no difference in the survival between the ND (66% survival) and non-insulin dependent diabetic patients (65% survival in DD and OD); p= 0.4) (Figure 1).

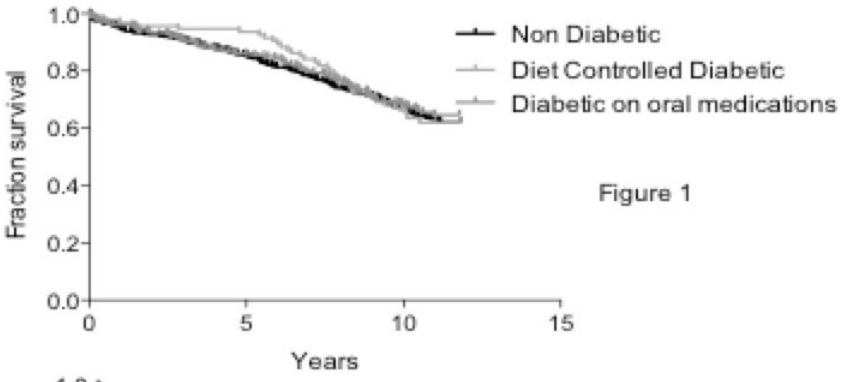

Figure 1

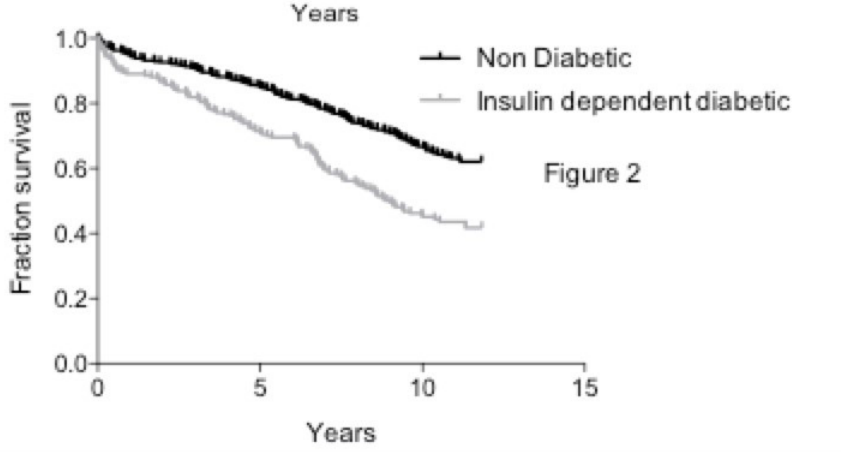

Figure 2

Conclusion: Insulin dependent diabetic patients experience worse long-term survival following CABG. Non-insulin dependent diabetic patients appear to have similar long-term survival to non-diabetic patients. This study, with the longest follow-up, is the first to demonstrate similar survival in non-insulin diabetic versus non diabetic patients after coronary surgery, at 12 years.

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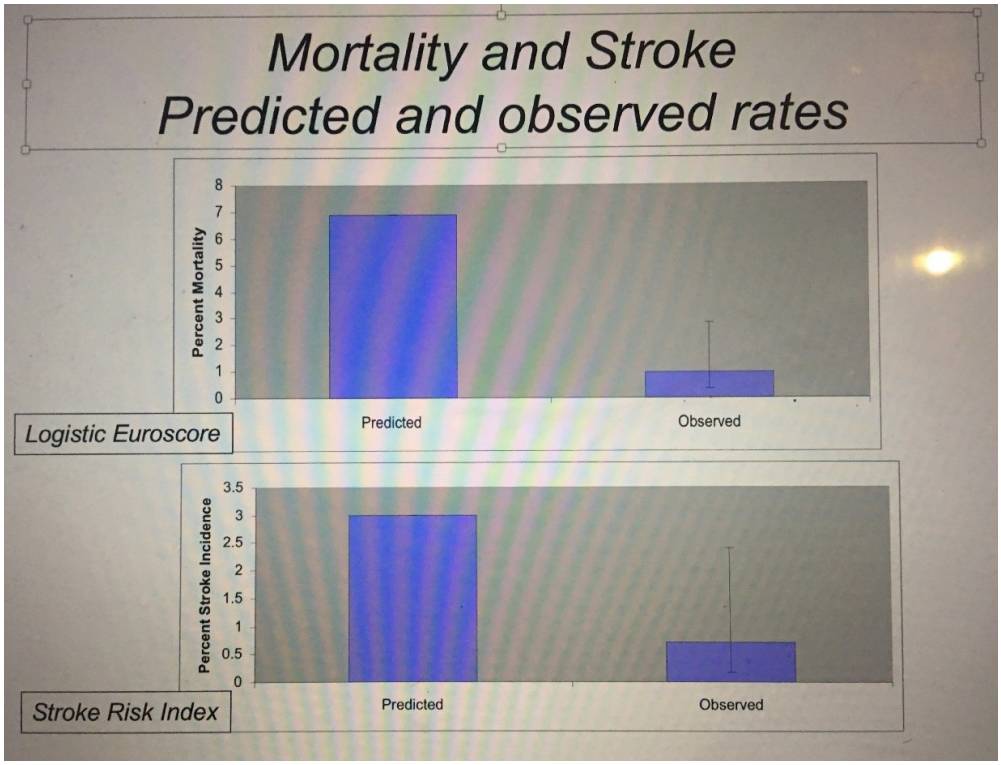
Stroke Reduction in Coronary Surgery Using a Simple Intraoperative Strategy

***Siva Patimalla Venkata[1]**, Jorge Balaguer[2], Tarek Absi[3]*
Institutions where study was performed: [1]Mayo Clinic Arizona, United States; [2]University of Pittsburgh, United States; [3]Vanderbilt University Medical Center, United States

Purpose: Stroke, one of the devastating complications of cardiac surgery, is associated with mortality and morbidity. Two mechanisms have been proposed for most perioperative strokes. Atheroembolic events due to disruption of atherosclerotic plaques in the ascending aorta and cerebral hypoxia. These mechanisms could potentially be minimized with use of epiaortic ultrasound and cerebral oximetry.

Methods: An intraoperative neuroprotective strategy was used in 306 consecutive patients undergoing coronary artery bypass surgery with cardiopulmonary bypass in our institution. Epiaortic ultrasound (to diagnose and avoid surgical instrumentation of atherosclerotic plaques) and cerebral oximetry (to diagnose and correct brain oxygen imbalance) were applied to all patients and were the foundation of the strategy. A stroke risk index was utilized to calculate the risk of stroke for the entire population and high-risk sub groups. Observed and expected rates of perioperative stroke were compared

Results: Two patients suffered a perioperative stroke (2/306 patients) for a rate of 0.7% (95% CI 0.18%-2.4%). The expected risk of stroke for the same population was 2.99%. Our observed stroke rate also compared favorably with the expected rate in some high-risk patient populations. In patients with documented atherosclerosis of the ascending aorta, the stroke rate was 2.90% (95% CI: 0.51-14.5%; expected : 4.71%); in patients with vascular disease, it was 0.84% (95% CI: 0.15%-4.61%; expected :4.64%); and in patients older than 70 years, it was 0% (95% CI:0-92%; expected:5.13%). There were no transient ischemic attacks, coma or mortality associated with neurological adverse events.



Conclusion: This intraoperative strategy seems to be effective in reducing the incidence of perioperative stroke in patients undergoing coronary artery bypass surgery with cardiopulmonary bypass, even in the highest-risk populations. This strategy is simple, practical, not time-consuming and is easily applicable in a variety of settings.

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Impact of Left Ventricular Dysfunction on Long-Term Outcomes Following Coronary Artery Bypass Grafting Surgery

***Umar Imran Hamid**, Wael Awad, Georgios Sotiropoulos*
Institution where study was performed: St Bartholomew's Hospital, United Kingdom of Great Britain and Northern Ireland

Purpose: Left ventricular function is an important risk factor for operative mortality. However, there is no data on the long-term survival following cardiac surgery. The aim of this study was to evaluate the late survival of patients with good, moderately impaired and poor LV function following coronary artery bypass surgery.

Methods: We retrospectively analysed prospectively collected data from all patients undergoing isolated first time coronary artery bypass surgery in our centre over a 13 month period Jan 2006 – Jan 2007, to allow 10 years follow-up. All cause mortality was ascertained from the NHS Spine Portal. Demographic data and post-operative survival (in-hospital and late) in patients with good (LVEF >50%), moderately impaired (LVEF 30-50%) and poor (LVEF < 3 0%) LV function were established and the groups were compared.

Results: During this period a total of 672 patients underwent isolated first time CABG. The mean age was 67.6 ± 9.2years (range 26-88 years), and 524 (80%) were male. 391(58.2%) patients had good (mean age 67.4±9.4years), 230 (34.2%) had moderately impaired (mean age 67.7±9.1 years) and 51(7.6%) had poor (mean age 70.1±8.9 years) LV function. The overall in-hospital mortality was 1.49% (10/672); 0.51% (2/391) in patients with good LV function, 1.3% (3/230) in patients with moderately impaired LV function and 9.8% (5/51) in patients with poor LV function, p p < 0 .0001.

Conclusion: Patients with impaired LV function undergoing CABG have higher operative mortality, as predicted by EuroScore II. Those with moderately impaired LV function have similar 5 year but worse 10 year survival compared to those with good LV function, and those with poor LV function have worse mid- and long-term survival.

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Impact of Gender and Age on Long-Term Survival Following Coronary Artery Bypass Grafting Surgery

***Georgios Sotiropoulos**, Emma Louise Stewart, Alessandro Montecalvo, Wael Awad, Umar Imran Hamid, Adelina Dan*
Institution where study was performed: St Bartholomew's Hospital, United Kingdom of Great Britain and Northern Ireland

Purpose: Female gender is considered an independent risk factor following CABG. There is contradictory data on the long-term survival of patients based on gender. Objectives of this study were to evaluate the impact of gender on late survival following CABG and investigate whether any difference in survival was influenced by age.

Methods: We analysed prospectively collected data from all patients who underwent isolated first time CABG in our centre over a 2 year period, between Jan 2006 and Dec 2007; this allowed 5 and 10-year follow-up. Patient characteristics and post-operative outcomes were collected and analysed. All-cause mortality was ascertained from the NHS Spine Portal. Survival of female and male patients at 5 and 10 years following CABG was ascertained. In addition, the two groups were divided into those below or above 70 years of age to determine the effect of age on any differences in survival.

Results: A total of 1625 patients underwent CABG during this 2 year period. 311 (19%) patient were female nd 1314 (81%) male. Mean age was 66.8 (± 9.9) years for all patients (67.4 years for females and 66.6 years for males; p=0.75). Median follow-up was 127.7 months. Inhospital mortality was (10/1314) 0.75% for male, versus (1/311) 0.32% for female (P=0.39). 5 year survival was (277/311)89.1% for females versus (1104/1314) 84% for male (p=0.02). At 10 years, survival was (211/311) 67.8% for female versus (854 /1314) 65% for males, (p=0.13). With respect to age, survival for females 85% versus 75.4% at 10 years, respectively (p=0.007). For patients > 70 years, survival at 5 years was 81.6% for female versus 75.7% for male (p=0.24) and 46.3% versus 47.8%, at 10 years follow-up, p=0.96%.

Conclusion: This study shows that female gender is associated with better survival than male patients at 5 years, but not at 10 years, following CABG. Furthermore, In patients less than 70 years old female patients had increased survival at 10 years, compared to male.

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Impact of Antiplatelet Therapy Management on Clinical and Bleeding Outcomes in Patients Undergoing Coronary Artery Bypass Grafting Surgery

Ali Alsagheir[2], *Richard Whitlock*[1], *Emilie Belley-Cote*[2], *Alex Koziarz*[2], *Ahmad Makhdoum*[3], *Hatim Alraddadi*[2], *Andre Lamy*[1]
Institutions where study was performed: [1]Population Health Research Institute, Canada; [2]McMaster University, Canada; [3]Hospital for Sick Children, Canada

Purpose: The surgical community often has concerns when performing urgent coronary artery bypass grafting surgery (CABG) in patients who recently received DAPT. Therefore, we aimed to evaluate the effect of preoperative exposure to DAPT versus aspirin versus no antiplatelet therapy on 30-day and 1-year clinical outcomes in patients undergoing CABG.

Methods: We used patient-level data from CORONARY, a randomized controlled trial of off-pump versus on-pump CABG surgical technique, for analysis. The trial included 4752 patients from 79 centers in 19 countries. Aiming to maximize homogeneity in patient population and practice, we built a cohort with participants from North America, Europe and Australia. We divided these patients based on their pre-operative exposure to either DAPT, ASA only or no antiplatelet therapy in the 7 days before surgery and assessed rates of mortality, myocardial infarction, and stroke at 30 days and 1 year, and post-operative requirements for blood products.

Results: We included 1694 patients: 360 received DAPT, 920 received ASA and 414 received no antiplatelet agent. At 1 year, 71 patients had suffered an MI, 38 had a stroke and 65 had died. Mortality, MI, stroke and the composite of these three outcomes did not differ between the 3 groups, both at 30 days and 1 year. Exposure to DAPT was associated with significantly higher rates of red blood cell, plasma and platelet transfusion rates when compared to no antiplatelet or ASA alone (table 1). However, chest tube output at 12 hours and re-exploration after CABG did not differ significantly across the 3 groups (table 1).

Conclusion: Patients on DAPT in the 7 days before CABG surgery received significantly more blood products with a trend for higher re-exploration rate; however, clinical outcomes at 30 days and 1 year did not differ significantly from patients on ASA only or no antiplatelet agent.

	No antiplatelet agent (n=414)	ASA only (n=920)	DAPT (n=360)	p-value
Red blood cells				
n (%)	169 (41%)	361 (39%)	190 (52%)	<0.001
mean (SD)	357 (698)	315 (646)	419 (632)	
Plasma				
n (%)	90 (22%)	183 (20%)	118 (33%)	<0.001
mean (SD)	834 (695)	917 (930)	785 (1024)	
Platelets				
n (%)	50 (12%)	90 (10%)	110 (31%)	<0.001
mean (SD)	391 (292)	387 (258)	407 (354)	
Chest tube bleeding				
mean (SD)	507 (330)	498 (364)	541 (378)	0.16
median (IQR)	450 (300,650)	420 (280,620)	450 (300,660)	
Re-exploration n (%)	3 (1%)	14 (2%)	10 (3%)	0.07

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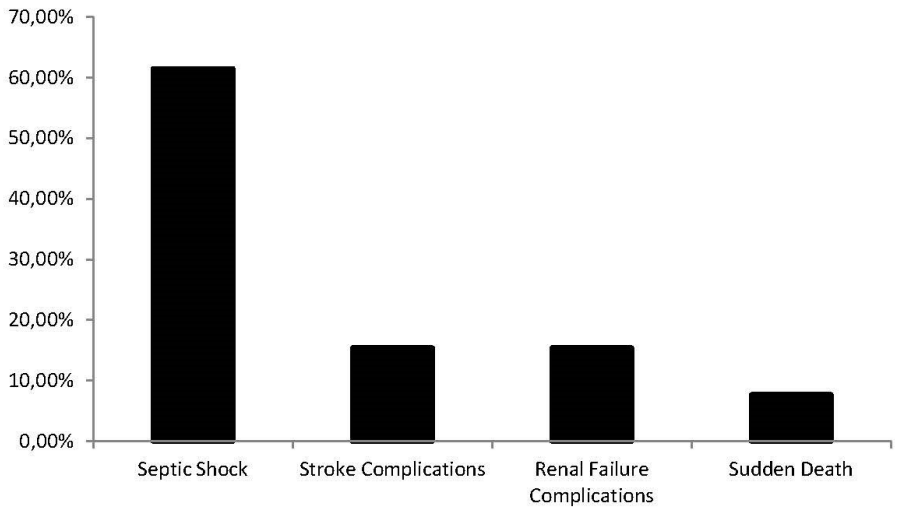
Preoperative Intraaortic Balloon Pump Impact in High-Risk Patients Undergoing Coronary Artery Bypass Grafting Surgery

Andrea Oliveira Freitas, *Danilo Gurian, Adilson Pires, Joao Correa*
Institution where study was performed: Hospital Estadual Mario Covas, Brazil

Purpose: High risk patients with severe left ventricular disfunction undergoing coronary artery bypass grafting (CABG) still remain a challenge. Benefits of preoperative intra-aortic balloon pumping (IABP) in the hospital recovery of such patients profile is known, but some meta-analysis recently showed reduction in the occurrence of renal failure and major cardiovascular events (MACCE).

Methods: A prospective non-randomized controlled clinical trial analyzed high risk patients undergoing CABG and preoperative IABP installed about 15 hours before the surgery by Seldinger technique. We included 295 patients with severe left ventricular dysfunction, considering the left ventricular ejection fraction (LVEF) estimated on the doppler echocardiogram by the Simpson method less than 40%. Exclusion criteria were emergency surgery, presence of severe aortic insufficiency, ventricular aneurysm or pseudo-aneurysm, and aortic dissection. Evolution data, mainly postoperative echocardiographic parameters and MACCE occurrence within 30 days after surgery, were evaluated. The data were submitted to Kolmogorov-Smirnov, Wilcoxon and Friedman tests, considering statistically significant p less than 0.05.

Results: The authors excluded 6 patients who lost follow-up after hospital discharge and could not be reevaluated after 30 days. This study observed 289 cases, 249 (86.2%) male patients and 40 (13.8%), female. Most of the population consisted of men, diabetics, young people, hypertensive and smokers, with approximately 30% LVEF and were performed 3.8±1.1 grafts per patient. Weaning of vasoactive drugs was early, which was still initiated in the immediate postoperative period by vasopressin, followed by noradrenaline and, finally, without the IABP, by dobutamine, in 3.1±1.09 days. All patients used IABP for 1.2±0.3 days, including the day before surgery, and required vasoactive drugs for 3.9±1.18 days. The diastolic diameter of the left ventricle was reduced to 59±6.26 (p 0.058), systolic diameter to 41±7.83 (p 0.001), and left ventricular ejection fraction improved to 39.50±8.66 (p 0.004). We observed the occurence of MACCE in 27 (9.3%) patients (p 0.002). The hospitalization time was 10.3±5.88 days and we observed 38 (13.1%) deaths.



Graphic 1. Distribution of causes of death on postoperative period.

Conclusion: Considering the good postoperative evolution, preoperative IABP may be an effective therapy in the treatment of high risk patients undergoing CABG. Our initial results confirm recent findings of other authors and suggest a significant protective effect from MACCE after 30 postoperative day, besides improvement of clinical and echocardiographic postoperative outcomes.

Table 1. Demographic Characteristics. n: number; sd: standard deviation.

	N	sd	p
Age (years)	61.13	7.38	-
Male	249 (86.2%)	-	-
Female	40(13.8%)	-	-
Preoperative FEVE	31.63	5.1	-
Postoperative FEVE	39.5	2.66	0.004
Diastolic diameter of the preoperative left ventricle (mm)	68.21	8.17	-
Diastolic diameter of the postoperative left ventricle (mm)	59	6.26	0.058
Sistolic diameter of the preoperative left ventricle (mm)	55.13	5.61	-
Sistolic diameter of the postoperative left ventricle (mm)	41	7.83	0.001
Coronary Artery Disease			
Left coronary trunk	53(18.3%)	-	-
Anterior Interventricular	273(94.4%)	-	-
Right	280(96.8%)	-	-
Circumflex	238(82.3%)	-	-
Cerebrovascular atheromatosis (>70%)	63(21.7%)	-	-
Systemic Arterial Hypertension	280(96.8%)	-	-
Unstable Angina	77(26.6%)	-	-
Previous acute myocardial infarction	237(82%)	-	-
Hypercholesterolemia	123(42.5%)	-	-
Diabetes mellitus	189(65.3%)	-	-
Previous coronary angioplasty	138(47.7%)	-	-
Smoking	213(73.7%)	-	-
Peripheral artery disease	37(12.8%)	-	-
Alcoholism	201(69.5%)	-	-
Preoperative Renal Insufficiency (creatinine up to 1.3)	29(10%)	-	-

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Total Arterial Revascularization Conversion: Are Three Internal Mammary Artery Grafts Better Than Two?

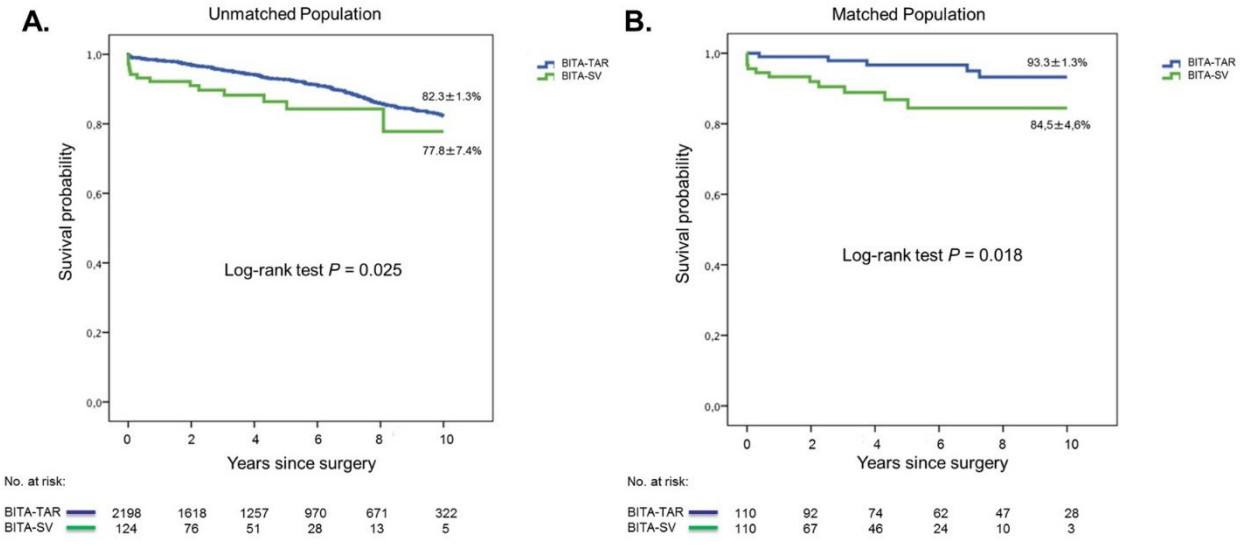
Mariano Camporrotondo, *Juan Espinoza, Juan Vrancic, Fernando Piccinini, Daniel Navia, Nestor Clusa, Miguel Chiappe, Martin Pairone, Nathalia Revelo, Alvaro Munoz*
Institution where study was performed: Instituto Cardiovascular de Buenos Aires, Argentina

Purpose: Bilateral internal thoracic arteries (BITAs) are associated with improved long-term survival. It is unclear whether the addition of a third arterial graft in patients already receiving BITA confers any additional benefit. We investigate the implication of conversion from total arterial revascularization exclusively with BITA grafts to BITA plus a saphenous.

