SOUTHERN THORACIC SURGICAL ASSOCIATION

63rd ANNUAL MEETING

NOV 9-12
STSA 2016
NAPLES

NOVEMBER 9-12, 2016

NAPLES GRANDE BEACH RESORT

SPECIAL THANKS

SPECIAL THANKS TO STSA
63RD ANNUAL MEETING CORPORATE SUPPORTERS

PLATINUM

Medtronic, Inc.

GOLD

Abbot Vascular
Baxter

SILVER

Edwards Lifesciences
Ethicon Endo-Surgery, Inc.

FUTURE MEETINGS

November 8-11, 2017
JW Marriott San Antonio Hill Country Resort & Spa
San Antonio, TX

November 7-10, 2018
Omni Amelia Island Plantation Resort
Amelia Island, FL

November 6-9, 2019
JW Marriott Marco Island Beach Resort
Marco Island, FL

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G. Alexander Patterson, *St. Louis, MO*

PROGRAM AT-A-GLANCE

WEDNESDAY, NOVEMBER 9, 2016

3:00 pm – 8:00 pm	**Registration** – *Meeting Planner Office*
5:00 pm – 6:00 pm	**2016 STS Cardiothoracic Surgery Jeopardy Competition for North America** In the General Session Room – *Royal Palm Ballroom IV-VIII*
7:45 pm – 10:00 pm	**STSA CTSNET Surgical Motion Pictures** – *Royal Palm Ballroom IV-VIII*

THURSDAY, NOVEMBER 10, 2016

6:30 am – 5:00 pm	**Registration** – *Meeting Planner Office*
6:30 am	**Continental Breakfast** – Royal Palm Foyer
7:00 am – 8:40 am	**Postgraduate General Session: Special Topics in Cardiothoracic Surgery** *Royal Palm Ballroom IV-VIII*
8:40 am – 8:55 am	**Break**
8:55 am – 10:15 am	**Postgraduate General Session: Teaching the Technical Aspects of Cardiothoracic Surgery** *Royal Palm Ballroom IV-VIII*
10:15 am – 10:45 am	**Break & Visit Exhibits** –*Orchid Ballroom/Foyer*
10:00 am- 3:30 pm	**Exhibits Open**- *Orchid Ballroom/Foyer*
10:45 am – 12:15 pm	**Postgraduate Subspecialty Breakout Sessions** Adult Cardiac Breakout – *Royal Palm Ballroom IV-VIII* General Thoracic Breakout – *Royal Palm Ballroom II-III* Congenital Breakout – *Acacia I-III* Interdisciplinary Care Provider Breakout – *Mangrove I-II*
12:15 pm – 1:30 pm	**Break & Visit Exhibits** – *Orchid Ballroom/Foyer*
12:00 pm – 4:00 pm	**Exhibits Open** – *Orchid Ballroom/Foyer*
1:30 pm – 2:30 pm	**Ethics Debate** Should Hospital Policy Forbid Surgeons to Schedule Concurrent Cases in the Operating Room? *Royal Palm Ballroom IV-VIII*
2:30 pm – 3:00 pm	**Break & Visit Exhibits** – *Orchid Ballroom/Foyer*
3:00 pm – 5:30 pm	**First Scientific Session** – *Royal Palm Ballroom IV-VIII*
5:30 pm – 6:00 pm	**2016 STS Cardiothoracic Surgery Jeopardy Competition for North America** *Finals in the General Session Room – Royal Palm Ballroom IV-VIII*

FRIDAY, NOVEMBER 11, 2016

6:30 am – 5:30 pm	**Registration** – *Meeting Planner Office*
6:30 am	**Continental Breakfast** –*Royal Palm Foyer*
7:00 am – 7:50 am	**Basic Science Forum** – *Royal Palm Ballroom IV-VIII*
7:45 am – 12:00 pm	**Exhibits Open** – *Orchid Ballroom/Foyer*
7:50 am – 8:00 am	**Break**
8:00 am – 10:00 am	**Second Scientific Session** – *Royal Palm Ballroom IV-VIII*
10:00 am – 10:30 am	**Break & Visit Exhibits** – *Orchid Ballroom/Foyer*
10:30 am – 10:50 am	**Kent Trinkle Education Lectureship** William A. Baumgartner, MD Evolution of Thoracic Surgical Training in the US *Royal Palm Ballroom IV-VIII*

10:50 am – 11:20 am	**President's Invited Lecturer** Michael J. Mack, MD The Future of Cardiothoracic Surgery: Why and How to Embrace Innovation *Royal Palm Ballroom IV-VIII*
11:20 am – 12:00 pm	**Presidential Address** Andrea J. Carpenter, MD We Stand on the Shoulders of Giants: Let's Look Up *Royal Palm Ballroom IV-VIII*
12:00 pm	**All Attendee Lunch** – *Sunset Veranda*
12:45 pm – 4:00 pm	**Exhibits Open** – *Orchid Ballroom/Foyer*
1:00 pm – 2:00 pm	**Dessert Served in the Exhibit Hall** – *Orchid Ballroom/Foyer*
2:00 pm – 3:30 pm	**Third Scientific Session A** – *Simultaneous Subspecialty Breakout Sessions* **Adult Cardiac Breakout** – *Royal Palm Ballroom IV-VIII* **General Thoracic Breakou**t – *Royal Palm Ballroom II-III* **Congenital Breakout** – *Acacia I-III*
3:30 pm – 4:00 pm	**Break & Visit Exhibits** – *Orchid Ballroom/Foyer*
4:00 pm – 5:00 pm	**Third Scientific Session B – Simultaneous Subspecialty Breakout Sessions** Adult Cardiac Breakout – *Royal Palm Ballroom IV-VIII* General Thoracic Breakout – *Royal Palm Ballroom II-III* Congenital Breakout – *Acacia I-III*
5:00 pm – 6:00 pm	**STSA Annual Business Meeting** *STSA Members Only – Royal Palm Ballroom IV-VIII*
6:00 pm – 7:00 pm	**Resident's Reception** – *Acacia IV-VI*
7:00 pm – 9:00 pm	**President's Mixer** – *Sunset Veranda*

SATURDAY, NOVEMBER 12, 2016

6:45 am – 11:00 am	**Registration** – *Meeting Planner Office*
6:30 am	**Continental Breakfast** – *Royal Palm Foyer*
7:00 am – 8:00 am	**Coding Update** – *Royal Palm Ballroom IV-VIII*
8:00 am – 9:00 am	**Fourth Scientific Session A – Simultaneous Subspecialty Breakout Sessions** Adult Cardiac Breakout – *Royal Palm Ballroom IV-VIII* General Thoracic Breakout – *Royal Palm Ballroom II-III* Congenital Breakout – *Acacia I-III* Transplant Breakout – *Mangrove I-II*
9:00 am – 9:30 am	**Break**
9:30 am – 9:50 am	**Harold Urschel History Lectureship** Robert M. Sade, MD A Surprising Alliance: Two Giants of the 20th Century *Royal Palm Ballroom IV-VIII*
9:50 am – 10:50 am	**Fourth Scientific Session B** – *Royal Palm Ballroom IV-VIII*
10:50 am – 11:50 am	**How To Do It** – *Royal Palm Ballroom IV-VIII*
12:00 pm	**Program Adjourns**
12:50 pm – 6:00 pm	**Various Social & Sporting Events** – *See page 8 & 9 for details*
7:00 pm – 11:00 pm	**Annual Awards Dinner & Dance** – *Royal Palm Ballroom IV-VIII*

SCHEDULE OF ACTIVITIES

THURSDAY, NOVEMBER 10

Spouse/Guest Hospitality Suite – *Chill Out Lounge*
Time: 8:30 am. – 11:30 am
STSA is providing a complimentary hospitality room for spouses and guests to mingle and make plans for exploring Naples.