Methods: Retrospective single center case-control study between 2003 and 2017. Consecutive triple-vessel disease off Pump CABGs with intention to perform total arterial revascularization (TAR) exclusively with BITA grafts were included (n = 2322). 2198 (94.7%) patients underwent TAR with only BITA (BITA-TAR Group) and 124 patients (5.3%) were converted to BITA plus Saphenous Vein (SV) (BITA-SV Group). Statistical adjustment were performed with propensity score matching (n = 110 each group). Primary endpoint was operative morbidity and mortality and 10-years mortality. Kaplan-Meier survival curves were compared between groups. Statistical significance was p = 0.05.

Results: Patients in the BITA-SV group were more non-elective, more previous acute myocardial infarction (AMI), more previous percutaneous coronary interventions, and more severe left ventricular dysfunction. After propensity score adjustment both groups had similar basal characteristics. Patients who underwent BITA-TAR had reduced unadjusted in-hospital mortality (1.1% versus 5.6%; p < 0.0001), less postoperative AMI (0.9% versus 4.8%; p < 0.0001), and less conversion off to on-pump (0.4% versus 8.1%; p < 0.0001). At 10 years, patients who underwent BITA-TAR experienced superior unadjusted survival (BITA-TAR, 82.3% ± 1.3% versus BITA-SV 77.8% ± 7.4%; p = 0.025). In the propensity-score-adjusted analysis, patients who underwent BITA-TAR grafting had better in-hospital mortality (0% versus 4.5%; p = 0.024), less postoperative AMI (0% versus 5.5%; p = 0.013), less conversion off to on pump (0% versus 6.4%; p = 0.007) and better survival at 10 years (BITA-TAR, 93.3 ± 3% versus BITA-SV 84.5±4.6%; p = 0.018).

Conclusion: This study suggests that coronary artery bypass grafting performed exclusively with BITA for triple vessel disease may be associated with better in-hospital and long-term survival. BITA-TAR graft conversion is associated with increased operative morbidity and mortality and worse long term survival.



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Single-Center Experience With the Use of Veno-Venous Extracorporeal Membrane Oxygenation in the Treatment of Post-Cardiotomy Acute Lung Injury

***Federico Sertic**, Dieynaba Diagne, Thomas Richards, Maria Molina, Robert Rice, Lexy Chavez, Christian Bermudez*
Institution where study was performed: Hospital of the University of Pennsylvania, United States

Purpose: Veno-Venous Extra-Corporeal Membrane Oxygenation (VV-ECMO) is rarely utilized in patients undergoing open cardiac operations. We sought to evaluate the outcomes of the use of VV-ECMO to support post-cardiotomy patients with Acute Lung Injury (ALI) and severe hypoxemia. This experience represents the largest single-center series available.

Methods: This is a retrospective analysis, from January 2014 to February 2018, of 18 patients (12M/6F), undergoing VV-ECMO for severe post-cardiotomy ALI. Patients who were supported with VA-ECMO and then were transitioned to VV-ECMO were excluded from this series. Pre-operative, intra-operative and post-operative continuous and categorical variables were compared between survivor and non-survivor using student's-t-test and chi-squared test, respectively. Effect of ECMO on ventilatory parameters (before and after ECMO) was analysed using student's-t-test. Complications rate, in-hospital mortality, causes of death, duration of ECMO support, ICU stay and hospital stay were also assessed.

Results: Eighteen-patients (age:52.8+/-16.5-years/range:21-78) required VV-ECMO for post-cardiotomy ALI. Comorbidities included: arterial-hypertension-(55%), diabetes-(22%), chronic-lung-disease-(22%), CKD-(33%), PVD-(16%), atrial-fibrillation-(22%) and previous-cardiac-surgery-(38%). The type of operation included: aortic-surgery-(50%), MVR-(23%), TVR-(17%), CABG-(5%) and ASD-closure-(5%). Mean-time from-surgery-to-ECMO was 3.2 days (range:0-to-11-days). Indications for VV-ECMO included: aspiration-pneumonia-(23%), bacterial-pneumonia-(23%), TRALI-(11%), viral-pneumonia-(5%) and ARDS-(38%). Post-operative-echocardiogram before ECMO-initiation revealed preserved LV-function in all patients (EF 67%+/-0.1). The use of VV-ECMO led to a significant improvement in ventilatory and blood-gas-parameters-(Table 1.) Non-survivors had a significantly higher-STS-score, longer-CPB-time and cross-clamp-time and higher-rates of emergency-surgery and post-operative-AKI-requiring-dialysis-(Table1). Eight patients-(44.4%) were successfully weaned from VV-ECMO. Complications included: AKI-requiring-dialysis-(55%), bleeding-(38%), surgical-site-infection-(15%), limb-ischemia-(5%), bowel-ischemia-(5%), CVA-(16%) and DVT-(16%). Overall-survival to hospital-discharge was 27.8%. Survival in the aortic-group was 11% and in the non-aortic-group was 44%-(p=0.11) with the aortic-population having significantly longer CPB-time-(p=0.0001) and no significant difference in the STS-score-(p=0.8). Causes-of-death included: MOF-(46.2%), progressive-respiratory-failure-(23%), sepsis-(23%) and major-bleeding-(7.8%). Mean-duration of ECMO-support, ICU-stay and hospital-stay were 6.4, 22.2 and 28.1-days respectively.

Conclusion: The use of VV-ECMO as rescue-therapy for ALI is associated with high mortality rate, especially in the aortic surgery population. Prolonged CPB time, high STS score, emergency surgery and post-operative AKI requiring dialysis are more frequently observed in non-survivors.

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Patients n.18	*Pre-ECMO*	*48-hours after ECMO*	*p-value*
PaO2 (mmhg)	*86.2*	*150.6*	***0.01***
PCO2 (mmhg)	*46.5*	*36.8*	***0.002***
Tidal volume (ml)	*493*	*395*	***0.04***
PEEP	*7*	*7.5*	*0.65*
FiO2 (%)	*88.8*	*58.8*	***0.0005***
PaO2/FiO2	*99.2*	*231.4*	***<0.0001***
	Survivor (5/18)	***Non-survivor (13/18)***	
Age (years)	55.4	51.9	*0.7*
BMI	30.7	32.4	*0.71*
HTN	4/5	6/13	*0.19*
Diabetes	1/5	3/13	*0.88*
Chronic lung disease	2/5	2/13	*0.26*
CKD	2/5	4/13	*0.7*
Previous cardiac surgery	2/5	5/13	*0.95*
Emergency surgery	1/5	9/13	***0.05***
Aortic surgery	1/5	8/13	*0.11*
STS score (%)	3.72	13.93	***0.004***
CPB time (min)	82.3	227.3	***0.002***
Cross-clamp time (min)	68	142.7	***0.016***
Time from surgery to ECMO initiation (days)	3	3.1	*0.97*
PaO2 at 48 hours after ECMO (mmhg)	168.8	143.6	*0.69*
PaO2/FiO2 at 48 hours after ECMO	224.8	233.9	*0.86*
Post-operative IABP support	0/5	2/13	*0.35*
RBC (ml)	6060	5630	*0.8*
Platelets (ml)	1020	1753	*0.2*
FFP (ml)	1360	2923	*0.13*
Cryoprecipitate (ml)	300	826	*0.11*
Post-op AKI requiring dialysis	1/5	9/13	***0.05***

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Long-Term Outcomes of Destination Therapy Left Ventricular Assist Devices

Nicolas Brozzi[1]*, Isabela Saba*[1]*, Fotios Andreopoulos*[1]*, Sandra Chaparro*[1]*, Ali Ghodsizad*[1]*, Maxim Armour*[2]*, Matthias Loebe*[1]

Institutions where study was performed: [1]University of Miami Miller School of Medicine, United States; [2]Jackson Memorial Hospital, United States

Purpose: Implantable left ventricular assist devices (LVAD) have become an effective therapy for patients with advanced heart failure who are not candidates for heart transplantation, including those with advanced age, sensitized, or presenting several comorbidities. Identification of patients that will benefit from prolonged LVAD support is critical to the success of this therapy.

Methods: We present a retrospective analysis of adult patients (>18 years of age) receiving continuous flow LVAD with Heart Mate II between 2009 and 2017. Demographic data, indication for LVAD support, INTERMACS score, postoperative complications, and complications while on long term support were analyzed. Primary end-point included duration of support until death, or device explant, and secondary end-point were late complications during LVAD support.

Results: A total of 95 patients received implantation of Heart Mate II LVAD as destination therapy between 2009 and 2017, including 41 (43%) patients > 65 years of age. INTERMACS score at time of implant was I in 15, II in 19, III in 57, and IV in 4 patients. Hospital mortality was 15 (15.7%). Hospital mortality for INTERMACS category I patients was 40% (6 of 15), for category II was 26% (5 of 19) and category III was 7% (4 of 57). For the 80 patients (85%) discharged from hospital, average support was 718 days (range 41-2,600), with longest support >5 years. Thirteen patients eventually became heart transplant candidates and were successfully transplanted. The most frequent complication on support was GI bleeding (20%), driveline infection (15%), stroke (9%), and pump thrombosis (5%).

Conclusion: Patients with advanced heart failure not eligible for heart transplantation present acceptable operative mortality, and low rate of late complications during long term LVAD support. Lower INTERMACS score resulted in significantly higher operative mortality, highlighting the importance of early indication for LVAD therapy. Some patients become transplant candidates while on LVAD support.

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HIV Patients Benefit From Advanced Heart Failure Therapies

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Institutions where study was performed: [1]University of Miami Miller School of Medicine, United States; [2]Universidad CES, Colombia

Purpose: Human Immunodeficiency Virus (HIV) affects millions of patients worldwide. Highly active anti-retroviral therapy (HAART) has improved long term survival around 90% at 15 years. HIV-associated cardiomyopathy is a major long-term complication of HIV infection, but many programs consider HIV-infection a contraindication for heart transplantation or left ventricular assist device (LVAD) support.

Methods: We present a case of vertically acquired HIV patient, developing pregnancy related cardiomyopathy, who required LVAD support, and subsequently received successful heart transplantation. A literature review updates the current status of this topic.

Results: A 34 year old female patient, with history of HIV acquired perinatally, on HAART, with prior central nervous system toxoplasmosis, and viral pericarditis, history of hypertension, and bilateral pulmonary embolus, developed dilated peripartum cadiomyopathy after delivery of healthy term female newborn in 2009. She initially developed heart failure with LVEF 15-20%, and symptoms NYHA FC II, and evolved to NYHA FC IV over the course of 8 years. Patient was admitted with advanced heart failure symptoms, and low cardiac output, requiring insertion of IABP. She was listed for heart transplant, but continued to decline requiring insertion of HeartWare LVAD as bridge to transplantation. She presented good postoperative recovery and was discharged home 26 days after surgery. Patient received heart transplantation six month later, with no complications, and is currently doing very well one year after transplant.

Conclusion: HIV-associated cardiomyopathy is a major long-term complication of HIV infection. HIV-positive patients presenting adequate viral load control on anti-retroviral therapy can benefit from advanced heart failure therapies in the form of LVAD support or heart transplant.

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Post-Infarction Ventricular Septal Rupture: Does a Decreasing Incidence Mean an Increasing Problem?

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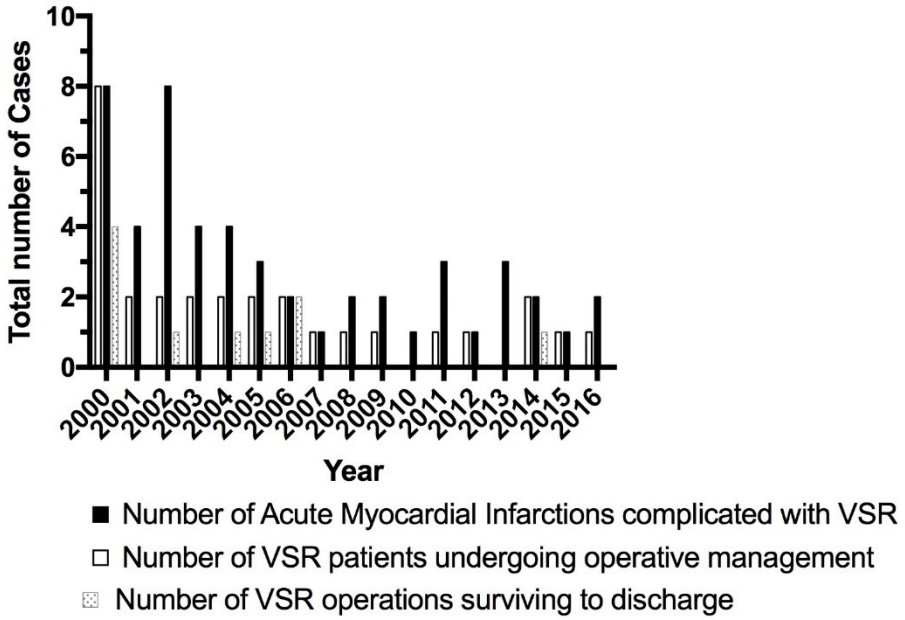
Institutions where study was performed: [1]Plymouth University, United Kingdom of Great Britain and Northern Ireland; [2]Derriford Hospital, United Kingdom of Great Britain and Northern Ireland

Purpose: Post infarct ventricular septal rupture(VSR) is a catastrophic complication of acute myocardial infarction(AMI), it requires experienced surgeons to achieve modest survival rates. We set out to assess how the prevalence of, and surgical exposure to, post infract VSR has changed during the era of primary percutaneous coronary intervention(PPCI).

Methods: Our institution's cardiothoracic department serves a tertiary population in the region of 4 million. Our hospital database was searched using ICD coding to identify the number of AMI and surgical VSR repairs between 2000 and 2016. Through cross-referencing against our surgical database we calculated operative mortality, and 1,5 and 10-year survival.

Results: The number of patients admitted to our unit with AMI during the period was 11,861. The proportion undergoing PPCI has increased from 14.2%(80) in 2000, to 47.4%(385) in 2016, in the same period the number of VSRs that presented to the unit has fallen from 8(1.4%) in 2000, to 2(0.24%) in 2016. Our surgical mortality rate following VSR repair was 55%(16), but our 1, 5, and 10-year survival rates were consistent at 40.7%. Those who underwent conservative management had 1,5 and 10 year survival of 19.0%. Thus indicating that if patients survived surgery they had a good chance of long term survival.

Conclusion: There has been a reduction in the proportion of AMI cases complicated with VSR associated with a rise in PPCI during study period. Whilst this had been associated with a considerable decrease in VSRs coming to surgery, there must surely be concern for the trainee cardiothoracic surgeon.



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Surgical Treatment of Hypertrophic Cardiomyopathy: When the Surgery Matters

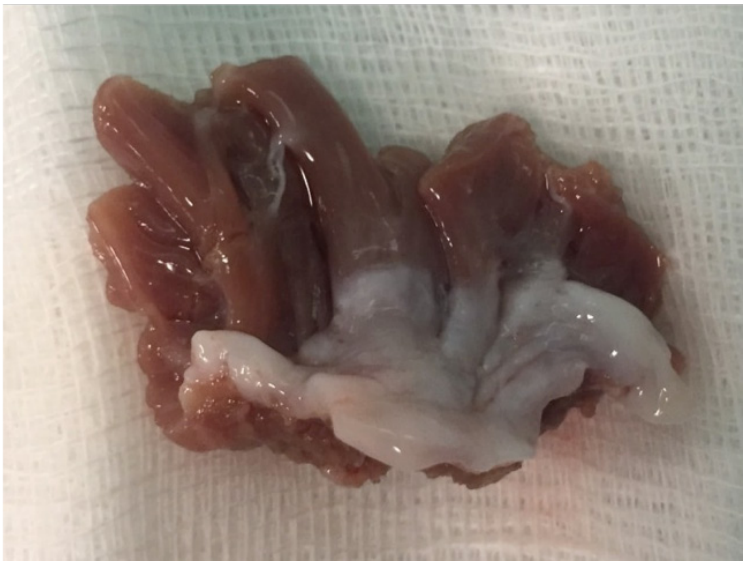
Kostyantyn Rudenko[1], *Lidiia Nevmerzhytska*[1], *Polina Danchenko*[2], *Vasyl Lazoryshynets*[1], *Oleksii Krykunov*[1], *Andrii Rusnak*[1], *William Novick*[3]

Institutions where study was performed: [1]Amosov National Institute of Cardiovascular Surgery, Ukraine; [2]Bogomolets National Medical University, Ukraine; [3]William Novick Global Cardiac Alliance and University of Tennessee Health Science Center, United States

Purpose: The purpose of this cohort randomized study is to establish the effectiveness of surgical extended septal myectomy, accompanied by anomalous fibrous chordal attachments resection and papillary muscles (PM) mobilization in patients with hypertrophic obstructive cardiomyopathy (HOCM) and to evaluate its impact on the hemodynamics, heart failure degree, and survival rate.

Methods: The research includes 118 consequential symptomatic patients (59 (50%) males, average age – 49±16,4 (median=54)) with HOCM who underwent surgical extended myectomy with secondary chordae resection and mobilization of the anterior and posterior groups of PM (Fig. 1). An evaluation of the following parameters in groups of patients before and after surgical intervention was performed: systolic pressure gradient (SPG) on the left ventricle outflow tract (LVOT) – the average SPG accounted 93,6±23,2mmHg, mitral regurgitation (MR) degree – 101 (85,6%) patients with moderate or severe MR degree, NYHA functional class – 36 (30,5%) patients in functional class III or IV, survival rate and main post-operative complications.

Results: According to the obtained data, SPG decreased from 93,6±23,2 mmHg prior the surgery to 19,7±11,4 mmHg after the treatment (p < 0 ,001). 21 (17,8%)patients had moderate degree of MR after the surgery, as before intervention the number of patients who had moderate or severe MR degree accounted 101 (85,5%)out of 118 study patients (P < 0 ,001). Out of 118 patients, 36 (30,5%)of whom have had III-IV NYHA functional class before the procedure, 115 (97,4%) had functional class I-II in the latest follow-up (P < 0 ,001). The mortality accounted 1,7% (2 patients). Out of 118 patients, one (0,8%) underwent implantable cardioverter-defibrillator (ICD) implantation in the post-operative period within the prophylaxis of sudden death (SD), and 5 (4,2%) patients underwent pacemaker implantation due to complete post-operative AV-block. In addition, out of 118 selected patients, 12 (10%) had paroxysmal or persistent form of atrial fibrillation (AF). In the post-operative period there weren't registered any incidents of AF in individuals mentioned above.



Conclusion: Surgical extended septal myectomy with anomalous fibrous chordal attachments resection and PM mobilization is a gold standard of treatment of patients with HOCM. Successful correction of HCM can be conducted only by surgeon with experience in reconstruction of the valvular pathologies with mandatory pre-operative MRI or CT-planning and intraoperative echocardiographic control.

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Short-Term Mechanical Circulatory Support Devices as Bridges to Heart Transplantation

***Alejandro Bertolotti**, Elian Giordanino, Daniel Absi, Liliana Favaloro, Florencia Renedo, Daniela Rubira, Roberto Favaloro*
Institution where study was performed: Favaloro Foundation University Hospital, Argentina

Purpose: Patients(P) with refractory cardiogenic shock have high short-term mortality, requiring hemodynamic support to access a heart transplant. Short-term mechanical circulatory support devices(MCS) allow bridge to transplantation(BTT). This study aims to describe clinical characteristics and outcomes in P with centrifugal pump(CP) and extracorporeal membrane oxygenation(ECMO) as BTT.

Methods: MCS used as BTT between April 2006 and April 2018 were evaluated retrospectively. P assisted as bridge to decision or recovery were excluded, and only P that accessed transplantation were analyzed. Categorical parameters were provided as numbers and percentages, continuous data as mean ± standard deviation, survival was depicted using Kaplan–Meier curves. A p value < 0.05 was considered significant.

Results: MCS was used as BTT in 32 P, 24 (75%) of whom underwent transplantation. Among the 15 P on ECMO, 13 (86.7%) received a heart transplant, whereas 11 P (64.7%) of the 17 P in CP were transplanted. Analyzing the 24 recipients, the mean age was 33.13±19.18, 37.5% (9 P) were < 1 8 years, 13P (54.2%) were men, and dilated cardiomyopathy was the main etiology (7P, 29.2%). Mean time in MCS was 8.29±5.67, P on CP were more frequently reoperated for bleeding (6 P 54.5% vs. 0 P; p=0.005) without differences in acute kidney injury, transfusion requirements or vasoplegia compared with ECMO. After heart transplantation, overall mortality was 16.7% (4 P) and there were no differences between ECMO and CP regarding this or other outcomes (Table 1, Figure 1). In the multivariate analysis, independent predictors of mortality were acute kidney injury on MCS, vasoplegia postransplantation and time in intensive care unit

Conclusion: Short-term MCS as BTT are an effective approach in a developing country, allowing successful transplantation in the majority of cases. P on ECMO had fewer reoperations for bleeding, without differences in mortality or other complications.