FRIDAY, NOVEMBER 11

Spouse/Guest Hospitality Suite – *Chill Out Lounge*
Time: 8:30 am – 12:00 pm
STSA is providing a complimentary hospitality room for spouses and guests to mingle and make plans for exploring Walt Disney World® Resort.

All Attendee Lunch – *Sunset Veranda*
Time: 12:00 pm (Followed by dessert in the Exhibit Hall)
Cost: Complimentary

Resident's Reception – *Acacia IV-VI*
Time: 6:00 pm – 7:00 pm
Residents, fellows, and medical students attending the meeting are invited to join STSA leaders for this hour-long networking event. Spouses/guests are welcome.

President's Mixer – *Sunset Veranda*
Time: 7:00 pm – 9:00 pm
Cost: Complimentary
Attendees receive two tickets with registration. Additional tickets may be purchased for $25.00. Visit the registration desk for details.

Gather with fellow meeting attendees for an evening of networking and fun.

SATURDAY, NOVEMBER 12

Spouse/Guest Hospitality Suite – *Chill Out Lounge*
Time: 8:30 am – 12:00 pm
STSA is providing a complimentary hospitality room for spouses and guests to mingle and make plans for exploring Naples.

Golf Tournament
Location: Naples Grande Golf Course
Time: Tee times begin at 12:50 pm
Cost: $210.00 (Price includes roundtrip transportation, greens fees, and box lunch.)

Advanced registration is required. Subject to cancellation if registration is insufficient. Registrants will be notified in advance and refunds will be issued if this event is cancelled.

Voted one of the 10 best new golf courses in Florida, come enjoy the private Naples Grande golf course designed for players of all skill levels. Acclaimed golf architect Rees Jones designed a par 72 championship course that proves both interesting and challenging. Each hole at this demanding golf course promises an exhilaratingly new experience. With extraordinary elevations and unique water features expertly incorporating the indigenous Florida foliage, this course offers stunning fairways for year-round play.

Please note the following dress code: Men must wear collared shirts with long pants or Bermuda length shorts. Ladies must have a collar or sleeves on their top. Dresses, shorts or skirts of appropriate length are allowed. Only soft-spiked shoes are allowed on the course.

Rental clubs are available for $70.00, and soft spike golf shoes may be rented for $15.00. Rental items are not included in the golf tournament cost. . Confirmed golfers will be contacted after advance registration closes on October 10 to collect rental needs.

Annual Awards Dinner & Dance
Reception: 7:00 pm - 8:00 pm
Dinner: 8:00 pm - 11:00 pm
Cost: $100.00 per adult / $40.00 per child (ages 12 and younger)

Conclude your 63rd Annual Meeting experience with the always-memorable Annual Awards Dinner & Dance. Join fellow meeting attendees and their families for an evening of dinner and music. Advanced registration is recommended. A limited number of tickets will be sold on site.

We will have the return of WOOSAH!!!, a great band to include special jam sessions from our members' talent to play for us all night long. We shortened the award presentation to maximize the time to socialize and enjoy your friends at STSA. Although black tie is always in fashion, you are welcome to wear cocktail attire. Be comfortable and have fun! It will be the perfect finale to a great meetin

NEW THIS YEAR ! – Private Childcare During Awards Dinner & Dance
Time: 7:00 pm - 10:00 pm
Cost: $50.00 per child

This private childcare option is for STSA guests only, and will offer games, entertainment and fun for children ages 4-11. Price includes childcare from 7:00 pm – 10:00 pm and a child-friendly dinner. Conveniently located near the Awards Dinner & Dance for easy drop-off and pick-up.

Naples Grande Loggerheads Kid's Club
Cost: $40.00 plus tax per child, daytime
$50.00 plus tax per child, evening

The Loggerheads Kids Club invites children ages 4 to 11 to experience a fun-filled day set to inspire all of their senses. Children will enjoy a variety of arts and crafts, water activities, video games and movies. The Loggerheads Kids Club is conveniently located adjacent to the Mangrove Pool. Reservations must be made by 9:00 pm the previous day and may be billed to your room. Please call 239-594-6787 for more information and reservations, or visit www.naplesgrande.com/resort/kids-club for additional details.

This service is limited, please make reservations in advance.

Childcare Services
The Naples Grande Beach Resort recommends the following childcare providers:

My Naples Nanny
239-595-1922
www.mynaplesnanny.com

TLC
239-598-1515
www.atlcservice.com

DISCUSSION OF PAPERS
Discussions of papers at the Annual Meeting are considered for publication in The Annals of Thoracic Surgery. Please review the program outline carefully to determine if you have a particular interest in some of the topics, then be prepared to discuss them at the meeting. If you wish, you may request a copy of the manuscript in advance of the meeting by contacting the author directly. Each session has a limited amount of time reserved for discussion. Assigned discussants are limited to two minutes and two questions.

PRESENTATION AND PUBLICATION
Authors of oral presentations are required to submit a manuscript for consideration for publication in The Annals of Thoracic Surgery before noon on Saturday, November 12, 2016. Manuscripts must be submitted via The Annals online manuscript submission system at www.atseditorialoffice.org. A paper copy of the manuscript will not be accepted for consideration. Primary authors and co-authors that are delinquent in submitting their manuscript to The Annals on time will not have their presentations considered for publication in The Annals. In addition, these authors will not have abstracts considered by the Program Committee of the STSA for two (2) subsequent meetings.

ACCREDITATION
The Southern Thoracic Surgical Association is accredited by the Accreditation Council for Continuing Medical Education (ACCME) to provide continuing medical education for physicians.

The STSA designates this live activity for a maximum of 21.25 *AMA PRA Category 1 Credits*™. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

STSA CME MISSION
The continuing medical education mission of the Southern Thoracic Surgical Association is to design and deliver high-quality, practical, innovative, and scientifically rigorous educational programming at its Annual Meeting in the areas of cardiovascular, general thoracic, and congenital heart surgery, as well as ethics and professionalism, leadership, and practice management.

Such educational programming is meant to advance the overall competence of cardiovascular, general thoracic, and congenital heart surgeons, and ultimately to help them improve their patient outcomes and promote patient safety.

Continuing medical education activities are presented in a variety of formats at an STSA Annual Meeting; these include (but are not limited to) presentations of peer-reviewed scientific abstracts, updates on relevant scientific research, didactic presentations, debates, video presentations, and sub-specialty-specific break-out sessions. All educational sessions include the opportunity for questions, answers and discussion to further support the educational needs of the meeting attendees and the program learning objectives.

STSA educational activities are developed and provided with the intent of confirming an existing knowledge base, imparting new knowledge, enhancing competence in the content areas covered, and addressing identified professional practice gaps. The expected results include participants' reporting greater confidence in their clinical care skills and a willingness to change their behavior or adapt new strategies as appropriate.

ELECTRONIC CME EVALUATION
The STSA 63rd Annual Meeting evaluation and CME credit claim process is electronic. Registrants who wish to receive CME credit for sessions they attend will be required to complete the electronic evaluation for the session. This is the only way physicians can earn CME credit for their attendance. Using the electronic evaluation system, registrants can complete the meeting evaluation, claim CME credit, and print CME certificates. Certificates of Attendance are also available for non-physician attendees.

The electronic evaluation provides attendees the opportunity to offer feedback to the STSA Council and Program Committee regarding content offered, including information about applicability of the content to current practice, quality of the material presented, and recommendations for future programming. This information is invaluable in the planning of future STSA educational programs.