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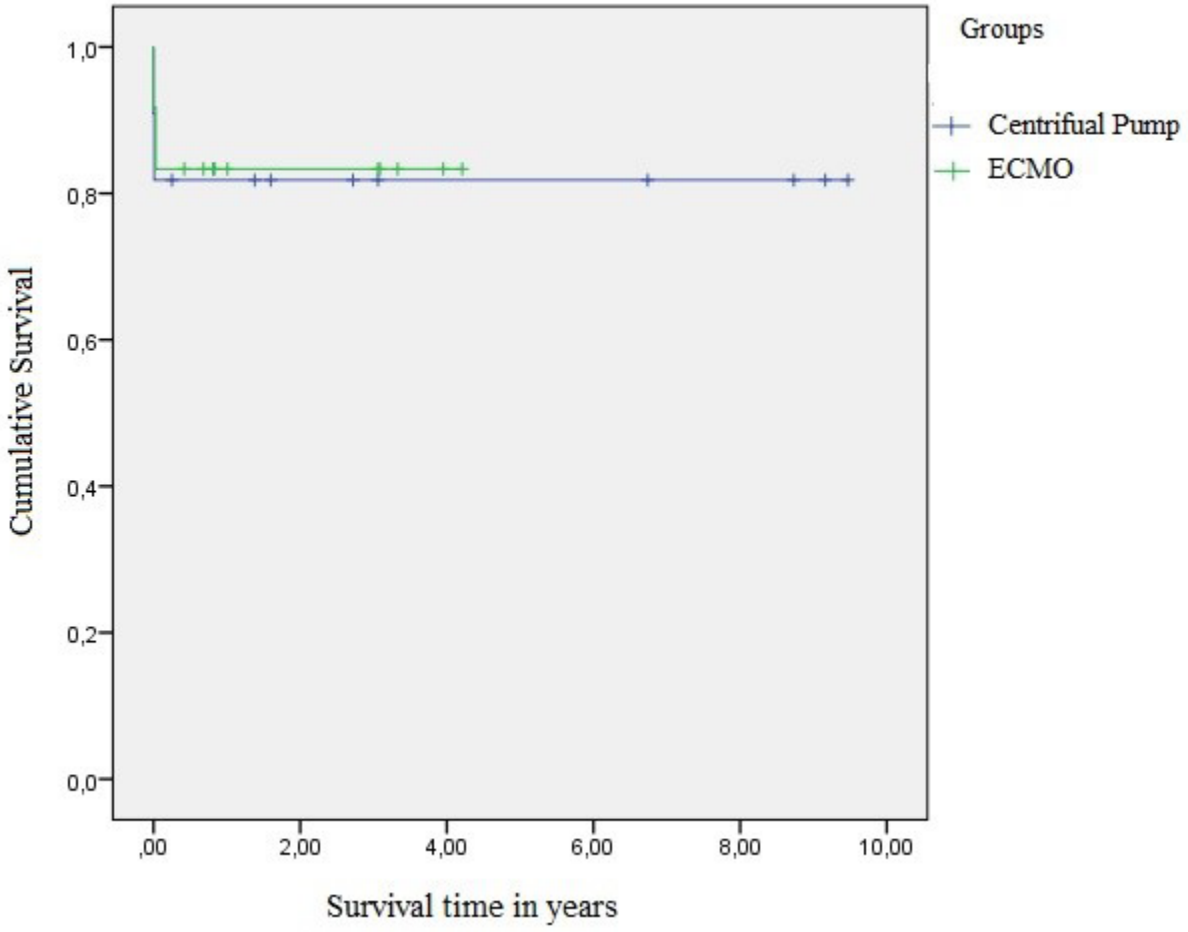

	General (n=24)	Centrifugal pump (n=11)	ECMO (n=13)	p
Transfusion requirements on MCS	36,71±31,4	49,72±32,22	25,69±27,06	0,06
Vasoplegia, n (%)	9 (37,5)	4 (36,36)	4 (30,77)	1
AKI, n (%)	10 (41,67)	7 (63,63)	3(23,07)	0,1
Reoperation, n (%)	6 (25)	6 (54,55)	0	0.003
72hs pos-Tx				
Transfusion requirements	30,5±20,1	25,73±14,20	34,54±23,84	0,3
Vasoplegia, n(%)	9 (37,5)	4 (36,36)	5 (38,46)	1
AKI, n (%)	14 (58,33)	8 (72,72)	6 (46,15)	0,24
Reoperation, n (%)	1 (4,16)	1 (9,09)	0	0,46
PGF, n (%)	12 (50)	5 (45,45)	7 (53,84)	1
days in hospital	34,58±33,11	37,27±27,86	32,31±37,98	0,72
days in ICU	20,75±17,73	23,45±22,31	18,46±13,24	0,5
30-day mortality n (%)	4 (16,67)	2 (18,18)	2 (15,38)	0,84

MCS, Mechanical circulatory support device; AKI, acute kidney injury; PGF, Primary graft failure; ICU, intensive care unit

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Residual Pulmonary Hypertension Further to Undergoing Pulmonary Endarterectomy: A Review and Meta-analysis

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Institutions where study was performed: [1]General Teaching Hospital, Czech Republic; [2]First Faculty of Medicine, Charles University, Czech Republic

Purpose: Chronic thromboembolic pulmonary hypertension is a form of pulmonary hypertension which can be treated via a surgical procedure named “pulmonary thromboendarterectomy” (PEA). However, in some patients, pulmonary hypertension can persist even further to undergoing PEA. This study investigated the incidence of residual pulmonary hypertension in patients who underwent PEA.

Methods: A meta-analysis was performed upon 25 published studies reporting residual pulmonary hypertension (RPH) in CTEPH patients further to PEA. A customised Excel sheet was deployed to extract all relevant and patient-specific data upon study design, demographics, diagnostic methods, surgical interventions and clinical outcomes. Publication bias was visualised via Funnel plots and quantified with the Egger test deploying the Review Manager v5 Software. Statistical heterogeneity was assessed via the Cochrane Q and I2statistics. The Dersimonian and Laird random-effect model was deployed for performing the meta-analysis models via the Review Manager v5 Software.

Results: Eighteen studies reported residual pulmonary hypertension after PEA in CTPEH patients. The heterogeneity between these studies was statistically significant (Cochran Q 300.417 (df 17), I2 94.34; P = 0.00). A random effects model showed that 25% (95% CI 0.18-0.34) of the patients suffer with RPH after PEA (Figure 1). Fig.1 Forest plot of residual PH after PEA in patients with CTPEH. Pooled event rates are estimated with a random effects model, which shows that 25% (95% CI, 0.18-0.34) of the patients experienced RPH after PEA The funnel plot showed that there is a likelihood of publication bias as more studies were plotted on the left side. Duvall and Tweedie’s trim and fill imputed no possibly missing studies (Supplementary figure 1). Egger’s test (B0 = -3.42, 95% CI -6.49, -0.35, t=2.36, df=16, P1-tailed=0.02) showed that the publication bias was statistically significant.

Conclusion: The outcome for CTEPH patients has greatly improved last years and PEA is still the treatment of choice in terms of both survival and functional improvements. In the current meta-analysis, RPH was reported in 25% post PEA surgery.Patients with persistent PH after PEA are now also reported a good prognosis.

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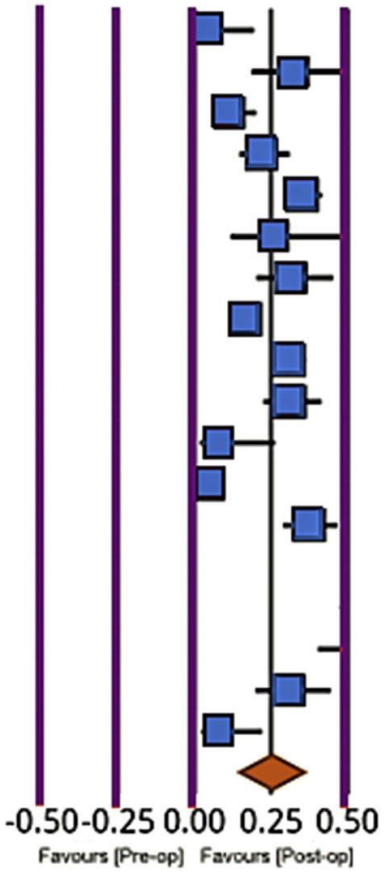
Study name	Event rate	Lower limit	Upper limit	Relative weight
Yin et al, 1992	0.03	0.00	0.19	2.72
Nagaya et al, 2002	0.32	0.19	0.50	5.73
Ogino et al, 2006	0.11	0.06	0.20	5.89
Bonderman et al, 2007	0.22	0.15	0.31	6.35
Condliffe et al, 2008	0.35	0.29	0.41	6.69
Ishida et al, 2009	0.26	0.12	0.47	5.15
van der Plas et al, 2010	0.31	0.21	0.45	6.10
Mayer et al, 2011	0.17	0.13	0.21	6.69
Freed et al, 2011	0.31	0.26	0.36	6.73
van der Plas et al, 2011	0.31	0.23	0.41	6.41
Li et al., 2013	0.08	0.02	0.26	3.81
D'Armini et al., 2014	0.05	0.03	0.07	6.23
Perrot et al, 2015	0.38	0.29	0.46	6.53
Shimura et al, 2015	0.95	0.53	1.00	1.67
Cannon et al, 2016	0.51	0.48	0.54	6.83
Richter et al, 2016	0.57	0.41	0.72	5.91
Surie, 2016	0.31	0.20	0.44	6.10
Sang et al., 2016	0.08	0.03	0.22	4.47
	0.25	0.18	0.34	



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Concomitant Cardiac Resynchronization Therapy in Patients Undergoing Cardiac Surgery: A Systematic Review and Meta-analysis

***Ali Alsagheir*[2], *Nayer Youssef*[2], *Emilie Belley-Cote*[2], *Ahmad Makhdoum*[3], *Alex Koziarz*[2], *Saurabh Gupta*[2], *Willilam McIntyre*[2], *Richard Whitlock*[1]**

Institutions where study was performed: [1]Population Health Research Institute, Canada; [2]McMaster University, Canada; [3]Hospital for Sick Children, Canada

Purpose: Cardiac resynchronization therapy (CRT) improves survival and quality of life in patients with left ventricular dysfunction. Guidelines recommends delaying implantation after cardiac surgery. However, earlier implantation may improve synchrony and hemodynamics. We systematically review and meta-analyze the available evidence for concomitant CRT implantation at the time of cardiac surgery.

Methods: We searched EMBASE, MEDLINE, and CENTRAL from inception to January 2018 for randomized controlled trials evaluating CRT versus standard care in adult patients (? 18 years of age) with LV dysfunction undergoing cardiac surgery. We performed screening, full-text assessment, risk of bias evaluation using the Cochrane tool and data collection independently and in duplicate. We pooled data using random-effects model. We evaluated our confidence in the evidence using the GRADE framework.

Results: We reviewed 128 articles in full-text, 12 of which were included in the final analysis (565 participants). Post-operative mortality (7 RCTs,n=418) did not differ with CRT (RR=0.82, 95%CI=0.14-4.62, I2 = 25%, very low quality), but was significantly lower at latest follow-up (2RCTs, mean= 34 months) with concomitant CRT (RR= 0.35, 95% CI 0.16-0.74). When pooling data for; Cardiac output/Cardiac Index (10 RCTs;n=563; SMD=1.04, 95%CI=0.36-1.72, I2 = 93%, moderate quality), LVEF (4 RCTs;n=253; MD 8.04 hours; 95%CI=5.93-10.16; I2 = 66%; low quality), mean time of inotropic support (3 RCTs; n=181; MD -24.5 hours, 95%CI= -44 to -5, I2 = 45%, low quality) were significantly different in favour of CRT. At latest follow-up, patients had higher exercise capacity as assessed by 6MWT (MD=57 meter, 95%CI=20-95, moderate quality) and better quality of life as assessed by MLHFQ (MD= -13 points, 95%CI=-19 to -8, moderate quality) in favor of CRT. However, CRT did not change the mean of LOS in the ICU.

Conclusion: In patients with LV dysfunction undergoing cardiac surgery, concomitant CRT implantation improves hemodynamic outcomes, exercise capacity and quality of life. Its impact on mortality remains unclear. A large, appropriately powered RCT is required to definitively address the risks and benefits of CRT implantation at the time of cardiac surgery.

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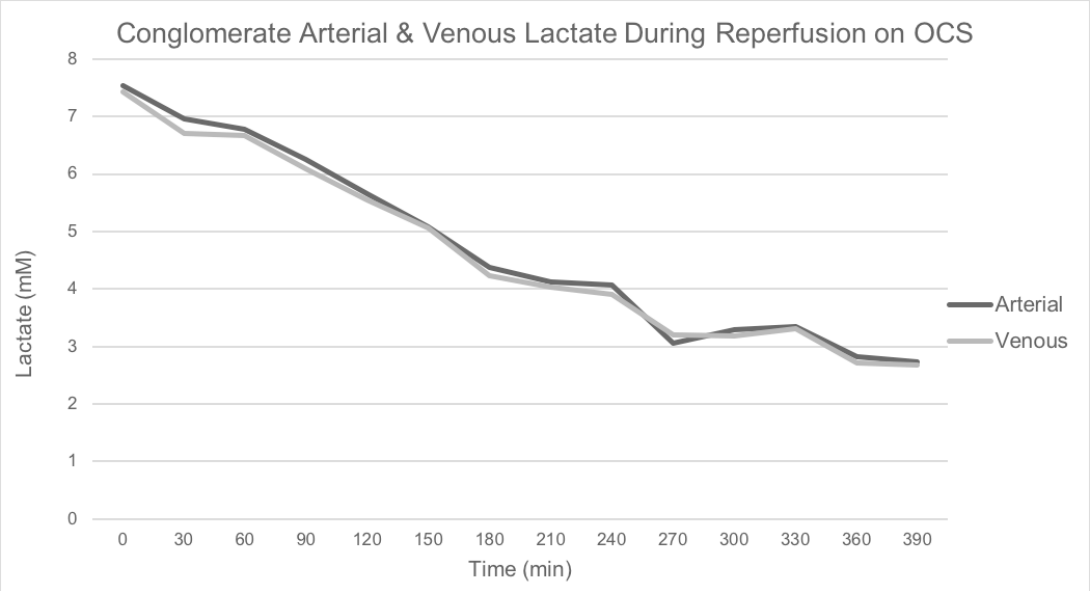
Donation After Circulatory Death Heart Transplantation in Australia: A Solution to the Donor Shortage?

***Sarah Scheuer**, Victor Chang, Hong Chee Chew, Arjun Iyer, Mark Connellan, Claudio Soto, Priya Nair, Alasdair Watson, Emily Granger, Paul Jansz, Andrew Jabbour, Anne Keogh, Eugene Kotlyar, Chris Hayward*
Institutions where study was performed: St Vincent's Hospital, Sydney, and Victor Chang Cardiac Research Institute, Australia

Purpose: Heart transplantation, although successfully performed throughout the world, is limited by a paucity of suitable donors. DCD heart transplantation is an emerging clinical practice, established in Sydney, Australia; with 69 DCD transplants performed across four centres to date in Sydney and the UK.

Methods: Between July 2014 and July 2018, 25 DCD heart transplants were performed in our institution. Donor information including cause of death, LV function at time of referral, and critical time points during the retrieval process were collected. All hearts were reperfused and assessed utilizing the TransMedics OCS Heart™. Initial and ongoing recipient data were collected through follow-up at the Heart Lung Clinic. The following outcomes were analysed: survival, delayed graft function, ICU and hospital length of stay (LOS), serial endomyocardial biopsy (EMBx) and echocardiogram results post-transplant. Furthermore, the impact on the activity of the heart transplant unit was also assessed.

Results: Donor and recipient mean age were 29±6 and 52±14 years respectively, with 21:4 (M:F) donors and 19:6 recipients. Recipient baseline mean transpulmonary gradient was 9.3±3.7mmHg with a cardiac index of 2±0.6L/min/m2. Forty-eight percent of recipients had a previous sternotomy and 36% had a LVAD in situ at time of transplantation. Average time from withdrawal of life support to asystole was 10±4 mins, and average warm ischaemic time (WIT) was 23±5 min. Time on NMP was 278±66 min. Average arterial and venous lactate results whilst on NMP are shown below. Nine patients required early ECMO for delayed graft function, however 8 of 9 demonstrated normal graft function one-week post-transplant. Current survival is 96% with all surviving patients demonstrating normal cardiac function on echocardiogram on most recent follow-up. Importantly, the addition of the DCD pathway in our institution has resulted in an approximately 15% increase in our transplant activity.



Conclusion: The DCD transplantation pathway established at our institution has excellent outcomes despite an increased propensity for early graft dysfunction. Having led to a significant increase in the transplant activity at our institution it represents an important avenue to combat the ongoing disparity between supply and demand in heart transplantation.

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Early Extracorporeal Membrane Oxygenation Use Post-Donation After Circulatory Death Heart Transplantation: Risk Factors and Outcomes

***Sarah Scheuer**, Victor Chang, Hong Chee Chew, Arjun Iyer, Mark Connellan, Claudio Soto, Priya Nair, Alasdair Watson, Emily Granger, Paul Jansz, Andrew Jabbour, Anne Keogh, Eugene Kotlyar, Chris Hayward, Kumud Dhital*
Institutions where study was performed: St Vincent's Hospital, Sydney, and Victor Chang Cardiac Research Institute, Australia

Purpose: Twenty-five DCD heart transplants have been performed since 2014 at our institution. Despite excellent long-term outcomes, there is a significantly higher rate of ECMO within this cohort compared to DBD transplantation. This study aims to identify factors leading to the requirement for ECMO post-transplant and the outcomes of this cohort.

Methods: This study was undertaken as a retrospective analysis. DCD heart transplant recipients were stratified into two groups based on the requirement for early ECMO. Donor data was collated using referral documentation, retrieval data from the local database, and recipient data extracted from hospital medical records. Key donor and retrieval factors were identified and compared between the ECMO and non-ECMO groups including withdrawal timepoints, duration of normothermic machine perfusion, intraoperative details, and post-operative outcomes. Data was interrogated to identify factors predisposing to the use of ECMO with a particular view to identifying modifiable features.

Results: Early ECMO support was required in 9 DCD recipients, representing an ECMO rate of 36% in comparison to 10% in the DBD cohort over the same time period. Baseline donor and recipient demographics were similar between both groups. The time between asystole and institution of cardioplegia (AP) (warm ischaemia) was significantlylonger in the ECMO group however there was no significant difference between the cold ischaemic time and machine perfusion time. There was a trend towards a poorer lactate recovery during normothermic machine reperfusion in those hearts requiring early ECMO support. Intra-operatively, the ECMO group had a longer bypass time; and post-operatively showed significantly longer ICU and hospital stay. However, despite the high rate of early ECMO in the DCD cohort, 8 of 9 recipients demonstrated normal graft function at one-week post-transplant. There was one death in the ECMO group with an overall survival of 96% in our DCD cohort.

Conclusion: Prolonged AP time results in higher rates of delayed graft function requiring early ECMO support. However, in all surviving patients, graft function had normalised one-week post operatively with excellent overall survival rates. Ongoing research will work towards further improving the ischaemic tolerance of DCD hearts to obligatory warm ischaemic time.

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Changing Life-Threatening Hanta Virus Cardiopulmonary Syndrome Results With Extracorporeal Membrane Oxygenation Support in an Underserved Population in Southern Chile

***Juan Carlos Bahamondes**, Ivan Lagos, Mauricio Pena, Ronald Trujillo, Claudio De la Hoz, Luis Quininir*
Institution where study was performed: Hospital Regional Temuco, Chile

Purpose: The purposes of this study are to evaluate the initial experience of extracorporeal membrane oxygenation support (ECMO) in a subgroup of patients with HVCS who had a predicted mortality of 100% and to assess the complications associated with this treatment modality and with our preferred standard cannulation technique.

Methods: Five patients with severe HCVS were supported with ECMO between November 2016 and October 2017. Mean Murray score was 2.5 (1.75 – 3.35). All patients presented with progressive ventricular dysfunction. 2 patients had acute renal failure and 1 patient had hepatic failure. Cannulation of the femoral vessels was performed on an emergency basis by a percutaneous approach in 2 and by an open technique in 3 patients. In addition, all patients were cannulated through the right internal yugular vein as a complement to the return femoral cannula. A distal perfusion cannula was used in the femoral artery in all patients.

Results: Duration of ECMO averaged 8.8 days (range 2–12 hours). Complications from cannulation occurred in all patients: lower extremity ischemia of at least one toe in 5 patients (100%), severe bleeding in 1 (20.%) patient, retroperitoneal hematoma in 1 (20%), no patient required a leg amputation. All patients required renal substitution therapy. 3 patients (60%) had an infection of the femoral cannulation site. 2 patients died (40%) due to multiorgan dysfunction and cerebral hemorrhage. The overall survival was 60%. All survivors recovered completely and were discharged from the hospital after a mean hospital stay of 22.8 days (21-39 days).

Conclusion: 60% of patients supported survived and recovered completely. The complications associated with this treatment may be attributed to the fact that all patients were in shock or in full cardiac arrest, and the procedure had to be done expeditiously. Earlier institution of ECMO may decrease the complication rates and improve the overall survival.

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Percutaneous Transseptal Mitral Valve Implantation in Failed Bioprosthetic Valves: Early Experience in Brazil

***Marco Antonio Oliveira*[1]*, Gustavo Judas*[1]*, Pedro Felipe Nicz*[2]*, Fabio de Brito Jr*[1]*, Fernando Bacal*[3]*, Ricardo Silva*[1]*, Marco Marino*[4]*, Fernando Reis*[4]*, Mauricio Prudente*[5]*, Maurillio Deininger*[6]**

Institutions where study was performed: [1]Sao Paulo, Brazil; [2]Instituto do Coracao, Brazil; [3]Hospital Israelita Albert Einstein, Brazil; [4]Hospital Madre Teresa, Brazil; [5]Hospital Encore, Brazil; [6]Hospital Universitario Lauro Wanderley, Brazil

Purpose: Mitral bioprosthetic dysfunction is a frequent condition and the traditional surgical treatment (valve replacement) is riskier when compared to the first surgery. In patients of high surgical risk, the percutaneous treatment presents itself as a safe alternative and with more medium-term favorable results.

Methods: We reported the first Brazilian experience of percutaneous implantation of bioprosthetic valve for the treatment of patients with dysfunction of mitral surgery bioprosthetic valve. Between June 2016 and December 2017, seven high-risk surgical patients with bioprosthetic mitral valve dysfunction were treated with a transcatheter expandable balloon prosthesis using femoral venous access and via transeptal in 7 Brazilian centers.

Results: The median age was 69 years (IIQ 67-73.5), the median STSPROM score 8.5% (IIQ 5.9-14), all of them with limiting symptoms of heart failure (CF3-4) and three of them were submitted to more than one previous thoracotomy. Four (57.1%) cases presented pure stenosis of the surgical bioprosthetic, two (28.6%) mixed dysfunction and one (14.3%) with isolated insufficiency. The positioning and implantation of the prosthesis were successfully performed in all patients, using, as a guide, a 3D transesophageal echocardiography and radiopaque markers of surgical bioprosthesis, when available. One (14.3%) patient had left ventricular outflow tract obstruction, with severe hemodynamic instability, evolving to intraprocedural death. A significant reduction of the transvalvular gradient and absence of residual regurgitation was detected in all cases. The median length of hospital stay was 5 days (IIQ 3.3-8.75) after the procedure. Six (85.7%) patients presented marked clinical improvement (CF1-2) in a follow-up of 30 days.

Conclusion: This is first Brazilian experience of transcatheter treatment of dysfunction of mitral surgical bioprosthetic. The data presented corroborate the safety, effectiveness, short hospitalization time and significant functional improvement demonstrated in international series. Obstruction of the LV outflow tract is a severe complication, appropriate patient selection and procedure planning is mandatory.

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Early Results of Minimally Invasive Video-Assisted Mitral Valve Surgery: What Have We Learned?