In addition to being useful for program planning, program evaluation and future needs assessment are important components of the requirements that the STSA must meet to maintain accreditation through the Accreditation Council for Continuing Medical Education (ACCME). It is by meeting the requirements set forth by the ACCME that the STSA is able to award CME credit for educational programming.

The electronic evaluation can be completed by meeting registrants onsite at computer kiosks located in the Royal Palm Foyer

Attendees can also access evaluations by visiting the online evaluation website through personal computers or handheld devices at https://www.xcdsystem.com/stsa. In order to make this process more convenient for attendees, the meeting evaluations will be available online through Saturday, November 26, 2016.

Attendees can log in to the evaluation website with the following information:
Username: E-mail Address (note, your username is the e-mail address that you used to register for the Annual Meeting)
Password: STSA User ID (your user ID is printed on the bottom or your meeting badge)

This process will allow STSA to maintain an electronic record of CME earned by physicians. Files will be maintained for a minimum of six years. Any questions regarding this procedure should be directed to STSA Headquarters at (312) 202-5892 or via e-mail at stsa@stsa.org.

STSA POLICY REGARDING DISCLOSURE
The Southern Thoracic Surgical Association will seek thorough financial and commercial disclosure information, according to ACCME requirements and recommendations, from all presenters, discussants, and moderators participating in an STSA Annual Meeting. Failure or refusal to provide disclosure information automatically disqualifies participation. All disclosure information will be communicated to the learners through appropriate means, including but not limited to the Annual Meeting Program Book.

STSA leadership, planning committee members, and staff will also provide disclosure information to be kept on file and communicated to meeting attendees through the STSA Annual Meeting Program Book.

All abstracts and disclosure statements will be reviewed approximately three (3) months prior to the Annual Meeting by staff for unidentified conflicts of interest. Any such potential conflicts will be brought to the attention of the STSA President, Chairman, and CME Committee Chair for review and resolution. Any potential conflicts of interest must be resolved before presentation. If a conflict is deemed unresolvable, the paper cannot be presented at the Annual Meeting.

The STSA Disclosure Policy (as outlined on page XX) will be communicated to the learner via the Annual Meeting Program Book.

STSA EDUCATION DISCLOSURE POLICY
As a sponsor of continuing medical education accredited by the Accreditation Council for Continuing Medical Education (ACCME), the Southern Thoracic Surgical Association requires that any individual who is in a position to control the content of an educational activity must disclose all relevant financial relationships (including known relationships of his or her immediate family, department, and partners) with any healthcare-related business or other

entity whose products or services may be discussed in, or directly affected in the marketplace by, the educational content. The ACCME defines a "relevant financial relationship" as a relationship of any amount occurring within the previous twelve (12) months. The question of whether a disclosed conflict situation could represent undue influence on the educational activity by a commercial interest, or whether the disclosed information is sufficient to consider an abstract, presentation, or other educational enduring material to represent potentially biased information must be resolved prior to an individual's involvement in STSA educational programming.

Required disclosures include (1) financial interest of any amount (e.g., through ownership of stock, stock options, or bonds) (2) the receipt of any amount of cash, goods or services within the current 12-month period (e.g., through research grants, employment, consulting fees, royalties, travel, or gifts) or (3) a non-remunerative position of influence (e.g., as officer, director, trustee or public spokesperson). NOTE: To avoid confusion with regard to the question of "relevance," STSA requires that anyone in a position to control content (planners, speakers, authors, volunteer leaders, staff) must review the content they are addressing and disclose relationships with companies that have a material interest in the content being covered regardless of the division of the company for which that relationship exists. For instance, if a speaker will be referencing a product made by the X division of ABC company, but his relationship is with the Y division, he must still disclose the relationship. EXCLUDED from this disclosure requirement are blind trusts or other passive investments such as mutual funds. In the case of a financial or other relationship disclosure, the company, product/service, and specific nature of the relationship must be noted. Disclosure is mandatory for any person involved in the planning, management, presentation, and/or evaluation of STSA educational activities.