***Gustavo Judas**, Marco Antonio Oliveira, Joao Antonio Vieira, John De Oliveira Freitas, Diogo Santos Faria, Rafael Lencioni, Sergio Oliveira*
Institution where study was performed: Hospital Beneficencia Portuguesa, Brazil

Purpose: Minimally invasive mitral valve surgery has evolved during recent years achieving safety and efficacy outcomes equivalent to median sternotomy, however no consistent information is available on the training to perform this surgery. Therefore, it is necessary to assess the surgical team performance when beginning to apply this new technique.

Methods: Where included the first 38 consecutive patients undergoing MIMVS, operated by two cardiovascular surgeons, between 1st April 2014 and 31th December 2017. Patients were divided into four different groups according to procedure time line, from first to the last case: from 1 to 10, from 11 to 20, from 21 to 30 and from 31 to 38. We defined surgical failure as the occurrence of one or more of the following events: (I) perioperative death; (II) intraoperative conversion to median sternotomy; (III) postoperative femoral/aorta artery dissection; (IV) stroke; (V) in-hospital reoperation for any cause; and (VI) surgical wound infection.

Results: Mitral valve repair (n=22) and mitral valve replacement (n=16) were performed for different pathologic conditions: Fibroelastic degeneration (n=32), rheumatic disease (n=5) and chronic endocarditis (n=1). This series showed no early mortality. Surgical failure occurred in five patients shared in all groups, except in group IV. There was a gradual decrease in cardio-pulmonary bypass and cross-clamp times during the study. Log linear also showed a decrease trend in length in the Intensive Care Unit and in total hospitalization. There was difference between groups regarding cardiopulmonary bypass, ICU and post-op hospitalization times. Comparing only the initial (group 1) and the final (group 4), there was significant difference for these three variables. None perioperative myocardial infarction, major stroke, femoral artery dissection or deep venous thrombosis were found. Atrial fibrillation was seen in four patients, all of them medically treated, without differences between the groups.

Conclusion: Despite long cardio-pulmonary bypass and cross clamping times, MIMVS can be performed by surgeons with no prior experience with this technique, as long as they received appropriated training and proctoring. We showed a decrease in ICU and hospitalization length of stay with the learning curve, enabling a faster overall rehabilitation without earlier mortality.

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Simultaneous Transcatheter Valve Procedures via Transapical Approach: A Service Experience

***Romullo Santos**, Leonardo Paim, Roney Sampaio, Flavio Tarasoutchi, Luiz Felipe Moreira, Davi Freitas Tenorio, Henrique Ribeiro, Fabio Jatene, Marcelo Campos Vieira, Honorio Palma, Pablo Pomerantzeff*
Institution where study was performed: Instituto do Coracao do Hospital das Clinicas da Faculdade de Medicina da Universidade de Sao Paulo, Brazil

Purpose: Simultaneous transcatheter valve procedures can be an interesting alternative for conventional double valve replacements, due to increased mortality and morbidity. Despite the progress of transcathether interventions, there are few reports of combined procedures. This case series describes our institutional experience on simultaneous thanscatheter valve procedures via transapical approach.

Methods: A retrospective single center study was conducted using our institutional database analysis, during the period of May 2015 through June 2018. We identified 5 patients submitted to combined THV procedures, via transapical approach, using ballon expandable valve platform. All cases were evaluated by the Heart Team and deemed high risk for conventional operation. Operations were performed in a hybrid OR with transesophageal echocardiography and fluoroscopic guidance for adequate valve deployment. Pre and postoperative operative characteristics were analyzed and follow-up varied from 1 month to 3 years.

Results: Three patients (two males, one female) aged 63, 60 and 48 underwent simultaneous transcatheter aortic and mitral ViV implantations; one 72 year-old male underwent Mitral ViV + TAVI and one 36 year-old male received Mitral ViV + Tricuspid ViV (who had 4 previous surgeries). They had multiple comorbidities, mean number of 2.6 previous cardiac surgeries, all presented with severe dyspnea, NYHA class IV and pulmonary hypertension (60-103mmHg). EuroScores varied from 6.2 to 31.2 and STS scores of 0.7 to 13.1. Their mean aortic and mitral gradients fell 22.2 and 4.4 mmHg, respectively. There was no operative related mortality and patients were discharged after an average of 13.7 days. Upon follow-up, 3 patients maintained functional class NYHA I and 2 patients on NYHA II. Four patients had only mild paravalvular leak (PVL) and one developed moderate PVL. Two patients developed endocarditis 7 months and 1 year post-op, both medically treated.

Conclusion: In our experience, simultaneous THV procedures presents as a safe and feasible option to conventional double valve surgery, especially in high risk patients. This is even more important when considering a developing country reality, where rheumatic disease plays an important part and reoperations are frequent.

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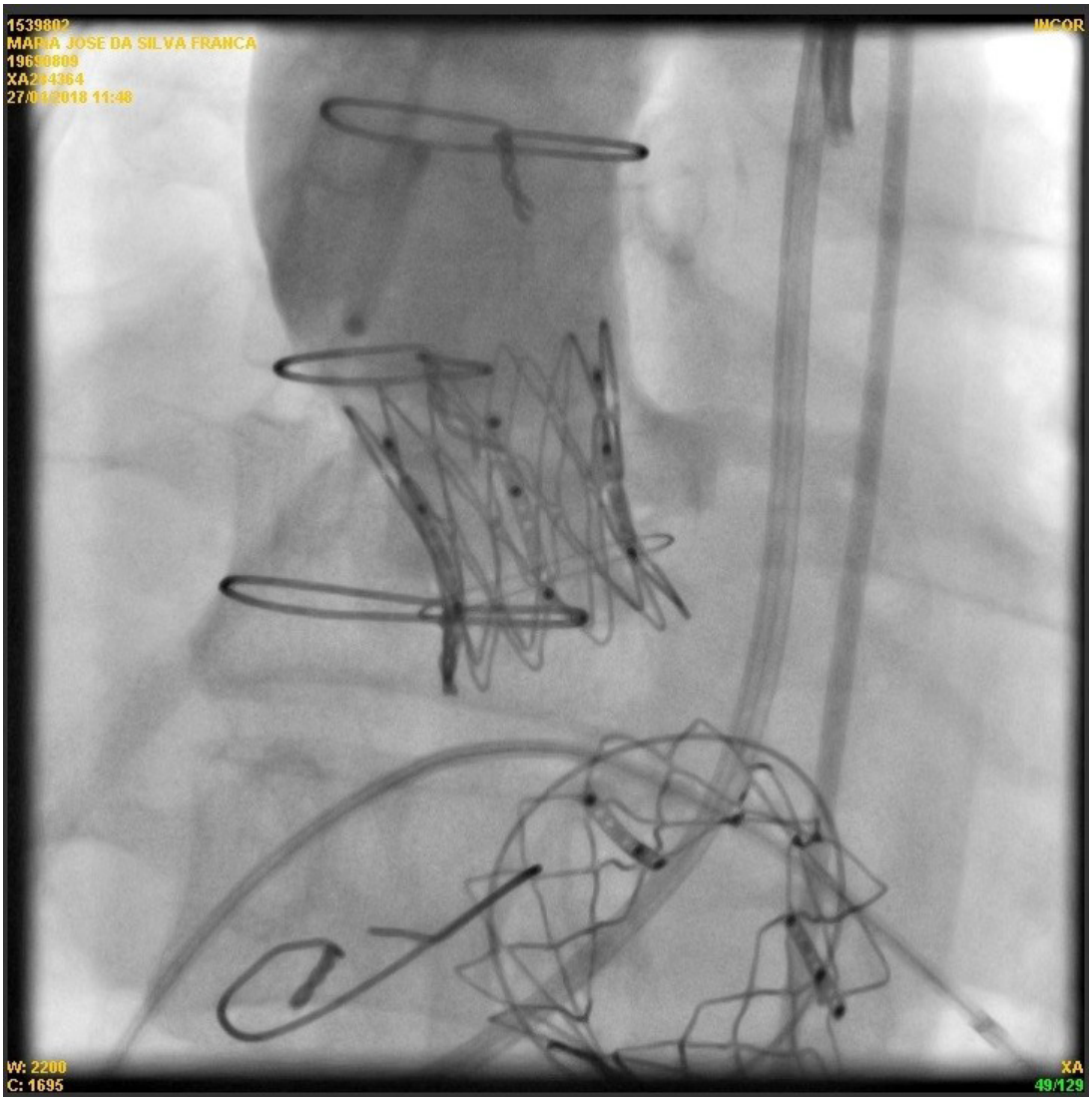

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Transcatheter Mitral Valve-in-Valve Implantation: A Fertile Ground to Plant the Transcatheter Seed — Reports on the First 50 Cases in a Latin American Center

***Leonardo Paim**, Roney Sampaio, Luiz Felipe Moreira, Flavio Tarasoutchi, Davi Freitas Tenorio, Romullo Santos, Joao Bosco Bastos Filho, Fabio Jatene, Honorio Palma, Marcelo Campos Vieira, Pablo Pomerantzeff*
Institution where study was performed: Instituto do Coracao do Hospital das Clinicas da Faculdade de Medicina da Universidade de Sao Paulo, Brazil

Purpose: Rheumatic disease is still endemic in Latin America and developing countries. Patients are usually operated on at a younger age and receive multiple reinterventions, when mechanical valves are not utilized. Transcatheter mitral valve-in-valve implantation (TMVIV) can be a good alternative for treatment of degenerated bioprosthesis in this high risk cohort.

Methods: A retrospective, single centre, data-base analysis study was conducted to evaluate immediate and 30-day post-operative results of 50 consecutive patients who underwent transcatheter mitral ViV implantation, from May-2015 to June-2018. All patients received a balloon expandable valve, implanted through transapical approach. Surgical procedures were performed by our Heart Team in a Hybrid OR. Pre and postoperative characteristics were analyzed and scrutinized between first and second half of patients, to evaluate the impact of the learning curve. Post-operative mortality, hospital length of stay, transvalvular gradients and functional class were investigated. No patients were lost to follow-up during this period.

Results: Patients had a mean age of 65 years, 71,4% female, 57,1% had chronic renal failure, with median pre-operative NYHA III. Mean STS scores for mortality, morbidity and EuroSCORE II were 8,36%, 39,28% and 12,12%, respectively. On average, patients had 2 previous surgeries, valve durability was of 12,1 years and 63,3% had rheumatic fever as etiology for mitral valve disease. Pre-operative ECO showed mean mitral gradients of 11,4 and max 23,9 mmHg, which dropped to 5 and 12,2mmHg postoperatively; 40% of patients had severe pre-op pulmonary hypertension (>60mmHg) but only 18% remained upon discharge. 35% of cases were urgent procedures and overall mean hospitalization was 20 days (8 days in ICU). Overall mortality within 30 days was 14%, with one death during the procedure. Further sub-analysis between first and second half of cases showed initial mortality of 20%, followed by a later drop to 8% in last 25 cases.

Conclusion: TMVIV has shown to be an excellent option for treatment of degenerated bioprosthesis in high risk patients. Results show the impact of the learning curve and the importance of keeping an active transcatheter program in developing countries as well, where rheumatic patients can also benefit from avoidance of multiple reoperations.

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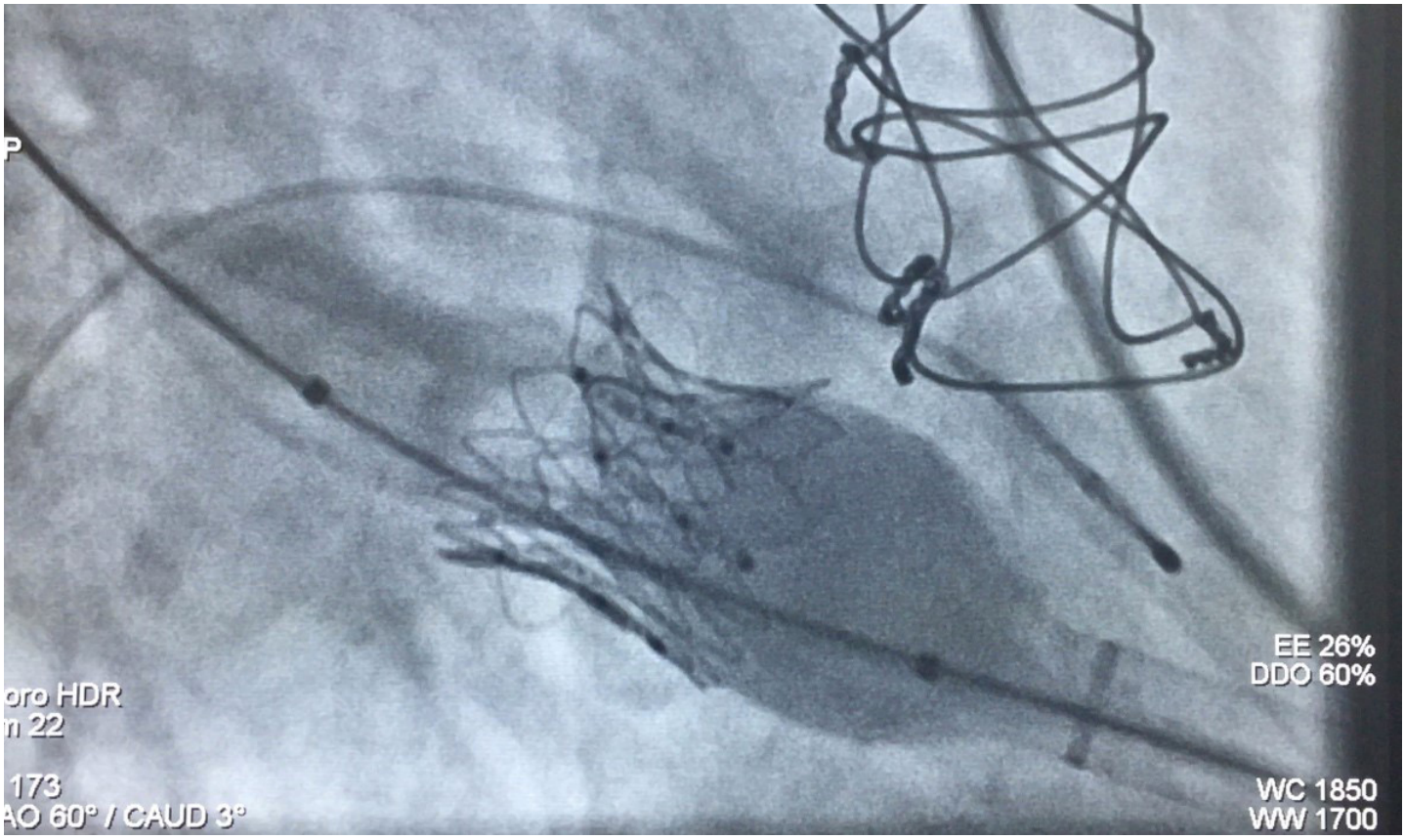

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Treatments for Hypertrophic Obstructive Cardiomyopathy With Significant Mitral Valve Insufficiency

***Atsushi Shimizu**, Keitaro Mahara, Ryougen Yun, Daiki Saitoh, Kanako Kishiki, Itaru Takamisawa, Morimasa Takayama, Shuichiro Takanashi*
Institution where study was performed: Sakakibara Heart Institute, Japan

Purpose: The treatments for hypertrophic obstructive cardiomyopathy (HOCM) with significant mitral valve insufficiency (MI) have many options. Although mitral valve replacement is commonly chosen, there are several reports of mitral valve plasty with or without myectomy for MI. What procedure to choose and its long-term results for this pathology is unclear.

Methods: Between 2009 to 2017, 95 cardiac operations were performed for HOCM patients; 33% (31 cases) had moderate or severe MI. Mean age was 64 years old and 35% were male. Perioperative results and long-term outcomes (mortality, reoperation and recurrent MI) were compared between the mechanism of MI and selected operation.

Results: The mechanism of MI was systolic anterior motion of the mitral valve (SAM) in 87%, leaflet degeneration in 32% and leaflet prolapse in 39%, with each mechanism overlapping. The operation was mitral valve replacement (MVR) (42%), mitral valve plasty (MVP) (23%) and isolated myectomy (35%). MVR for leaflet degeneration, MVP for leaflet prolapse and isolated myectomy for SAM had a reasonable result for treating MI and reducing the intra-ventricular obstruction in HOCM. There was no operative death. In the mean follow-up period of 3.1±1.9 years, estimated survival at 5 years were 75±14%, no reoperation and recurrent MI. Hemodynamic parameters by echocardiography improved significantly.

Conclusion: To select the appropriate operation according to the mechanism of MI in HOCM, the number of MVR could be reduced.

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Surgical Treatment of Cardiac Tumors: Experience of a Single Center

***Julio Castillo**, Josias Rios, Daniel Espinoza, Giorgio Gabino*
Institution where study was performed: Instituto Nacional Cardiovascular (INCOR) - EsSalud, Peru

Purpose: Cardiac tumors represent a low incidence with varied clinical manifestations. Our objective is review of the form of presentation, histological lineage, intrahospital mortality and the cardiac tumor location in patients underwent surgical treatment.

Methods: Data were collected retrospectively from the patient's files who had cardiac tumor diagnosis and underwent surgical treatment during the period January 2010 to December 2017 in our center. The antecedents, forms of presentation, and histopathological data were described.

Results: A total of 50 cases were found in this review. We observed that 88% (n = 44) were benign tumors and 12% (n = 6) were malignant. The most frequent tumor was Myxoma with 72% (n = 36). We found that 6% (n = 3) of the tumors ha multifocal presentation. Tricuspid valve plasty was the most performed procedure together with tumor excenesis in 30% (n = 15). The intrahospital mortality was 4% (n = 2), the mortality was very high in the group of malignant tumors during the follow-up. 12% (n = 6) of the patients presented neurological events due to embolism.

Conclusion: Surgical resection of the tumor is an effective procedure for the treatment of cardiac tumors. In our study, benign tumors were the most frequent, and the most frequent type was myxoma. Mortality was very high in the group of malignant tumors during follow-up, results similar to the current evidence.

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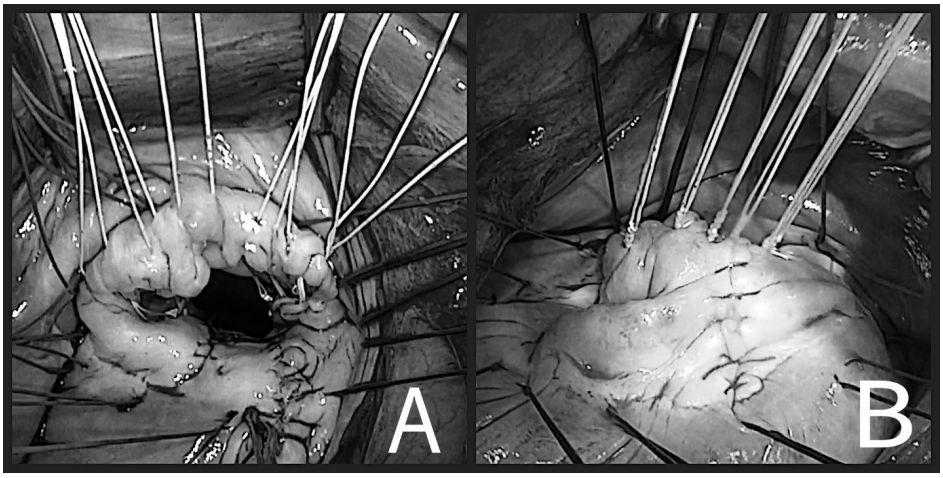
Experience With the Use of Premeasured Chordal Loops for Mitral Valve Repair: Is It a Useful and Reproducible Technique?

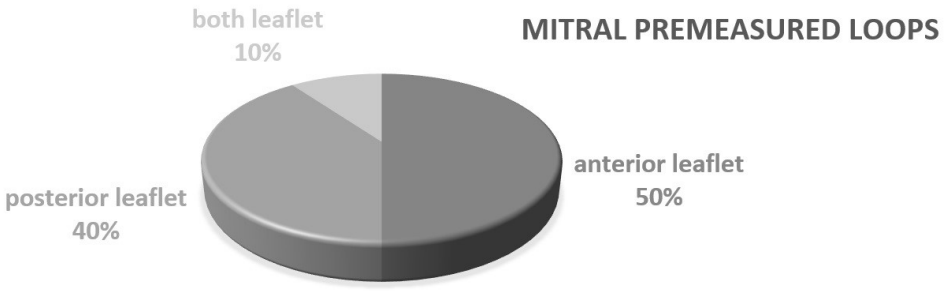
***Guillermo Gutierrez**, Christian Gil, Gustavo Bastianelli, Guillermo Vaccarino*
Institution where study was performed: Hospital Universitario Austral, Argentina

Purpose: Mitral valve repair is the strategy of choice in patients with regurgitation caused by leaflet prolapse. Resection and closure of the defect for posterior prolapse and chordal transfer for anterior prolapse provide good results. However, some current techniques involve the use of artificial chordae to correct this defect.

Methods: With the aim of simplifying the creation of artificial chordae, Von Oppell and Mohr developed the concept of chordal loops with premeasured length for accurate repair. This method does not require the surgeon to manually adjust the loop length; it potentially reduces operative time and increases the probability of successful repair. An observational and retrospective review of early clinical experience identified 10 patients consecutively treated with this technique within a 90 day period. The decision to use premeasured chordal loops was left to the discretion of the surgeon.



Results: Causes of mitral regurgitation were posterior leaflet prolapse in 5 patients, anterior prolapse in 3 and bileaflet prolapse in 2. All patients underwent complete sternotomy. Clamp loops were applied in anterior leaflet of 5 patients, posterior leaflet of 4 and both anterior and posterior of 1 patient. Prosthetic annuloplasty was performed in 9 patients and triangular resection in segment P2 in 8 patients. Intraoperative TEE monitoring did not show any regurgitation in 8 of the patients treated and recorded trivial mitral regurgitation in 2 patients. Pre- discharge echocardiograms confirmed trivial regurgitation or no failure in all 10 cases. There were no cases of perioperative mortality. A male patient with COPD developed minor respiratory complications after surgery and a female patient developed biventricular dysfunction with prolonged hospitalization and subsequent recovery of function.



Conclusion: Complex mitral repair with premeasured loops should be included amongst traditional techniques since it is an undeniably effective, reliable and highly reproducible method even in adverse conditions. The rising interest in this technique has prompted us to conduct further evaluations to assess its medium and long term results.

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Minimally Invasive Mitral Valve Surgery in Argentina: How Do We Do It?

***German Fortunato**, Vadim Kotowicz, Ricardo Posatini, Roberto Battellini*
Institution where study was performed: Hospital Italiano de Buenos Aires, Argentina

Purpose: Purpose: Minimally invasive video assisted mitral valve surgery (MICS-MVR) has grown in popularity worldwide [1-2], but in our country it is still an uncommon technique. To assess the outcomes of patients solved by MICS-MVR in the greatest series of Argentina. Primary: Post-operative mortality within 30 days. Secondary: technical-surgical results and

Methods: Methods: Retrospective analysis of mitral MICS surgeries performed at Hospital Italiano of Buenos Aires from January 2010 to April 2017. During that period a, total of 140 mitral surgeries were performed, 71 of them by MICS (50,7%). Inclusion criteria: Patients undergoing MICS-MVR by surgeons trained in mini-invasive surgery in a reference center.

Results: Results: Out of 71 cases, 83,09% (n =59) were elective surgeries, 14,08 % (n =10) urgent and 2,81% (n =2) emergency. The STS PROM% and STS PROMM% were 4,86 ± 9,2 and 22,6 ± 16,1 respectively. Seven patients with previous cardiac surgery and seven with infective endocarditis (IE) in active treatment, were included. Surgeries performed: Mitral Valve Replacement 50,7% (n = 36) (19 Rheumatic); Mitral Repair 49,2% (n = 35). There were no deaths nor mediastinitis in mitral repair. Reasonable postoperative bleeding (211 ml). There were no cases of ischemic stroke. Mortality at 30 days: 4,2% (n = 3). Conversion to sternotomy: n=3.

Conclusion: Conclusions: The observed mortality is similar to that calculated by risk score (STS PROM% 4,86 ± 9,2 vs. 4,2.%). The MICS technique could be used in patients with previous cardiac surgery, IE and/or patients with elevated preoperative risk score with good results [3].

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Minimally Invasive Mitral Valve Surgery After Previous Sternotomy Without Aortic Clamping: Short- and Long-Term Results of a Single Surgeon at a Single Institution

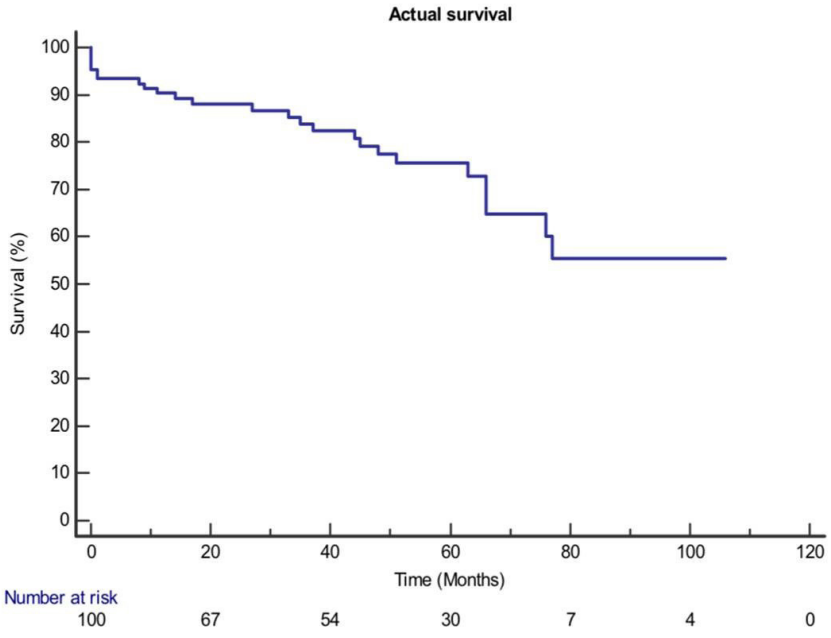
***Kinsing Ko**, Thom de Kroon, Najim Kaoui, Bart van Putte, Nabil Saouti*
Institution where study was performed: St Antonius Hospital Nieuwegein, Netherlands

Purpose: Minimal invasive surgery has become the standard approach for mitral valve pathology in many centers worldwide. The focus of this study is to analyse short- and longterm results of minimally invasive mitral valve surgery (MIMVS) after previous cardiac surgery on hypothermic fibrillating heart.

Methods: All consecutive patients undergoing MIMVS at our institution between December 2005 and December 2015 were studied retrospectively. Access was through right anterolateral mini thoracotomy, cannulation in the groin vessels and myocardial protection by hypothermic fibrillatory arrest without aortic clamping. Primary outcome was in hospital complications, secondary outcome was long-term survival. All complications were listed by pre-specified definitions, mainly based on M-VARC definitions. Survival data were obtained through consulting municipal personal records database.

Results: 105 Patients underwent MIMVS, with a mean age of 68 ± 9 years, 66% were male and left ventricular function was preserved in 64%. 71% had a 1st redo, 16,2% a 2nd redo, 4,8% a 3rd redo and 1,9% a 4th redo. 40,1% had at least a previous mitral valve surgery, 33,3% had at least previous AVR/Bentall, 30,5% had ast least previous CABG, 12,4% had at least previous CABG + AVR/Bentall, 26,7% had at least a previous aortic surgery. A repair was performed in 22/63 patients (35%) without previous mitral valve surgery. Mean cardiopulmonary bypass time was 168 ± 46 minutes. Early (in-hospital) mortality was 4,8% (5/105), stroke rate 1,9% (2/105), conversion to sternotomy 1,0% (1/105). 5-years survival was 75,5% ± 5%.

Conclusion: In the current study, redo MIMVS on hypothermic fibrillatory arrest is associated with an acceptable rate of overall complications, low stroke risk, low early mortality and acceptable late mortality. MIMVS has proven to be a safe approach for redo mitral valve surgery in our institution.



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In hospital complications		
	n (total = 105)	%
Early mortality	5	4,8%
Conversion to sternotomy	1	1,0%
Myocardial infarction, <48h	2	1,9%
Myocardial infarction, >48h	0	0,0%
Need for inotropes > 30 min after correcting fluid state *(Low cardiac output syndrome)*	28	26,7%
Stroke	2	1,9%
Phrenic nerve palsy	3	2,9%
Renal failure, AKIN class II – III	6	5,7%
Re-intervention cause		
Bleeding	9	8,6%
Redo MV surgery	3	2,9%
TIA	3	2,9%
Delirium	9	8,7%
New postoperative atrial fibrillation	6	15,0%
New pacemaker	6	7,2%
Postoperative erythrocyte transfusion	30	29,5%
Mitral valve repair (previous mitral valve surgery pateints excluded)	35%	22/63
Mean cardiopulmonary bypass time	168 ± 46 min	
Median ICU admission	2 days (IQR 1-3)	
Median ventilation time	9 h (IQR 7-15)	
Median Low cardiac output state	24 h (IQR 12-48)	

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Redo Mitral Surgery: Is Right Thoracotomy Better Than Resternotomy?

***Javier Maldonado Escalante**, Maria-Alejandra Molina, Maria Alejandra Castillo, Camilo Rodriguez*
Institution where study was performed: Clinica Universitaria Colombia, Colombia

Purpose: Mitral valve reoperation is a surgical challenge because of pericardial adhesions and ventricular dilatation. The patient is at risk of bleeding, ventricular dysfunction and infections among others. Right mini-thoracotomy is an emerging alternative approach that might reduce this risks.

Methods: From July 2008 to June 2018, 66 patients underwent reoperation of the mitral valve in Clinica Universitaria Colombia. The choice of surgical approach was determined by the surgical team based on their expertize. Most of the right mini-thoracotomies were performed using endoballoon clamps. The preoperative and operative data of the patients were saved in dtabase during their hospitalization. A descriptive analysis of the clinical variables and a bivariate analysis is performed to identify differences between the two techniques.

Results: 19 patients had a right thoracotomy (RT) approach and 47 patients had a full re-sternotomy (FS) approach. 13 of the RT patients (68.4%) were done with endoballon clamps. 11 (16,6%) patients died in-hospital 2 (10,5%) RT vs 9 (19,1%) FS (p 0,36). There was no statistical difference between the groups regarding age (p= 0,86), EuroScore (p= 0,63), intra or postoperative use of blood products (p= 0,34) or hospital length of stay (p= 0,34). The FS group had a significantrly higher intubation time (p= 0,05).

Conclusion: There is a tendency to a higher operative mortality in patients with re-sternotomy. Since we found a significant shorter intubation time in the right mini-thoracotomy, we strongly believe that further differences were not reached because of the small sample size of this group.

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Triple Valve Surgery 8-Year Follow-Up: A Single-Center Study

***Javier Maldonado Escalante**, Maria-Alejandra Molina, Maria Alejandra Castillo*
Institution where study was performed: Clinica Universitaria Colombia, Colombia

Purpose: There is very limited literature regarding triple valve procedures because the primary cause of valvulopathy in developed countries is degenerative disease. Since in Latin America we still have a high incidence of rheumatic fever we evaluated our results with aortic, mitral and tricuspid procedures done simultaneously for rheumatic disease.

Methods: From February 2010 to June 2018, 34 patients underwent triple valve combined procedures (aortic replacement, mitral replacement/repair and tricuspid repair) in Clinica Universitaria Colombia. The preoperative and operative data of the patients were collected during hospitalization. The patients were followed up with in-hospital trans thoracic echoardiography and at 3, 6 and 12 months after surgery. A quality of life survey was done by phone during the three year follow up. A descriptive analysis was performed with the clinical variables and a Kaplan- Meier model was used for survival.

Results: Mean age was 68,2 (95%CI: 64,3 - 72,1), 25 (75,7%) patients were female. Mean EuroScore was 9,71% (95% CI: 6,7 - 12,7). We performed 33 (97,1%) aortic valve replacements, 1 (2,9%) Bentall procedure, 29 (85,2%) mitral valve replacements, 5 (14,7%) mitral valve repairs and 34 (100%) tricuspid repairs. 5 (14,7%) patients died in-hospital. The mean follow up was 21,5 (95% CI: 14,7 - 32,9) months. 3 (8,8%) deaths occurred during this follow up. The self reported mean score of quality of health (EQ-5D-5L) was 72,3 (95% CI 62,2- 82,4).

Conclusion: The triple valve combined surgery is a high risk procedure that requires both an active heart failure clinic and a high experienced surgical team. Although mortality is high, the patients that survive have a moderate to high perception of quality of health that warrant their evaluation for surgery.

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Minimally Invasive Mitral Valve Repair vs Conventional Mitral Valve Plasty in Bogota, Colombia

Javier Maldonado Escalante*, Camilo Rodriguez, Maria-Alejandra Molina*
Institution where study was performed: Clinica Universitaria Colombia, Colombia

Purpose: The conventional approach to mitral valve repair is a full sternotomy (FS) but in the last two decades the minimally invasive (MI) approach (parasternal, hemisternotomy and thoracotomy) have shown excellent perioperative outcomes. We compare the clinical outcomes between these two techniques in Clinica Universitaria Colombia.

Methods: From July 2008 to February 2018, 51 patients underwent mitral valve repair in Clinica Universitaria Colombia. The surgical approach dependend on the surgical team experience. All patients received an anuloplasty associated to other procedures (resection, neochordae and/or sliding plasties). All patients were monitored with intraoperative TE echocardiograms. The preoperative and operative data of the patients were collected during hospitalization. A descriptive analysis of the clinical variables and a bivariate analysis was performed to identify differences between two groups.

Results: Mitral Valve Plasty were performed on 51 patients: 18 (35,2%) were done with minimally invasive (MI) approach and 33 patients (64,7%) with a conventional approach. The mini-thoracotomy approach was preferred (88.8%) over the mini-sternotomy.The FS group was significantly older (p=0,023) and in preoperative heart failure (p=0.03) but the rest of the preoperative variables were not significantly different. There were no operative mortalities in both groups. There were no statistically significant differences in the postoperative outcomes between the two groups except for a longer bypass time (p= 0,001) and shorter ICU length of stay (p= 0,008) and less incidence of intraoperative mitral valve regurgitation (p=0.006) in the MI group

Conclusion: The MI approach is a safe and useful procedure. Our results are similar to those reported in the world literature in spite of having a small sample size. Apparently the mitral valve repair was also more effective with a MI approach.

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Validation of a Mitral Repair Feasibility Score in a Latin American Health Center

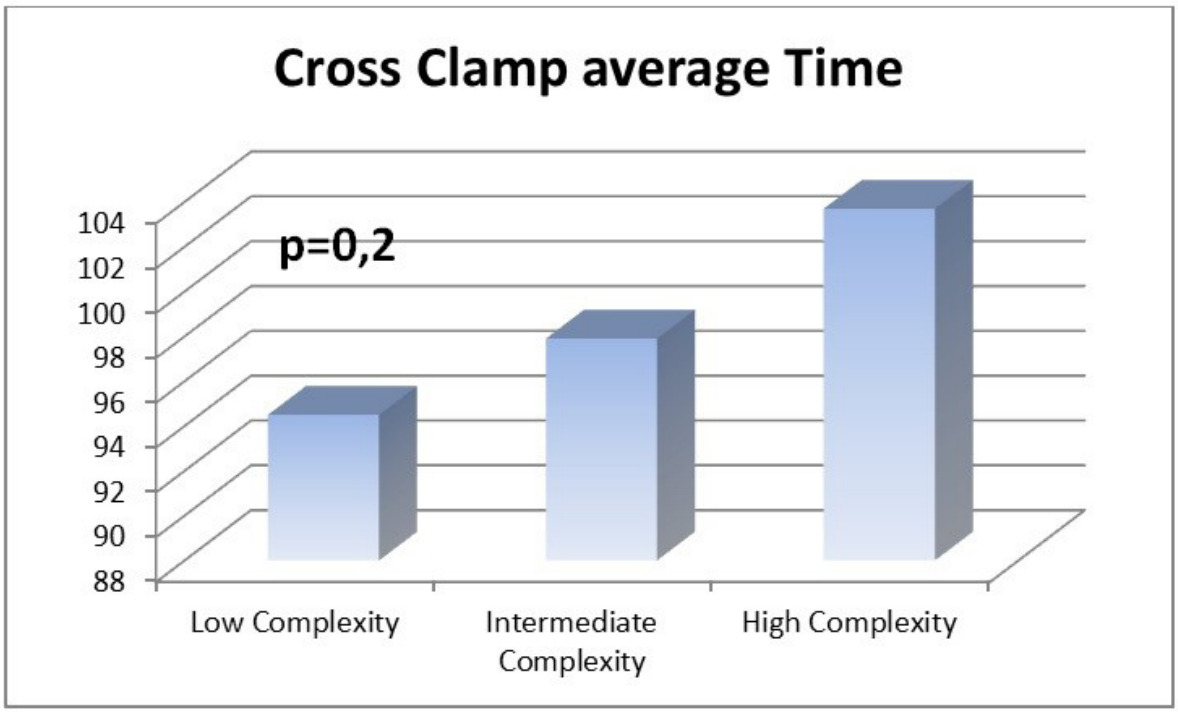
***Martin Vivas**, Rodrigo Campins, Juan Vrancic, Florencia Castro, Ricardo Ronderos, Florencia Castro, Daniel Navia, Alvaro Munoz*
Institution where study was performed: Instituto Cardiovascular de Buenos Aires, Argentina

Purpose: The feasibility of mitral valve repair is a major factor when considering surgical indication in primary valve disease. Our goal is to use a Complexity Scoring System, already published in the literature, to predict outcome in a single center population.

Methods: A cohort of 116 patients in whom surgical indication was mitral valve repair due to primary disease, that were operated between 2011 - 2018 was analyzed. Echocardiograms performed before and one month after surgery were retrospectively analyzed. A score was assigned to each valve based on the following: prolapsing segment (1 point for each posterior and 2 points for each anterior or commissural), valvular restriction (2 points) and presence of calcification (3 points if the ring is compromised or 2 points otherwise). The valves were classified into three groups according to their complexity.

Results: The average age was 63.5 years, range (26-82). 58.12% (68) were male. 111 had successful mitral valve repair (repair rate 94.87%). Mortality was 0.8% and significant residual MR rate was 1.8%. STATA version 14.1 was used, using Fisher's test for categorical variables and Kruskal Wallis for continuous variables. Complexity groups were stratified according to Score in Low (Group 1), Intermediate (Group 2) and High (Group 3); cross clamping time averages (in minutes) were 94.5 for G1, 97.9 for G2 and 103.63 for G3 (p: 0.2); the combined endpoint of significant residual MR + need of valve replacement were: 5.56% (2) for G1; 11.43% (8) for G2 and 27.27% (3) for G3 (p: 0.09). Residual MR G1: 0%, G2: 1.5% (1), G3: 11.1% (1) (p: 0.15). Need of valve replacement G1: 0% G2: 7.1% (5) G3: 10% (1) (p: 0.14).

Conclusion: Classifying primary mitral regurgitation according to this feasibility score could predict prolongation of the clamping time, need of valve replacement and significant residual MR in our population. Probably the analysis of a larger number of patients will allows us to find significant differences between the groups.



complejidad	resultad 0	1	Total
0	34	2	36
	94.44	5.56	100.00
1	62	8	70
	88.57	11.43	100.00
2	7	3	10
	70.00	30.00	100.00
Total	103	13	116
	88.79	11.21	100.00

Fisher's exact = 0.094

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Feasibility and Long-Term Outcomes of Mitral Valve Repair in Degenerative Valve Disease: Comparison Between Posterior and Anterior or Bileaflet Mitral Valve Prolapse

***Juan Vrancic**, Fernando Piccinini, Mariano Camporrotondo, Florencia Castro, Martin Vivas, Bruno Simonetto, Daniel Navia, Juan Espinoza*
Institution where study was performed: Instituto Cardiovascular de Buenos Aires, Argentina

Purpose: Mitral valve repair is the goal standard for mitral regurgitation. The aim of this study is to compare the clinical and echocardiographic outcomes of mitral valve repair secondary to degenerative mitral valve disease in patients with posterior versus anterior or bileaflet mitral valve prolapse.

Methods: Between April 1997 and July 2018, 474 patients underwent surgery for moderate to severe degenerative mitral valve regurgitation: 336 had posterior mitral valve prolapse (Group 1) and 138 had anterior or bi-leaflet mitral valve prolapse (Group 2). There were no differences in gender between groups. Patients in Group 1 were slightly older (p=0.044). Clinical follow-up was completed in 91,4 % of the cases with a mean follow-up period of 4,36 ± 3,5 years and 80% completed echocardiographic follow-up with a mean of 3,6 ± 2,2 years.

Results: The procedure was successful in 89.6% of cases (49 intraoperative conversions to mitral valve replacement) (Group 1: 96.9 % vs. Group 2: 71.8%; p < 0.01). Overall in-hospital mortality was 2.1% (10/474), and 10-year survival was 91,8 ± 2.2% (Group 1: 94 % ± 2.2% vs. Group 2: 86.5 ± 5.6%; p = 0.041). At 10-year follow-up, 95.5 ± 1.2% of patients were free from reoperation (Group 1: 97.3 ± 1.3% vs. Group 2: 95,1 ± 2,5%; p = 0.302), 79.0 ± 4.4% remained free from moderate to severe mitral regurgitation (Group 1: 80.8 ± 4.8% vs. Group 2: 71.9 ± 9.6%; p = 0.14) and 91.2% were asymptomatic (92% Group 1 vs. 89.3% Group 2; p = 0.5).

Conclusion: Patients undergoing mitral valve repair secondary to degenerative posterior mitral valve prolapse had significantly higher survival and slightly lower incidence or reoperation in the long-term follow-up. There were no differences in freedom from moderate to severe mitral regurgitation between both groups at 10-year follow-up.

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Mitral Valve Repair: How to Make Volume Not Matter — A Single-Center Experience

***Manuel Giraldo-Grueso**, Nestor Sandoval, Jaime Camacho, Ivonne Pineda-Rodriguez, Juan Umana*
Institution where study was performed: Fundacion Cardioinfantil - Instituto de Cardiologia, Colombia

Purpose: This study shows how low-volume centers can achieve results in mitral valve repair (MVr) surgery comparable to those reported by referral centers. It compares outcomes of MVr using resection versus noresection techniques, tendencies, and rates of repair.

Methods: Between 2004 and 2017, 200 patients underwent MVr for degenerative mitral valve disease at our institution. Fifty-eight (29%) patients underwent resection and 142 (71%) noresection. Previous to surgery, all patients were assessed by the institutional MVr, which is laed by an experienced cardiac surgeon. Operations were performed through a conventional median sternotomy or minimally invasive techniques (right lateral minithoracotomy or periareolar approach). Preoperative and postoperative variables were described according to the Society of Thoracic Surgeons database guidelines Baseline demographics and clinical characteristics were summarized using descriptive statistics. Survival was analyzed through Kaplan-Meier method. A significance level of 0.05 was used.

Results: Follow-up was 94% complete, mean follow-up time was 2.3 years. There was no 30-day mortality. Five patients required mitral valve replacement after an average of 5.3 years (Resection= 2; Noresection=3). Freedom from severe mitral regurgitation was 98% at 6.6 years of follow-up for the noresection group, and 92.5% at 7 years for the resection group (log rank: 0.888). At last follow-up, two patients died of cardiovascular disease related to mitral valve, 168 patients (89%) showed no or grade I mitral regurgitation, and 83% of the patients had NYHA class I (Table 1). Patients with previous myocardial infarction had increased risk of recurrent mitral regurgitation (p=0,030). Within four years, we inverted the proportion of mitral valve replacement and repair, and in 2016 we achieved a mitral valve repair rate of 96% (Figure 1).

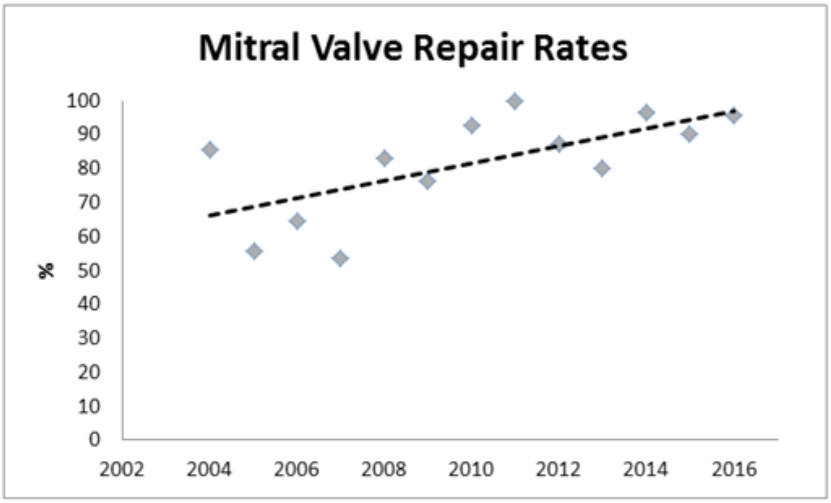

Figure 5. Mitral valve repair rates over the years, tendency line is shown in black.