Failure to disclose relevant financial relationships disqualifies the individual from being a planning committee member, a teacher, or an author of CME materials, and this individual cannot have any responsibility for the development, management, presentation, or evaluation of STSA CME activities. This requirement is intended neither to imply any impropriety of such relationships nor to prejudice any individual presenter or author. It is merely to identify such relationships through full disclosure, and to allow the STSA to assess and resolve potential influences on the educational activity prior to the planning and implementation of an educational activity. All abstracts and presentations are reviewed for potential conflicts of interest. All conflicts of interest must be resolved prior to presentation. Any abstract / paper with a conflict that is deemed unresolvable will not be presented at the Annual Meeting. If no relevant financial relationships exist, the individual must indicate this on the disclosure form.

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 recent 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 or 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.

Authors listed with a D next to their names have indicated, in accordance with the ACCME Standards and the STSA Disclosure Policy, that they have a financial or other relationship with a healthcare-related business or other entity to disclose; or their paper's content describes the use of a device, product or drug, that is not FDA approved, or the off-label use of an approved device, product or drug. Please refer to the Relationship Disclosure Index on page 382 for a listing of all disclosure information.

OVERALL MEETING OBJECTIVES
To present recent advances in research, surgical techniques, patient management, and the diagnosis and treatment of cardiothoracic disease to cardiothoracic specialists and related health care professionals; and to provide a forum for cardiothoracic surgeons and related healthcare professionals to exchange ideas through open discussion periods and question-and-answer sessions related to the practice of cardiothoracic surgery.

After attending the STSA Annual Meeting, participants should have a broader understanding of new and standard techniques and current research specifically related to adult cardiac surgery, general thoracic surgery, congenital heart surgery, and related transplant procedures. Attendees can utilize knowledge gained from the STSA Annual Meeting to help select appropriate surgical procedures and interventions and integrate state of the art knowledge into their own practices.

TARGET AUDIENCE
The STSA Annual Meeting is intended for all professionals involved in delivery of cardiothoracic care with particular emphasis on cardiothoracic surgeons. Cardiothoracic residents, fellows, nurse practitioners, research scientists, and other health care professionals may also benefit from various sessions and interactions with cardiothoracic colleagues.

SPEAKER READY ROOM
The Speaker Ready Room is located in Banyan I-II. Speakers are requested to go to this room upon arrival, or at least four hours prior to the opening of their session to upload slides. Speakers will not be allowed to bring their laptop to the podium.

SCHEDULE OF EVENTS*

*SCHEDULE OF EVENTS IS SUBJECT TO CHANGE.

2016 Cardiothoracic Surgery Jeopardy Competition for North America in the General Session Room
5:00 pm – 6:00 pm
Royal Palm Ballroom IV-VIII

WEDNESDAY, NOVEMBER 9, 2016

7:45 pm – 10:00 pm
Royal Palm Ballroom IV-VIII
(Presentations are limited to ten minutes, followed by five minutes of discussion.)

CME Credits Available: 2.25
Moderators: *HelenMari Merritt and ***D****Richard L. Lee

7:45 pm - 8:00 pm (page 44)
1V. Robotic Repair of Mitral Commissural Endocarditis With a Bridging Patch Technique
Takashi Murashita, Kevin J. Tveter, ***D****J.S. Rankin, Lawrence M. Wei, *Vinay Badhwar
West Virginia University Medical Center, Morgantown, WV

8:00 pm - 8:15 pm (page 46)
2V. Extracardiac Valved Conduit for Calcific Mitral Stenosis
Justin Van Meeteren, *Hartzell Schaff
Mayo Clinic, Rochester, MN

8:15 pm - 8:30 pm (page 48)
3V. Management of the Small Aortic Root Using the 'Floating Valve Technique'
Jonathan M. Hemli, Yuriy Dudiy, Derek R. Brinster
Lenox Hill Hospital, New York, NY