Conclusion: This study suggests that MVr techniques are safe and effective. Recurrence of severe mitral regurgitation and need for mitral valve replacement are rare. We show that low-volume centers can achieve results comparable to those reported worldwide by establishing a MVr team.

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Table 1. Preoperative, perioperative, postoperative, and last follow-up variables.

Variable n (%)	No Resection n=142	Resection n=58	*p* value
Preoperative Variables			
Male sex	83 (58.4)	39 (67.2)	0,247
Age years, median IQR	58 (48-66)	56 (48-66)	0,969
Diabetes	9 (6.3)	1 (1.7)	0,287
Hypertension	59 (41.5)	20 (34.5)	0,354
COPD	7 (4.9)	4 (6.9)	0,58
Previous myocardial infarction	0	3 (5.2)	**0,023**
NYHA functional class			0,079
I	12 (8.7)	9 (17.3)	
II	99 (72.3)	36 (69.2)	
III	26 (19)	7 813.5)	
Perioperative Variables			
Isolated MV repair	107 (75)	49 (84,5)	0,108
Minimally invasive	51 (35.9)	7 (12.1)	**<0,001**
Cardiopulmonary bypass time	117 (95-141)	117 (105-143)	0,552
Cross clamp time	91 (75-110)	95 (83-108)	0,371
ICU length of stay (days)	1 (1-4)	1 (1-3)	0,495
Hospital length of stay (days)	3 (2-5)	4 (3-5)	0,674
Postoperative complications			
Reoperation for bleeding	0	2 (3.4)	0,083
Renal impairment	2 (1.4)	0	0,503
Hospital length of stay	8 (5-15)	8 (5-14)	0,906
30-day Mortality	0	0	
Last Follow-up			
NYHA functional class			0,797
I	115(84.5)	41 (78.8)	
II	16 (11.7)	9 (17.3)	
III	3 (2.2)	2 (3.8)	
IV	2 (1.5)	0	
Mitral Valve Regurgitation			0,267
None/Trace	76 (56.0)	22 (42.3)	
Mild	48 (35.3)	22 (42.3)	
Moderate	9 (6.6)	6 (11.5)	
Severe	3 (2.1)	2 (3.8)	

Categorical data are expressed as number (%) and continuous data as median (Interquartile range)

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Flattening the Learning Curve of Minimally Invasive Mitral Valve Repair

***Manuel Giraldo-Grueso**, Jaime Camacho, Nestor Sandoval, Ivonne Pineda-Rodriguez, Juan Umana*
Institution where study was performed: Fundacion Cardioinfantil - Instituto de Cardiologia, Colombia

Purpose: Since minimally invasive mitral valve repair (Mini-MVr) technique was introduced, it has become a routine approach to mitral valve disease. However, surgeons from low-volume centers might be reluctant to adopt this technique due to the initial learning curve involved.

Methods: Between 2004 and 2017, 200 patients underwent a mitral valve repair (MVr) for degenerative mitral valve disease at our institution. Fifty-eight (29%) patients underwent a Mini-MVr and 142 (71%) a conventional MVr. Previous to surgery, all patients were assessed by the institutional Mini-MVr team, which is lead by an experienced cardiac surgeon. Mini-MVr were performed by a right lateral minithoracotomy or periareolar approach while conventional repairs were performed through a conventional median sternotomy. Variables were described according to the Society of Thoracic Surgeons database guidelines. Baseline demographics and clinical characteristics were summarized using descriptive statistics.

Results: Follow-up was 94% complete, mean follow-up time was 2.3 years. There was no 30-day mortality. Five patients required mitral valve replacement after an average of 5.3 years. Patients from the Mini-MVr group were younger (p = < 0,001) and healthier. Median left ventricular ejection fraction for the Mini-MVr group was 55% (46-60) and 60% (55-61) for conventional MVr group (p = 0,013) (Table 1). At last follow-up, two patients died of cardiovascular disease related to mitral valve and 168 patients (89%) showed no or grade I mitral regurgitation (Table 1). We compared cardiopulmonary bypass (CPB) and cross-clamp times of Mini-MVr with the standard times of conventional MVr at our institution. Results showed that in the first cases Mini-MVr times were higher than the conventional approach. Nevertheless, after the thirtieth case, CPB and cross-clamp times start lowering, and finally, after the fiftieth case, they became shorter than the conventional MVr times. (Figure 1).

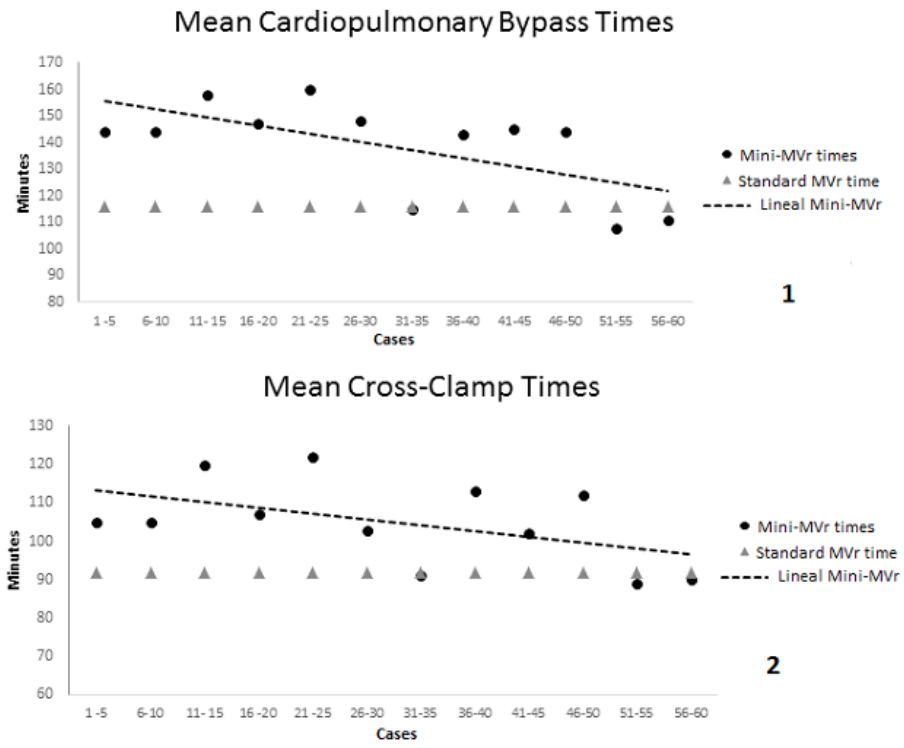

Figure 1. Image 1 represents the decreasing time of mean cardiopulmonary bypass related to the number of cases. Image 2 represents the decreasing time of cross-clamp related to the number of cases.

Conclusion: This study suggests that Mini-MVr techniques are safe, effective, and provides excellent short and long-term outcomes. Low-volume centers can accomplish Mini-MVr results comparable to those reported worldwide. The creation of a Mini-MVr team, lead by an experienced surgeon can help flatten the learning curve.

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Table 1. Preoperative, perioperative, postoperative, and last follow-up variables.

VARIABLES	Conventional MVr n =142	Mini-MVr n =58	*p* value
Preoperative Variables			
Male sex n(%)	59 (54,3)	44 (75,9)	0,004
Age years, median IQR	60 (51-67)	49 (40-56)	<0,001
Body mass index Median (IQR)	25,9 (23,6-19,4)	24,5 (2,8-26,19)	0,01
Diabetes mellitus n (%)	10 (7)	0	0,066
Hypertension n (%)	70 (49)	9 (15,5)	<0,001
Previous myocardial infarction n (%)	3 (2,1)	0	0,558
Previous stroke n (%)	6 (4,2)	0	0,184
COPD n (%)	11 (7,7)	0	0,036
Preoperative Blocker n (%)	78 (54,9)	49 (84,5)	<0,001
Preoperative creatinine Median (IQR)	0-9 (0,9-1)	1 (,9-1,1)	0,064
Ejection fraction Median (IQR)	55 (46-60)	60 (55-61)	0,013
NYHA > II n (%)	104 (78,8)	52 (91,2)	0,039
Pulmonary hypertension n (%)	60 (42,5)	14 (26,4)	0,047
Elective; n (%)	86 (60,5)	45 (77,6)	0,044
Postoperative complications			
Bleeding requiring reoperation n (%)	9 (6,3)	1 (1,7)	0,287
Deep wound infection n (%)	3 (2,1)	0	0,558
Stroke n (%)	2 (1,4)	2 (3,4)	0,581
Mortality (%)	0	0	-
Last Follow-up			
Mitral Valve Regurgitation			0,187
None/Trace	61 (44,8)	39 (75)	
Mild	57 (41,9)	11 (21,1)	
Moderate	13 (9,5)	2 (3,8)	
Severe	5 (3,6)	0 (0,0)	

Categorical data are expressed as number (%) and continuous data as median (Interquartile range)

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Mid-Term Postoperative Follow-Up After Surgical Correction of Hypertrophic Cardiomyopathy in Infancy and Childhood

Mohamed Abdullah
Institution where study was performed: Cairo University, Egypt

Purpose: Septal myectomy has been considered the gold-standard for symptomatic patients with hypertrophic obstructive cardiomyopathy for over 50 years. It is being challenged by alcohol septal ablation in the last 2 decades, but its late effects of myocardial scarring are not known, therefore, not recommended in children and young adults.

Methods: A total of 9 patients underwent surgical interventions for HOCM. All patients were below 12 years of age. The patients were operated upon in Cairo University Hospitals, Egypt; in the period between April 2014 and February 2016. Pre-operative and operative data were collected and analyzed statistically. Post-operative evaluation was documented at different periods and data collected and analyzed in comparison with pre-operative data as well as at these different follow up periods.

Results: Mean age of all patients was 6.1 ± 2.6 years. 77.8% were males. All the patients were symptomatic. Preoperative mean pressure gradient (PG) was 95.4 ± 15.2 mmHg. Mean septal wall thickness (SWT) was 1.52 + 0.45 cm, mean degree of mitral regurge (MR) was 1.7 ± 0.83. Immediate postoperative assessment showed significant clinical improvement and significant reduction of PG to 20.0 ± 14 mmHg, SWT to 0.98 ± 0.38 cm, and mean degree of MR to 0.89 ± 0.33. Short-term and mid-term follow up showed sustained improvement. There were no deaths.

Conclusion: Surgical procedures for HOCM are generally safe and effective for improvement of symptoms, LVOT gradient, mitral regurge. Early surgical intervention is advocated to prevent progression of valve disease.

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To Outsource or Develop: Cost-Effectiveness of a Pediatric Cardiac Surgery Program Development in a Small Country

Marcelo Cardarelli[1]*, Vladimir Chadikosvki*[2]*, William Novick*[3]
Institutions where study was performed: [1]Inova Children's Hospital, United States; [2]University Clinic for Pediatric Surgery, Macedonia; [3]University of Tennessee Health Science Center, United States

Purpose: Countries lacking pediatric cardiac surgery programs have limited options for managing children diagnosed with congenital heart disease. The cost-effectiveness of sending patients abroad for treatment versus developing a local program should be carefully considered. We investigated the cost-effectiveness analysis of developing such program in a small Eastern-European country.

Methods: Calculated costs during different stages in the development of a program in the Former Yugoslav Republic of Macedonia (Population: 2 Million) were obtained. All patients diagnosed and surgically treated between 2010 and 2017 were included along 3 distinctive periods. Cost-Effectiveness is provided in US$ per Disability Adjusted Life Years (DALY) as unit of health value. 2010-2012 - Outsourcing Period (All patients sent abroad for surgical treatment) 2013-2016 - Foundational Period (Program development with help from a global charity organization) 2017 - Tutelage Period (Semi-Independent program) Foundational period included: capital and operational costs, some unavailable medications and limited disposables.

Results: The number of patients discharged home during each period, as well as the operational and capital costs, can be found on Table 1. The case-mix of patients was similar throughout the entire study period. The unit of health value was averaged to 43.4 DALY averted per patient discharged. The cost-effectiveness during the three periods were: $460; $383 and $237 per DALY averted respectively. In the case of this particular country, once the 35 patients/year threshold was crossed, the economies of scale justified developing a local program.

Conclusion: When compared with outsourcing services abroad, and after accounting for the initial capital investment costs, the development of a pediatric cardiac surgery program was a highly cost-effective public health policy for a developing country with a small population. Further studies on outsourcing services between states or cities would be beneficial for larger countries.

Table 1

	Outsourcing (2010-12)	Foundational (2013-16)	Tutelage (2017)
Operational Costs	-	$2,148,238	$514,452
Capital Costs	-	$664,874	-
Total Costs	$ 2,394,466	$2,813,112	$514,452
Patients Discharged	120	169	50
Costs per patient discharged	$19,953	$16,645	$10,289
DALYs averted (per patients)	43.4 years	43.4 years	43.4 years
Cost-Effectiveness	$460 per DALY averted	$383 per DALY averted	$237 per DALY averted

DALY = Disability Adjusted Life Year

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Does Arterial Stiffness Improve After Percutaneous Management of Aortic Coarctation? A Case Series Report

***Manuel Giraldo-Grueso**, Dario Echeverri, Miguel Ronderos, Felix Montes*
Institution where study was performed: Fundacion Cardioinfantil - Instituto de Cardiologia, Colombia

Purpose: Arterial stiffness (AS) is a cardiovascular risk marker and it has been described as an independent predictor of cardiovascular mortality. However, it is still unknown if patients with aortic coarctation can improve AS parameters after a percutaneous intervention.

Methods: We measured AS parameter (pulse wave velocity (PWV), aortic augmentation index (Aortic Aix), and brachial augmentation index (Brachial Aix)) with an oscillometric method (Arteriograph®, Tensiomed) to patients with aortic coarctation. The measurements were recorded one-day previous to percutaneous intervention (pre-intervention measurement) and previous to hospital discharge (post-intervention). All measurements were performed by the same physician and were categorized as high quality. Baseline demographics and clinical characteristics were summarized using descriptive statistics.

Results: Four patients were included in the study. Ages ranged between 14-25 years, three patients were male, three had hypertension but only one was controlled with anti-hypertensive drugs. Three patients were NYHA class I and one was NYHA class II. In the pre-intervention AS measurements, three patients had high systolic and diastolic blood pressures, median brachial aix was -19,45%, aortic aix 18,6%, PWV was 7,8 m/s, and central systolic blood pressure 137,7mmHg. In the post-intervention AS measurements, PWV improved in all patients, while brachial and aortic aix improved in three patients. Median post-intervention brachial aix was -48,35%, aortic aix 13,2%, PWV was 7,15 m/s, and central systolic blood pressure was 107,8 mmHg (Table. Figure).

Conclusion: Our results showed that PWV improved rapidly in young patients with aortic coarctation after a percutaneous intervention, this behavior could be related to a healthy vascular reserve. Pathological post-interventions AS measurements could be related to arterial hypertension and target organ damage. However, bigger studies are needed to make stronger conclusions.

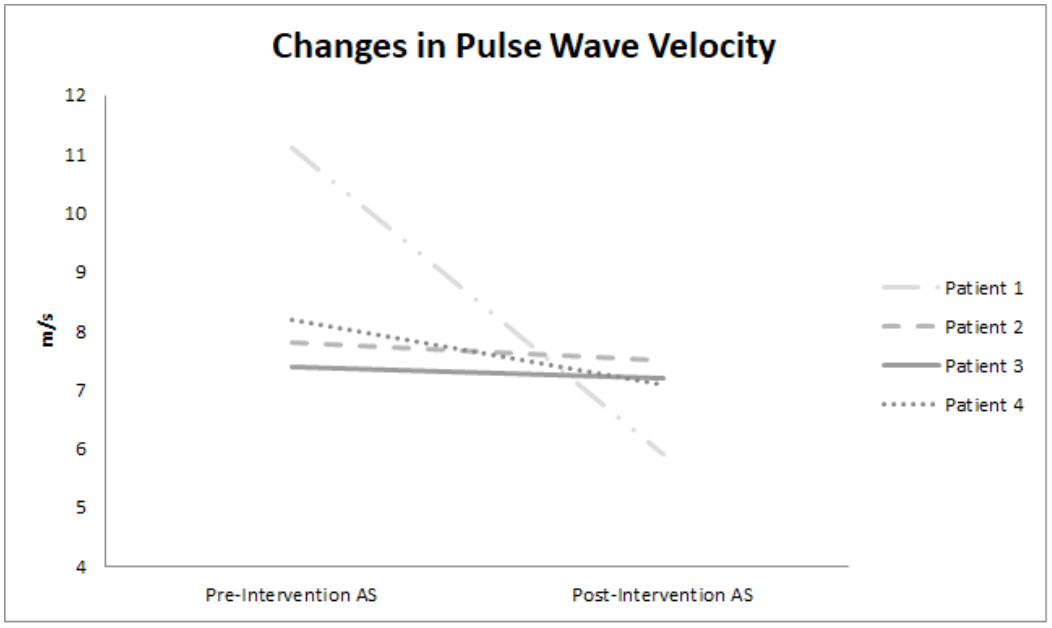

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Table 1. Changes in arterial stiffness measurements.

Variables	Patient 1	Patient 2	Patient 3	Patient 4
Age	14	25	15	16
Gender, Male	Yes	Yes	Yes	No
Weight, kg	65	80	40	67
Hypertension	Yes	Yes	No	Yes
Anti-hypertensive medication	No	Yes	No	No
NYHA	II	I	I	I
Pre-Intervention AS				
Systolic Arterial Pressure (mmHg)	168	130	115	143
Diastolic Arterial Pressure (mmHg)	89	87	68	95
Mean Arterial Pressure (mmHg)	115	101	84	111
Pulse Pressure (mmHg)	79	43	47	48
Brachial Aix (%)	-21,7	-17,2	-60,3	17,2
Aortic Aix (%)	26,7	10,6	8,8	46,3
Pulse Wave Velocity (m/s)	11,1	7,8	7,4	8,2
cSAPc (mmHg)	160,8	125	110	150
cDAPc (mmHg)	71,8	80	62	55,2
Post-Intervention AS				
Systolic Arterial Pressure (mmHg)	123	125	133	106
Diastolic Arterial Pressure (mmHg)	60	54	79	41
Mean Arterial Pressure (mmHg)	81	78	97	63
Pulse Pressure (mmHg)	63	71	54	65
Brachial Aix (%)	-37,5	-63	-53,1	-43,6
Aortic Aix (%)	18,7	5,8	10,8	15,6
Pulse Wave Velocity (m/s)	5,9	7,5	7,2	7,1
cSAPc (mmHg)	111,6	104	119,3	92,3
cDAPc (mmHg)	51,6	50,2	40,3	51,3

cDAP: Central diastolic artery pressure.

cSAP: Central systolic artery pressure

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Single-Stage Repair of Sternal Cleft and Cardiac Defects Outside the Neonatal Period

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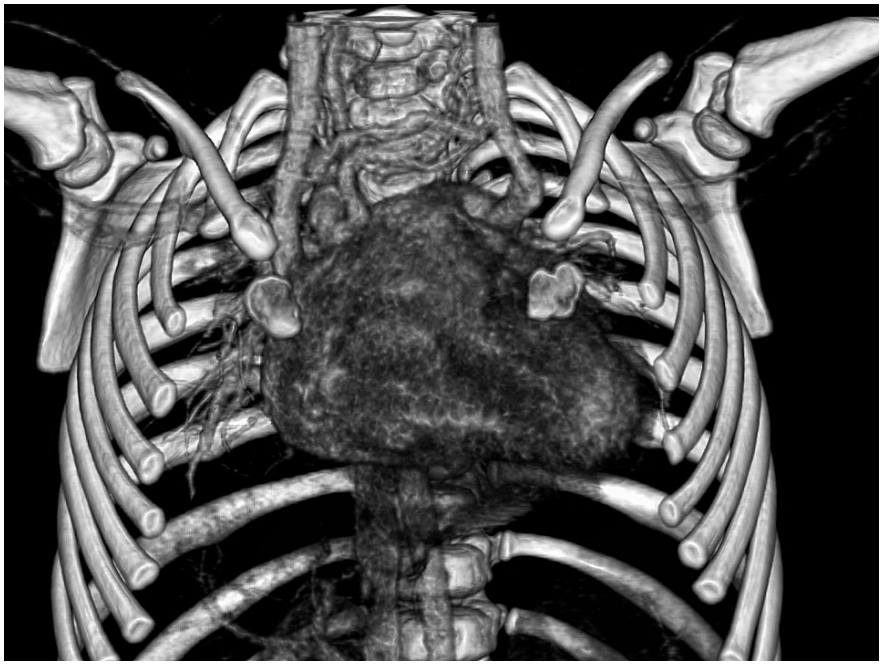
Institution where study was performed: Instituto Nacional de Pediatria, Mexico

Purpose: To present the case of a 3-year-old female patient with diagnosis of sternal cleft and congenital heart disease who underwent a successful cardiac and thoracic correction at the same time. There are few reports of this association and type of correction at this age.

Methods: Skin was gently dissected until the pericardium was identified. The two sternal cartilaginous ends were identified and the lower cartilage bridge was resected. Cannulation of aorta, superior right, superior left and inferior venae cavae. Surgery consisted in ligation of aorto-pulmonary collateral, section of ductus arteriosus and closure of ventricular septal defect. 96-minute cardiopulmonary bypass time and a 36-minute aortic clamp. Longitudinal edges of costal cartilage are dissected on both sides, freeing 2cm of pectoralis major on each side. The edges of the cartilage were regularized, and 5 polyester points were placed. No extra tissue was used to close the sternum.

Results: The patient remained stable after skin closure and got extubated in the OR. The patient stayed 48 hours in the cardiovascular intensive care unit, discharged home on the fifth postoperative day. Seventeen months after the surgery, the patient is asymptomatic from the ventilatory and hemodynamic stand point. She goes to kindergarten, referred with normal physical activity for her age. The thorax is well faced, stable, with adequate respiratory movement. Last echocardiogram without residual defect with preserved ventricular function. Currently without medical treatment.

Conclusion: The late presentation of this type of cases urges a thorough peri-operative evaluation, as well as a correct surgical decision. The case of our patient shows the ability to succeed in a single stage surgical correction of a sternal and cardiac defects, outside neonatal period and without any extra material.



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Fetal Hypoxemia Causes Abnormal Myocardial Development in a Preterm, Ex-Utero Fetal Ovine Model: Implications for Adult Cardiovascular Disease and Novel Fetal Therapy

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Institutions where study was performed: [1]Children's Hospital of Philadelphia, United States; [2]Temple University Hospital, United States; [3]Hospital of the University of Pennsylvania, United States

Purpose: Intrauterine hypoxemia is a major cause of neonatal morbidity and mortality and predisposes to adult cardiovascular disease. In a novel extrauterine fetal support system, we tested the hypothesis that hypoxemic support of the fetus alters myocardial development and function whereas normoxic support allows normal myocardial development and function.