8:30 pm - 8:45 pm (page 50)
4V. Combined Pulmonary Artery Sleeve Resection / Left Upper Lobectomy and Extended Resection of the Thoracic Aorta After TEVAR For T4 Lung Cancer
Raymond Lee, Gopal Singh, John Vandenberge, Jason Glotzbach, ***D***Isaac George, ***D****Joshua R. Sonett
NY Presbyterian Hospital / Columbia University, New York, NY

8:45 pm - 9:00 pm (page 52)
5V. Tetralogy of Fallot With Ebstein's Anomaly Correction in a Neonate
Shu-Chien Huang, Ling-Yi Wei
National Taiwan University Hospital, Taipei, Taiwan

9:00 pm - 9:15 pm (page 54)
6V. Right Axillary Thoracotomy for Transatrial Repair of Congenital Heart Defects: VSD, Partial AV Canal With Mitral Cleft, PAPVR/Warden, Cor Triatriatum and ASD
*Ali Dodge-Khatami, *Jorge D. Salazar
Children's Heart Center, University of Mississippi Medical Center, Jackson, MS

9:15 pm - 9:30 pm (page 56)
7V. Repair of Aortic Valve, Large Periaortic Abscess and LV-PA Fistula in a 5 Year-Old With Acute Bacterial Endocarditis
Matthew Johnston, *Yoshio Ootaki, Michael Quartermain, Eduardo Goenaga-Diaz, Allison Welch, *Ross M. Ungerleider
Wake Forest University, Winston-Salem, NC

*STSA Member ***D*** Relationship Disclosure

POSTGRADUATE PROGRAM

9:30 pm - 9:45 pm (page 58)
8V. Repair of Incarcerated Type IV Hiatal Hernia With Intrathoracic Stomach, Herniated Omentum, Small Bowel and Transverse Colon Can be Safely Achieved via Laparoscopic Approach
Farzaneh Banki
University of Texas Health Science Center Houston, Memorial Hermann Southeast Esophageal Disease Center, Houston, TX

9:45 pm - 10:00 pm (page 60)
9V. Video-Assisted Thoracoscopic Resection of Right Upper Lobe Lung Cancer With Chest Wall Involvement
Erin A. Gillaspie, *Shanda H. Blackmon
Mayo Clinic, Rochester, MN

THURSDAY, NOVEMBER 10, 2016

POSTGRADUATE PROGRAM
7:00 am – 12:15 pm
The first portion of the Postgraduate Program is the General Session, which will feature Special Topics in Cardiorthoracic Surgery presentations and Teaching the Technical Aspects of Cardiothoracic Surgery. Concurrent breakout sessions in adult cardiac, general thoracic, congenital heart surgery and interdisciplinary care provider which includes a panel discussion will take place between 10:45 a.m. and 12:15 p.m.

CME Credits Available: 4.5

GENERAL SESSION *Royal Palm Ballroom IV-VIII*
Special Topics in Cardiothoracic Surgery
Moderators: *D** Scott A. LeMaire and *Paul J. Chai
Educational Objectives: Upon completion of this program participants will be able to:
- Understand how contemporary ECMO centers have evolved due to technological advancements and improved outcomes.
- Appreciate the importance of team development and ECMO specialist training when developing or expanding an ECMO program.
- Understand complications related to blood transfusion.
- Define benefits of transfusion and address bleeding complications.
- Recognize patients at high and low risk from perioperative transfusion and from perioperative bleeding.