Methods: Preterm fetal lambs (n=16, gestational age 109±1 days; normal ovine term=145 days) were removed via caesarean-section and immediately connected via umbilical vessels to a low resistance oxygenator and placed in a sterile fluid environment. Control normoxic fetuses received normal fetal oxygen levels (n=9, oxygen delivery 23±1 ml/kg/min, 24±2 days), whereas hypoxemic fetuses received pathologically low oxygen levels (n=7, oxygen delivery 15±1 ml/kg/min, 18±2 days). Blood gases, hemodynamics, and echocardiographic parameters were collected. Left ventricular myocyte size, myocyte nuclear size, myocardial vascular density, and myocardial apoptosis were quantified. An additional control group consisted of fetuses with normal in utero development (n=8).

Results: Compared to control normoxic fetuses, hypoxemic fetuses developed a chronic lactic acidosis ($p < 0.0001$). Maximum cardiac output was decreased in both the right and left ventricles in hypoxic fetuses versus control normoxic fetuses ($p < 0.0001$). Hypoxemic fetuses also demonstrated an inadequate cardiac output reflex in the right ventricle ($p=0.02$). Diastolic function as measured by tricuspid and mitral E/A ratio was significantly decreased in the right ($p < 0.01$) and left ($p < 0.01$) ventricles of hypoxic fetuses versus control normoxic fetuses. Myocyte cell size ($p < 0.01$) and nuclear size ($p=0.01$) decreased, whereas myocardial capillary density increased ($p < 0.05$) in hypoxemic fetuses versus both control normoxic fetuses and control in utero fetuses.

Conclusion: Fetal hypoxemia altered myocardial development. Myocardial histologic changes in the fetal period that persist into adulthood may contribute to heart disease. Our ex utero fetal support system has the potential to become a significant novel therapy for preterm hypoxic fetuses, for which there are no current therapies to correct hypoxemia.

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Pediatric Congenital Heart Surgery Using a Vertical Right Axillary Minithoracotomy

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Institution where study was performed: CEDIMAT, Dominican Republic

Purpose: Vertical right axillary mini thoracotomy is an alternative approach for selected patients with congenital heart disease. We report our initial results in comparison to standard midline sternotomy.

Methods: Retrospective review of 20 patients that underwent corrective or palliative procedures between January and June 2018. Included were 10 patients with vertical right mini thoracotomy and 10 with midline stenotomy, both groups were comparable regarding age, weight and pathology.

Results: Mean age was 3. 2 years (6m to 5 y) and mean weight 15.8 Kg (9 -20Kg). On pump atrial septal defect closure was performed in 16, ventricular septal defect closure in 2 and off pump/shunt cavo-pulmonary anastomosis in 2. No early mortality was observed, one serous subcutaneous effusion was drained in one VRAMT patient. No significant difference was observed in extracorporeal circulation/shunt, aortic cross clamping, mechanical ventilation, intensive care and hospitalization times.

Conclusion: Vertical right axillary mini thoracotomy is a safe approach in comparison with standard midline sternotomy for selected patients with an important cosmetic advantage in children undergoing corrective or palliative heart surgery.

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Bidirectional Glenn in Resource-Limited Settings: How Safe Is the Off-Pump Option and Does It Reduce the Cost of Care?

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Institutions where study was performed: [1]William Novick Global Cardiac Alliance, Memphis, TN, and University of Tennessee Health Science Center, Memphis, United States; [2]Armed Forces Institute of Cardiology/National Institute of Heart Diseases, United States; [3]Inova Children Hospital, United States

Purpose: Providing comprehensive care for children with single ventricle physiology in resource limited settings represents a significant financial burden to the family and institution. We initiated a policy of performing the bi-directional Glenn (BDG) off-pump in 1/2006 and analyzed the differences in clinical results and cost with on-pump BDG.

Methods: Patients undergoing BDG were identified and extracted for analysis from our database and the affiliate program where this policy was instituted. Duplicate patients were identified and the duplicate entry was deleted from the database used for analysis. The period of study was from 1/2006 through 12/2017. The cohort was divided into on-pump (P) and off-pump (OP) groups by procedure and analyzed for differences in pre-operative status, additional procedures performed, extubation time, re-intubation rates, inotrope scores, complications, length of stay in ICU, OR + ICU expenses and mortality. Statistical significance was achieved when analysis resulted in p-values < 0.05.

Results: A total of 698 patients were identified. Males were 62.9% (439/698) and mean age was 4.5 ± 4.9 years. The on-pump group was 418/698 (59.9%) and off-pump 280/698 (41.1%). Previous procedures P; 148/418 (35.4%) and OP 29/280 (10.4%), (p < 0 .001). Additional procedures in the P group were performed in 60.2% (254/418) and in 17.1% (48/280) in the OP group, p< 0.001. ICU length of stay of 4.8±3.9 in P and 3.5±1.9 in OP (p < 0 .01). Ventilation time in hours 28.7±72.8 in P and 13.3±24.7 in OP (p < 0 .001). Re-intubation rates were 11.7% (49/418) in P and 8.6% (24/280) in OP (p=0.1). Inotrope scores and hours of duration respectively were: P; 27.1±33.7 and OP; 15.1±17.1, p < 0 .01; P-63.1±83.1 and OP-46.1±44.1, p < 0 .01.Hospital LOS P; 10.6±5.1 and OP 9.2±4.0 (p< 0.01). Mortality was 9.1% (38/418) in P and 2.5% (7/280) in OP (p < 0 .001). Expenses in P were $ 4000 and $ 3000 in OP (p< 0.001).

Conclusion: Off-pump BDG can be performed with low mortality and less expense which is critical in resource limited settings. Consideration of this method could result in in substantial cost savings in resource limited settings as well as resource replete institutions.

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Pediatric Veno-Arterial Extracorporeal Membrane Oxygenation: Experience at Fundacion Cardioinfantil - Instituto de Cardiologia

***Otto Gonzalez-Pardo**, Nestor Sandoval, Carlos Santacruz, Martha Reyes Casas*
Institution where study was performed: Fundacion Cardioinfantil - Instituto de Cardiologia, Colombia

Purpose: Since we have the availability to perform VA ECMO in pediatrics, the postoperative management of congenital heart diseases has changed, especially those of greater complexity.

Methods: A description is made of the cases of postoperative patients with congenital heart disease who have required support with VA ECMO

Results: Since 2014, the VA ECMO program in the Cardioinfantil Foundation has been started. Up to now, 30 children have been cannulated, all in the postoperative period of correction of congenital heart diseases, most of them have been corrections of tetralogy of Fallot with physiology of restrictive right ventricle in the postoperative period and patients with interventions performed on the aortic arch. Our mortality rate was 25% both when leaving intensive care and when leaving the hospital. The main cause has been the non-recovery of the native cardiac function. In general, we have not had hemorrhagic complications. Our incidence of renal replacement therapies is 100% because we initiate them early.

Conclusion: The availability of VA ECMO has changed the outcomes of the congenital heart diseases program in Fundacion Cardioinfantil, the overall mortality of the Unit in the last year was 1.5%, this is largely due to the fact that the VA ECMO program mortalitiy has been of 25%.

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Ebstein Anomaly in Patients Older Than 1 Year: Outcomes and Follow-Up

***Marisol Carreno**, Martha Reyes Casas*
Institution where study was performed: Fundacion Cardioinfantil - Instituto de Cardiologia, Colombia

Purpose: Ebstein anomaly (EA) is an infrequent congenital heart disease, associated to cardiac and extra-cardiac comorbidities. Complete repair is usually made in older patients. We present the experience in the treatment of patients older than a year with EA undergone to surgical repair.

Methods: Historical cohort of surgical patients between 2003 and December 2017, 52 patients operated, four patients under one year old, who underwent to palliative repair, 22 patients who received tricuspid valve repair. Describe of characteristics whit median and interquartile range, and proportions.

Results: Median age 14,7 (13-21,2) years, male 45,6%, preoperative saturation 87% (76-94), 50,5% type c followed by type A 20,5%. Most frequent procedure was tricuspid valve repair 48%, 4 cardiac transplant. Mortality 17,3%, low cardiac output was the most frequent complication 17,3% followed by arrhythmia 12,3%. Survival 87,5% at 7 years.

Conclusion: EA is a congenital heart disease which affect tricuspid valve and right ventricle, the cases are rare and the challenge of postoperative care is unique for ever case. The main results of our experience they have allowed us to consolidate a care protocol aimed at optimizing the hemodynamic disadvantages of immediate postoperative period.

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Univentricular Heart: A 10-Year Experience in Left Hypoplastic Heart Syndrome

***Marisol Carreno**, Martha Reyes Casas*
Institution where study was performed: Fundacion Cardioinfantil - Instituto de Cardiologia, Colombia

Purpose: The main goal of management of a univentricular heart or its equivalent is to have one ventricle that supports the systemic circulation. A goal of neonatal management is to procure unobstructed flow to the aorta. The aim of this study was to describe the outcomes of surgical treatment of left hypoplastic heart syndrome in the past 10 years.

Methods: Historical cohort of surgical patients between 2007 and December 2017, 35 patients operated. We describe of characteristics of patients, outcomes and survival whit median and interquartile range, and proportions.

Results: Median age 6 (2,9-10) days, male 65,7%, median weight 8,8 kg (4,9-17), preoperative saturation 92% (88-95), 11 hybrid Norwood and 5 Damus–Kaye–Stansel procedure were done, median clamp time 44 minutes (24-72), median icu stay 72 hours (48-144), in-hospital survival 50%, follow up at 30 days 100%.

Conclusion: Left hypoplastic heart is a high mortality congenital cardiac anomaly, in some cases in patients with prenatal diagnosis the pregnancy is terminated. Survived patients who undergone to surgical procedures had elevated surgical risk, related to mortality and complications.

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Measuring Capacity-Building in a Humanitarian Congenital Heart Disease Surgery Program

Marci Fults[5], *Rodrigo Soto*[1], *Tyler Wallen*[2], *Randa Blenden*[1], *Zafurallah Intikhab*[3], *Janet Nwaukoni*[4], *Nuha Fariha*[4], *Marilyn Le*[4]

Institutions where study was performed: [1]International Children's Heart Foundation, United States; [2]The University of Florida, United States; [3]Birmingham Children's Hospital NHS Foundation Trust, Paediatric Intensive Care, United Kingdom of Great Britain and Northern Ireland; [4]Philadelphia College of Osteopathic Medicine, United States; [5]Morristown Medical Center, United States

Purpose: Quantifying outcomes of capacity-building in humanitarian efforts can be challenging and continues to be an area of limited research. Our aim is to address these gaps by defining and improving quantitative measures of capacity-building after establishing a pediatric cardiac surgical program in low and middle-income countries (LMICs).

Methods: Our foundation is a charitable organization with 23 years of experience providing pediatric cardiac services in LMICs. We utilize the voluntary services of international expertise from cardiothoracic surgeons, intensivists, and anesthesiologist. We work closely with local communities to provide didactic and skill-based education. A retrospective review of CHD surgical trips from 2014-2016 in countries with at least two consecutive trips (Guyana and Dominican Republic) was performed. We analyzed volume and complexity of surgeries over time (i.e., RACH score, patient age, weight, and comorbidities) to assess capacity-building.

Results: Children (Mage: 5.9, SD: 5.0) receiving CHD surgery (N=122) from Guyana and the Dominican Republic were included. Many children were malnourished or emaciated with major pre-operative comorbidities. Overall reoperation (N=5, 4%) and mortality rates (N= 1, 0.8%) were low. When analyzing data for capacity- building we found post-operative complications (i.e., transfusions, pneumothoraxes) trended downward over consecutive years. We also found an increase in case volume within each country, and in each consecutive year. More data is needed to evaluate sustainability (i.e., education and training) and improving outcomes (i.e., improving local practices, long-term post-operative follow-up).

Conclusion: Current literature in humanitarian capacity-building has shown data can be difficult to obtain. Capacity-building continues to be a major part of our primary mission. Future goals include strategies to work closely with local sites to measure influence of didactic and skill-based education on medical knowledge and skill sets acquired over time.

		2014 (N= 15)	**2015** (N=39)		**2016** (M=73)	
	Whole Group	Guyana	Guyana	DR	Guyana	DR
Number of surgeries	122	15	24	15	28	45
Age (years)	M= 5.9 (SD: 5.0)	M= 6.6 (SD: 5.5)	M= 6.8 (SD: 4.6)	M= 4.0 (SD: 4.8)	M= 5.1 (SD: 5.6)	M= 6.4 (SD: 3.9)
Weight < 10 kilograms	N= 35(29%)	N=4 (26%)	N= 4 (10%)	N= 7 (18%)	N= 14 (19%)	4 (5%)
Nutritional Status (malnourished or emaciated)	N= 36 (30%)	N= 5 (33%)	N= 9 (23%)	N= 9 (23%)	9 (12%)	N = 4 (5%)
RACH score	M= 2.05 SD: 0.78	M=2.07 SD: 0.96	M= 1.91 SD: 0.87	M= 2.27 SD: 0.60	M= 2.33 SD: 0.92	M= 1.86 SD= .68
Pre-Op Spo2 %	M= 91.4 SD: 12.0	M= 83.6 SD: 18.0	M: 96.1 SD: 7.2	M= 85.1 SD: 13	M= 88.1 SD= 13.0	M= 98.0 SD= 2.8
Pre-Op Major Comorbidities	N= 15 (12%)	N= 2 (13%)	N=1 (3%)	N= 3 (8%)	N= 7 (10)	N = 3 (4%)
Post- Op Complications -ICU complications -Reoperation	 N= 61 (50%) N= 5 (4%)	 N=7 (47%) N=1 (7%)	 N=10 (26%) N= 0 (0%)	 N=8 (21%) N=2 (5%)	 N= 21 (29%) N= 2 (3%)	 N= 15 (21%) N= 0 (0%)
Mortality	N=1 (0.8%)	N=0 (0%)	N=0 (0%)	N=1	N= 0 (0%)	N= 0 (0%)

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Arterial Switch Operation for dextro-Transposition of the Great Arteries Is Safe Even in Patients Older Than 30 Days

***Tomas Chalela**, Carlos Obando, Nestor Sandoval, Ivonne Pineda-Rodriguez*
Institution where study was performed: Fundacion Cardioinfantil - Instituto de Cardiologia, Colombia

Purpose: The purpose of this study is to evaluate the results of patients with transposition of the great arteries older than 30 days taken to primary ASO and compare them to those younger.

Methods: A historical cohort study was conducted at our institution between January 2003 and May 2018. Patient information was obtained from the pediatric cardiac surgery audited database. Exposed group is formed with patients younger than 30 days taken to ASO and non-exposed group are patients older than 30 days taken to ASO. Patients older than 30 days with diagnosis of d-TGA with IVS were subject of subgroup analysis.

Results: During this period 143 patients received an ASO, 60 patients where older than 30 days, with 25% of them with intact ventricular septum. Preoperative characteristics were similar between the 2 groups and no significant statistical differences in mortality or morbidity were found. In the older than 30 days with IVS subgroup we found a decrease in mortality although not statistically significant (10% vs 6%, p=1), but the main difference was found in postoperative low cardiac output syndrome (40.7% vs 53.3%, p=0.37) and prolonged ventilation (69.5% vs 80%, p=0.53).

Conclusion: ASO in patients older than 30 days is safe in the short and long term even in patients with IVS, at the expense of a longer postoperative recovery.

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Global Postoperative Mortality in Critical Congenital Heart Disease: A Systematic Review

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Purpose: Critical congenital heart diseases require early surgical and medical intervention to survive. Globally, different surgical procedures are made presenting diverse results depending on hospital experience and the resources available. There is no study comparing worldwide results for early postoperative critical congenital heart disease mortality.

Methods: We conducted a systematic review following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines. 5 databases were reviewed, and multiple studies, published from 2012-2017, were analyzed to identify literature that reported early postoperative mortality (30-day mortality) in surgical procedures done in children < 1 year old diagnosed with a critical congenital heart disease. Inclusion and exclusion criteria were applied, followed by a second review of the selected articles by two different individuals to include the final results in the review.

Results: A total of 120 from 1712 articles were selected after the inclusion and exclusion criteria were applied. These included articles from all continents and involves surgeries performed on 26,111 patients. Early postoperative mortality varied widely between congenital heart defect and continent. Tetralogy of Fallot had the lowest mortality rate (1,80% CI 1,51-2,13), while Hypoplastic Left Heart Syndrome had the most elevated mortality (17,02%, CI 16,29-17,76). Truncus arteriosus presented the greatest difference in mortality worldwide (12% CI 7,26- 18,30). There was also a great difference between the number of articles and patients included for each heart defect, demonstrating a big distinction in literature and information available for various heart defects. Transposition of Great Vessels is the critical congenital heart disease that has more studies globally, but Hypoplastic Left Heart Syndrome presented the greatest number of studies overall.

Early Mortality in Cardiovascular Surgery for Critical Congenital Heart Disease in Children Under One Year of Age (Expressed in Percentage of Interventions 95% CI)

	Global	North America	South America	Europe	Asia	Oceania	Africa
Pulmonary Atresia	9,94 (6,98-13,61)	17,07 (10,06-26,38)*	ND	18,88 (11,79-28,51)*	1,76 (0,45-4,72)	ND	ND
Tricuspid Atresia	4,84 (3,06-7,24)	4,84 (3,14-7,12)	ND	ND	ND	ND	ND
D-TGV	6,39 (5,83-6,98)	3,04 (2,45-3,73)	23,95 (19,29-29,14)	6,73 (5,66-7,93)	5,95 (4,07-8,38)	2,88 (1,89-4,19)	3,52 (0,90-9,30)*
Tetralogy of Fallot	1,80 (1,51-2,13)	2,13 (1,77-2,55)	ND	1,19 (0,58-2,17)	0,61 (0,19-1,47)	1,03 (0,45-2,04)	ND
HLHS	17,02 (16,29-17,76)	17,12 (16,35-17,93)	ND	16,88 (14,93-18,98)	9,75 (4,63-17,68)*	13,3 (4,38-29,1) *	ND
TAPVR	12,2 (6,96-15,10)	6,66 (3,75-10,86)	ND	20,32 (14,54-25,96)	10,18 (6,65-14,77)	ND	ND
Truncus Arteriosus	12,00 (7,26-18,30)	16,66 (4,42-38,9)*	ND	3,27 (0,55-10,41)*	10,00 (1,71-29,29)*	21,56 (11,9-34,39)*	ND

* Information calculated from studies with total number of interventions less than 100 individuals

Conclusion: Despite advances in cardiac surgery throughout the years, there is an elevated early postoperative mortality. The difference in mortality between continents displays disparity influenced mainly by surgical experience, economic resources and pathologic characteristics of each disease. Work must continue to reduce the differences in mortality, and encourage literature publication globally.

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QUALITY AND OUTCOMES INITIATIVES

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Neurocognitive Decline Is Correlated With Leukocytosis and Serum IL-8, But Not Glycemic Control After Cardiac Surgery

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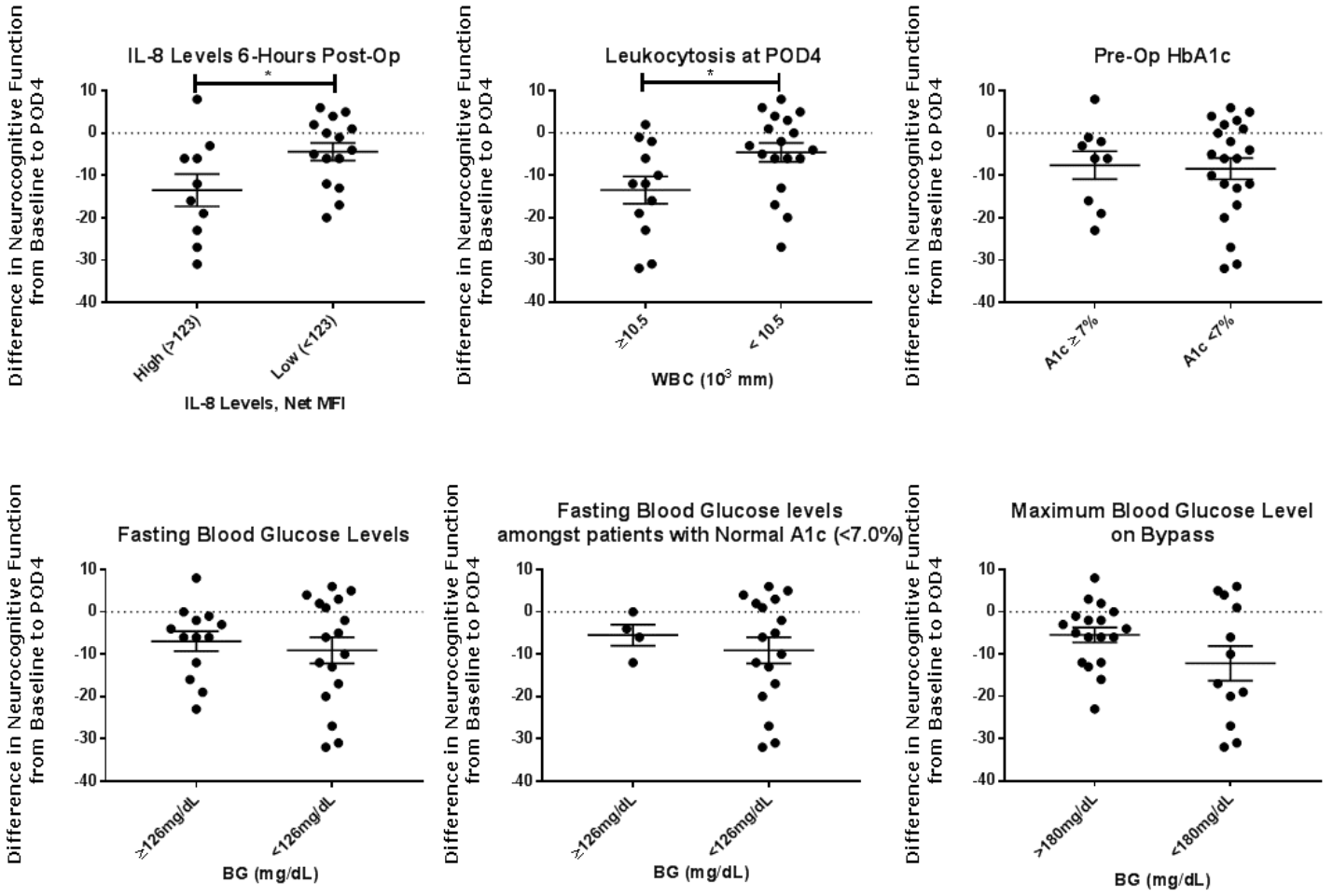
Institution where study was performed: Brown University Medical School, United States

Purpose: Neurocognitive dysfunction (NCD) is a known complication of cardiopulmonary bypass (CPB) that negatively impacts quality of life. Cardiac surgery and CPB cause a systemic inflammatory response and we hypothesize that patients with over-activation of inflammatory responses, including hyperglycemia, may have a delayed recovery of neurocognitive function after CPB.

Methods: Thirty patients undergoing coronary artery bypass grafting or a valvular procedure utilizing CPB were screened for NCD pre-operatively and post-operative on day four (POD4). Pre-operative, intra-operative, and post-operative laboratory values (HbA1c, glucose levels, WBC) were recorded. Patients with chronic renal dysfunction (Cr>2.0) or elevated liver enzymes were excluded. Cytokine concentrations were measured from patients' serum (pre-operatively, 6 hours post-operatively, and POD4) using a Luminex bead-based multiplex assay. Neurocognitive data are presented as a change from baseline to POD4 in standardized score for age and gender on RBANS. Data were analyzed by an unpaired Mann-Whitney U test.

Results: A decline in neurocognitive function occurred in 73% (22/30) of patients at POD4. Patients with leukocytosis (WBC > 10.5) on POD4 suffered more NCD when compared to their baseline function (p=0.03). Similarly, acute kidney injury (Cr > 1.2) on POD4 trended towards a decline in NCD (p=0.06). Patients with elevated IL-8 levels at 6 hours post-operatively had a significant decline in NCD at POD4 (p=0.04). Differences in TNF-a, IL-1b, IL-2, and IL-6 levels at any time point were not correlated with NCD (p>0.3 for all). There was no difference in NCD at POD4 between patients with elevated HbA1c levels pre-operatively (p=0.973) or elevated fasting blood glucose levels the morning of surgery (>126mg/dL, p=0.910), nor any difference between those who had higher maximum blood glucose levels during CPB (>180mg/dL, p=0.252), or average glucose levels during CPB (>160mg/dL, p=0.639). Pre-operative ejection fraction (EF), however, was significantly correlated with NCD at POD4 (p=0.01).

Conclusion: Post-operative leukocytosis is associated with NCD and renal dysfunction may exacerbate this systemic response. Inflammatory cytokine IL-8 elevation increases neutrophil chemotaxis and leukocytosis, both of which appear to increase NCD. However, glycemic control at any time point surprisingly does not seem to have any effect on NCD at POD4.



*** = p<0.05 by Mann-Whitney U test**

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US National Trends in Management and Outcomes of Constrictive Pericarditis: 2005-2014

***Makoto Mori**, Arnar Geirsson, Syed Usman Bin Mahmood, Clancy Mullan, Sameh Yousef*
Institution where study was performed: Yale University School of Medicine, United States

Purpose: Constrictive pericarditis is traditionally associated with poor outcomes even following pericardiectomy. Patient characteristics, trends in the management strategy, and outcomes in patients with constrictive pericarditis have not been characterized at the national scale. We aimed to characterize temporal trends in characteristics and outcomes in patients with constrictive pericarditis.

Methods: Annual consecutive cross-sectional study of patients admitted to hospitals in the U.S. with constrictive pericarditis was performed using the National Inpatient Sample (NIS) dataset between 2005-2014. In all analyses, survey statistics was used to account for the complex sampling design of the NIS. Poisson regression models adjusting for the U.S. census population estimate were fit to evaluate trends in the incidence of constrictive pericarditis, isolated pericardiectomy, and cardiopulmonary bypass (CPB) use. P value < 0 .05 was defined as a statistically significant trend. Descriptive analyses were performed to characterize patient characteristics and in-hospital mortality rates.

Results: During 2005-2014, 29,487 patients were admitted with constrictive pericarditis. Sixteen percent (4807 patients) underwent isolated pericardiectomy. Compared to medically managed patients, those undergoing pericardiectomy were younger (age 57 vs. 61 years, p < 0 .001), less likely to be female (25% vs. 41%, p < 0 .001), and generally harbored less comorbidities: history of myocardial infarction (5.5% vs. 18.4%, p=0.001), diabetes (22.6% vs. 26.2%, p=0.017), prior CABG (3.2% vs. 9.4%, p < 0 .001). peripheral vascular disease (4.8% vs. 6.7%, p=0.03), chronic kidney disease (19.1% vs. 25.1%, p < 0 .001). In-hospital mortality was 7.3% for those undergoing pericardiectomy and 6.8% for medically managed cohort (p=0.58). The incidence of constrictive pericarditis remained stable between 2005-2014 at 9-10 cases per million (p=0.5). CPB use increased over the decade from 15% to 29% (p < 0 .01). There was no statistically significant change in in-hospital mortality following pericardiectomy for constrictive pericarditis over the study period (8.9% in 2014, p=0.7).

Conclusion: Incidences of constrictive pericarditis remained stable between 2005-2014 at 9-10 cases/million. Only 16% underwent pericardiectomy, with younger and less comorbid patients more likely to be managed operatively. The use of CPB increased over the decade without a change in operative mortality, highlighting the persisting challenge of this complex disease.

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Use of the Quality of Life in Cardiovascular Surgery (QLCS) Questionnaire in Patients Undergoing Coronary Artery Bypass Grafting Surgery: Validation, Reproducibility, and Quality of Life Analysis at the First Year of Follow-Up

Marina Bond*[1]*, Jenny Lourdes de Oliveira[1], Pedro Farsky[1], Vivian Amato[1], Arturo Adrian Jara[1], Eduardo Farias[1], Ayane Maria Jacomine[1], Alysson Sehn[2], Magaly Arrais Dos Santos[1], Luiz Carlos Bento De Souza[3]

Institution where study was performed: [1]Dante Pazzanese Institute of Cardiology, Brazil; [2]Federal University of Rio Grande do Sul, Brazil; [3]Hospital do Coracao-ASS, Brazil

Purpose: The objectives of the present study are to validate the Quality of Life in Cardiovascular Surgery (QLCS) questionnaire and to observe the evolution of Quality of Life (QoL) in the first year of postoperative follow-up of patients submitted to Coronary-Artery Bypass Grafting (CABG).

Methods: A prospective observational study with patients submitted to CABG from July 2016 to June 2017, who signed the consent form and answered the QLCS, by telephone contact, with 30 days, 6 months and 1 year of follow-up. For its validation in the population submitted to CABG, it was evaluated its internal consistency through the Cronbach alpha at 30 days, and its test-retest reproducibility through the contents of kappa, correlation coefficient of concordance (CCC) and accuracy (Cb). The non-parametric ANOVA test was used for analysis of repeated measures, during follow-up, of the QLCS. It was considered significant $p < 0.05$.

Results: The QLCS is a new questionnaire, created specifically for postoperative cardiovascular surgery, easy to apply, which can be performed by telephone contact, composed of 5 questions (Table 1). A total of 351 patients were included, with a mean age of 65 years, 70% male, 85% hypertensive, 61% dyslipidemic, 53% diabetic, and 56% with a history of smoking. The Cronbach's alpha was 0.82, demonstrating adequate internal consistency. The Kappa index for questions ranged from 0.58 to 0.78, which ensures a moderate reproducibility, at least. The CCC was 0.93 and the Cb was 0.99, showing good precision and accuracy. Regarding the outcome of QLCS in patients undergoing CABG, was found at 30 days, 6 months and 1 year, scores of 17.95, 18.98 and 19.57, respectively. Thus, there was a progressive improvement in QoL over the first year of follow-up ($p < 0.0001$), as observed in Figure 1.

Conclusion: The QLCS proved to be a good questionnaire for evaluation of QoL in patients subjected to CABG, with adequate internal consistency, and at least moderate reproducibility. Its use throughout this first postoperative year revealed a progressive and significant improvement in the QoL of patients submitted to CABG.

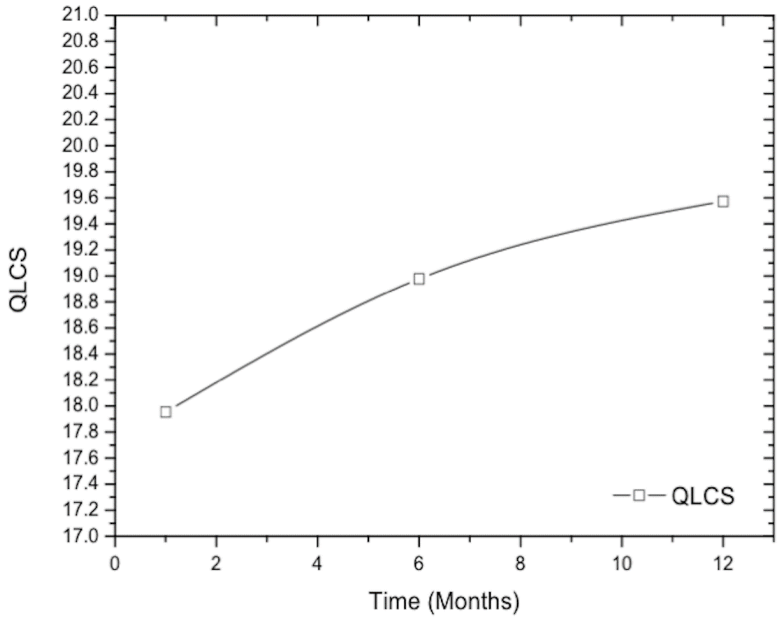

Figure 1: *The QLCS results in patients submitted to CABG at the first year of follow-up.*

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Table 1: *Quality of Life in Cardiovascular Surgery (QLCS)*

This questionnaire asks for your opinion about your health and how you feel and about your ability to perform your daily activities in the last 30 days, 6 months, 12 months and annually.

Answer the questions as follows:

1-Too Bad 2- Bad 3- Good 4- Very Good 5- Great

1) How is the patient's performance in daily activities / work / school?
2) How is the patient's health after surgery?
3) How is the patient's physical capacity after surgery?
4) From the emotional point of view how the patient is feeling?
5) In relationship with your family members how is the patient feeling?

Total:_____/ 5-25 points

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Taking Extracorporeal Membrane Oxygenation (ECMO) on the Road: Initial Experience With an ECMO Transport Team in Bogota, Colombia

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Institution where study was performed: Fundacion Clinica Shaio, Colombia

Purpose: ECMO is a potentially lifesaving therapy for patients with severe respiratory/cardiocirculatory failure. Unfortunately, ECMO is only available in highly-specialized hospitals and patients are often unstable to transport. Therefore, ECMO transport teams have emerged as an alternative to mobilize patients to hospitals with ECMO capabilities.

Methods: This is a cohort of patients admitted with severe pulmonary/cardiocirculatory failure transported from local hospitals to a reference hospital in Bogota-Colombia. After request, the ECMO mobile team was mobilized to the referring hospital to evaluate the patients and determine whether ECMO treatment was indicated. Then, patients were cannulated at the referring hospital and transported on ECMO to our reference center. Patients were transported by road in a medicalized ambulance. The ECMO team was consisted by six trained experts in ECMO.

Results: A total of ten patients were transported during our first year offering transportation on ECMO. Patients transported using ECMO were mainly male (90%), with a median (interquartile range [IQR]) of 51.5 (36.5, 53.7) years. Femoral and right jugular cannulation were performed in 70% of patients under transesophageal (50%), transthoracic (30%) ultrasound and fluoroscopy (20%) guidance. The mean (SD) transportation time was 31 (11.6) minutes with a mean distance of 8.7 (1.8) kilometers. Respiratory failure due to severe viral community-acquired pneumonia was the main cause requiring ECMO transportation (80%). All patients were diagnosed with severe respiratory/cardiocirculatory failure previously to ECMO treatment. All patients received adequate primary treatment at the referring center, including neuromuscular relaxation (100%), protective lung ventilation (100%) and prone ventilation (88%). The median (IQR) ventilation days were 7.5 (3.7, 21.2) days. The incidence of complications during transportation was 20%; without fatal complications. The 30-days survival was 70%

Conclusion: Survival and complications during transportation using ECMO were similar to those reported globally. Therefore, our team of trained experts confirmed that patients with severe pulmonary/cardiocirculatory failure could be safely transported under ECMO assistance from local referring centers in Bogota-Colombia. More experience is needed to optimize our process.

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Cancelation of Same-Day Cardiac Surgery at a Large Single Cardiac Center in the UK

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Institution where study was performed: St Bartholomew's Hospital, United Kingdom of Great Britain and Northern Ireland

Purpose: The cancellation of same-day cardiac surgery in the UK is an unfavourable outcome for patients. It also poses a considerable drain on resources. There is a lack of national data on the matter. This study aims to determine the extent and reasons for same-day cancellations at our unit.

Methods: We prospectively reviewed all same-day cancellations of elective and in-patient adult cardiac surgical procedures over a 8-month period from August 2017 to March 2018. Patients were divided into two groups: cancelled (C) and not cancelled (NC). Differences between the two groups were analysed.

Results: A total of 1399 patients were scheduled to undergo cardiac surgery during the study period. 898 (70.6%) of the surgeries were elective and 374 (29.4%) urgent. 233 (16.7%) were cancelled for the following reasons: 71 (30.5%) lack of ICU beds, 19 (8.2%) ICU staff shortage, 16 (6.9%) emergency case intervention, 15 (6.4%) patient-related issues, 14 (6.0%) overrunning case and 98 (42.1%) for other reasons. There was no significant difference in terms of mean age (C: 64.3yrs vs NC: 64.5yrs), urgency of the procedure (C: 77 -33.5% vs NC: 309 - 27.6%), EuroSCORE II (C: 3.3 vs NC: 3.8) and LVEF (C: good 113 - 64.2% vs. NC: good 659 – 60.6%) between two groups. Most commonly cancelled procedures were: AVR (31 – 16.1%) and double valve replacement (3 - 5.8%). In the C group, 83 (38.2%) underwent their procedure within 72 hours, 118 (54.4%) were rescheduled, 16 (7.4%) weren't performed.

Conclusion: Contrary to expectations, a large number of patients are being cancelled on the same day of planned surgery. There is a clear need to introduce measures to improve service provision, patient flow and quality of patient care.

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Predictors of In-Hospital Mortality for Patients Undergoing Redo Cardiac Surgery: A Steroids in Cardiac Surgery (SIRS) Substudy

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Institutions where study was performed: [1]Population Health Research Institute, Canada; [2]McMaster University, Canada

Purpose: Redo cardiac surgery accounts for about 8% of cardiac surgeries and carries approximately 10% risk of in-hospital mortality. Contemporary data regarding mortality after redo surgery and its predictors are limited, but may allow surgeons to identify patients at higher risk.

Methods: The Steroids in Cardiac Surgery (SIRS) trial assessed perioperative use of methylprednisolone. Of 7507 participants from 80 centres in 18 countries, 1214 underwent redo surgery. Using these patients as a cohort, we aimed to identify independent risk factors for in-hospital mortality. We created a logistic regression model using a forward step-wise entry model, with hypothesized and known risk factors for post-operative mortality: age, sex, prolonged cardiopulmonary bypass (CPB) time (>120 minutes), body mass index (BMI), EuroSCORE, treatment allocation (steroid or placebo), and operation type (coronary artery bypass grafting (CABG) only, CABG and valve, valve only, any aortic surgery, and miscellaneous).

Results: Follow-up was 99.9% complete. Patients with complete follow-up were included in the model. Mean age was 64 years with 40% females. 64% of patients were overweight or obese and 55% had a prolonged CPB time. Unadjusted in-hospital mortality was 8.2% (100/1213). Significant risk factors for in-hospital mortality included: increase in age by five years (adjusted OR (aOR) 1.14, 95% CI[1.03–1.27]), female sex (aOR 3.13, 95% CI[1.98–4.96]), prolonged CPB time (aOR 4.15, 95% CI[2.44–7.05]), and increase in EuroSCORE by one unit (aOR 1.15, 95% CI[1.04–1.27]). Factors associated with a significantly lower risk for in-hospital mortality included: being overweight or obese (aOR 0.44, 95% CI[0.26–0.72] and aOR 0.52, 95% CI[0.27–0.99], respectively), and any aortic surgery (aOR 0.37, 95% CI[0.15–0.93]). There was a negative interaction between prolonged CPB time and EuroSCORE (p=0.001): the risk of mortality associated with a prolonged CPB time was higher with a lower EuroSCORE.

Conclusion: Age, EuroSCORE, female sex, and prolonged CPB time were associated with increased in-hospital mortality after redo cardiac surgery. Our findings were consistent with the obesity paradox observed in cardiac surgery. The increased mortality risk with a lower EuroSCORE, but prolonged CPB, likely represents surgical misadventure; an unforseen complication in the operating room.

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Logistic Regression Model of In-Hospital Mortality for Redo Cardiac Surgery Patients

PREDICTOR VARIABLES	aOR (95% CI)	Significance
Age (increase by 5 year)	**1.14 (1.03 – 1.27)**	**0.013**
Female Sex	**3.13 (1.98 – 4.96)**	**< 0.001**
Prolonged Cardiopulmonary Bypass Time (> 120 minutes)	**4.15 (2.44 – 7.05)**	**< 0.001**
EuroSCORE (increase by 1 unit)	**1.15 (1.04 – 1.27)**	**0.005**
Underweight BMI (<18.5) (compared to healthy – 18.5–24.9)	0.96 (0.91 – 1.00)	0.195
Overweight BMI (25 – 29.9) (compared to healthy – 18.5–24.9)	**0.44 (0.26 – 0.72)**	**0.001**
Obese BMI (>30) (compared to healthy – 18.5–24.9)	**0.52 (0.27 – 0.99)**	**0.047**
Methylprednisolone	0.80 (0.51 – 1.24)	0.312
CABG Only	1.44 (0.48 – 4.30)	0.511
CABG and Valve	1.42 (0.31 – 2.77)	0.456
Valves Only	0.84 (0.44 – 1.42)	0.531
Any Aortic Surgery	**0.37 (0.15 – 0.93)**	**0.0328**

Abbreviations: aOR – adjusted odds ratios, CI – confidence intervals, BMI – body mass index, CABG – coronary artery bypass grafting

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Cardiovascular Surgery Academic League: A Successful Initiative Introducing Medical Students to Cardiovascular Surgery and Preparing Them for the Operative Field

***Rafael Coutinho**, Jackson Lopes, Dhaisa Conceicao, Tauana Sarmento, Gustavo Daltro, Jessica Alves, Adrielle Sabarin*
Institution where study was performed: Universidade Federal da Bahia, Brazil

Purpose: Academic Leagues (AL) are student-directed scientific organizations that improve medical students' contact to their area of interest. Cardiovascular Surgery (CVS) AL is responsible for allowing earlier hands-on experience in the operative field and preparing better residents. We aim to assess the impact of CVS AL in medical formation of medical students of a Brazilian city.

Methods: It is a descriptive observational study. Medical students from five different medical schools that have been members of the Cardiovascular Surgery Academic League (CVS AL) were assessed. An electronic form was filled by current and past members of a Cardiovascular Surgery Academic League, containing information regarding demographics, hands-on experience through internships and the acquisition of surgical skills, and their intent to pursue a career in Cardiovascular Surgery. Data collected was expressed as mean +/- standard deviation; or frequency and percentages.

Results: Since it's foundation in 2013, 60 members participated for at least 1 year. The electronic form was replied by 20 subjects. 75% are women. 58,3% were introduced to CVS between 20 and 23 years old; and were at the second year of medical school. 67% remained involved in the CVS AL for 3 school terms. 83% come from a public medical school. 91,7% had practical hands-on experience in the operative room, but only 41% truly entered the operative field and only 33% had the opportunity to touch the heart or practice suturing skills. 75% rated the practical experience as at least very good. All the 20 subjects have considered the possibility of becoming cardiovascular surgeons, but only 67% remain with the intent. Among the most frequent complaints for withdrawing the dream to be a CVS surgeon are: long training pathway; and massive workload.

Conclusion: More women are interested in Cardiovascular Surgery. Earlier hands-on experience provide better understanding of cardiovascular diseases and allow students to learn surgical skills prior to reaching residency. Earlier exposure to the operative field contributes to maintaining the intention of pursuing a career in the area, despite of the challenges faced.

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TRICUSPID VALVE

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Outcomes in Patients With Large Right Atrial Vegetations

Roger Carrillo[1], *Adryan Perez*[2]
Institutions where study was performed: [1]Palmetto General Hospital, United States; [2]University of Miami, United States

Purpose: When infected cardiac device leads are associated with vegetations, the ones < 2.0 cm can be managed percutaneously while larger ones are removed via open heart surgery. Unfortunately, many patients with cardiac device infections are not surgical candidates. Thus, we report outcomes associated with percutaneous management of large vegetations.

Methods: Prospective data from January 2003 to August 2018 identified 826 patients with infections undergoing lead extraction. 123 cases had vegetations measured in two dimensions (length and width) by transesophageal echocardiogram. 29 patients had three characteristics: A) At least one vegetation dimension ? 2.0 cm, B) not surgical candidates, and C) underwent transvenous lead extraction. The cohort was classified according to shape in two groups: “Spherical” if there was a difference less than 30% between dimensions and “Non-Spherical” if this difference was greater than 30%. Fisher’s exact test and ANOVA t-testwere used for analysis. A p-value > 0.05 was significant.

Results: See enclosed table. The two deaths in the “spherical” group were due to pulmonary embolism and occurred within 24 hours of the procedure, while no pulmonary embolisms occurred in the “non-spherical” group.

Conclusion: Vegetation size is an important determinant of outcomes in patients that are not surgical candidates undergoing transvenous lead extraction. However, vegetation shape is also a relevant factor as spherical vegetations may predict a worse result compared to non-spherical vegetations.

Characteristic	Cohort (n=29)	Spherical (n=6)	Non-spherical (n=23)	P-value
Age	67.4 (14.9)	66.3 (10.1)	67.0 (15.8)	0.42
Gender: Male	21 (72%)	5 (83%)	16 (70%)	0.65
Device Type	PM: 8 (27%) ICD: 15 (52%) CRTD: 6 (21%)	PM: 3 (50%) ICD: 2 (33%) CRTD: 1(17%)	PM: 5 (22%) ICD: 13 (57%) CRTD: 5 (22%)	0.41
Discharged Alive	27 (93%)	4 (66%)	23 (100%)	**0.034**

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[1] G. Weiss et al. The frozen elephant trunk technique for the treatment of complicated type B aortic dissection with involvement of the aortic arch: multicentre early experience. Eur J Cardiothorac Surg., 2015 Jan; 47(1):106-14; discussion 114.

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