7:00 am - 7:30 am
Managing an Expanding ECMO Program
Presenter: *D** Joseph B. Zwischenberger
University of Kentucky, Lexington, KY

7:30 am – 8:00 am
Blood Conservation: Best Practices for Reducing Bleeding and Transfusion Requirements
Presenter: *D** Victor A. Ferraris
University of Kentucky, Lexington, KY

8:00 am – 8:40 am
General Thoracic Surgery Legends Lecture
Esophageal Surgery 1973-2016 - Evolution and Regression
Presenter: Mark B. Orringer
University of Michigan, Ann Arbor, MI

8:40 am - 8:55 am
Break

Teaching the Technical Aspects of Cardiothoracic Surgery
Moderators: ***D****Scott A. LeMaire and *Paul J. Chai

8:55 am – 9:15 am
Challenges of Teaching Cardiothoracic Operations
Presenter: *John S. Ikonomidis
Medical University of South Carolina, Charleston, SC

9:15 am – 9:35 am
How I Teach It: Thoracoscopic Lobectomy
Presenter: ***D****Joshua R. Sonett
NY Presbyterian Hospital / Columbia University, New York, NY

9:35 am – 9:55 am
How I Teach It: Mitral Valve Repair
Presenter: Steven F. Bolling
University of Michigan, Ann Arbor, MI

9:55 am – 10:15 am
How I Teach It: Neonatal Cardiac Repair
Presenter: *E. Dean McKenzie
Texas Children's Hospital, Houston, TX

10:15 am – 10:45 am
Break- Visit Exhibits
Orchid Ballroom/Foyer

10:00 am – 3:30 pm
EXHIBITS OPEN
Orchid Ballroom/Foyer

ADULT CARDIAC BREAKOUT *Royal Palm I Ballroom IV-VIII*

Avoiding and Managing Problems in Adult Cardiac Surgery
Moderators: ***D****Anthony L. Estrera and *Neal D. Kon
Educational Objectives: Upon completion of this program participants will be able to:

- Distinguish between aortic intramural hematoma, penetrating ulcer, and dissection on CT scan.
- Determine the best course of treatment for acute intramural hematoma of the aorta.
- Appreciate patients that are high risk for complications during TAVR
- Review and describe solutions for complications during TAVR
- Describe the construction and makeup of the multidisciplinary "Heart Team", and its influence in improving patient outcomes and fostering communication between specialties to minimized complications during TAV
- Avoid complications of limited access incisions.
- Patient assessment and strategy for limited access incisions.

10:45 am – 11:15 am
Challenges in Managing Acute Ascending Aortic Intramural Hematoma
Presenter:*Chad N. Stasik
University of Texas San Antonio, San Antonio, TX

11:15 am – 11:45 am
Trouble During TAVR: Prevention and Management
Presenter: ***D****Vinod H. Thourani
Emory University, Atlanta, GA

*STSA Member ***D*** Relationship Disclosure

POSTGRADUATE PROGRAM

11:45 am – 12:15 pm
Dealing With Problems During Minimally Invasive Valve Procedures
Presenter: *D**Kevin Accola
Cardiovascular Surgeons PA, Orlando, FL

GENERAL THORACIC BREAKOUT *Royal Palm Ballroom II-III*

Getting Out of Trouble During General Thoracic Operations
Moderators: *Richard K. Freeman and *Melanie A. Edwards
Educational Objectives: Upon completion of this program participants will be able to:

- Discuss the management of inadequate operative exposure
- Discuss the management of immediate graft dysfunction
- Determine options for recipient-donor size mismatch
- Recognize potential pitfalls before they occur.
- Identify methods for salvage once an event has occurred.

10:45 am - 11:15 am
Managing Complications During Reoperative Lung Surgery
*David C. Rice
University of Texas MD Anderson Cancer Center, Houston, TX

11:15 am - 11:45 am
Dealing With Problems During Lung Transplantation
*G. Alec Patterson
Washington University School of Medicine, St. Louis, MO

11:45 am - 12:15 pm
Handling Misadventures During Minimally Invasive Esophogectomy
*Wayne L. Hofstetter
University of Texas, MD Anderson Cancer Center, Houston, TX

CONGENITAL BREAKOUT *Acacia I-III*

Handling Complications During Congenital Heart Surgery
Moderators: *Robert J. Dabal and *Paul J. Chai
Educational Objectives: Upon completion of this program participants will be able to:

- Identify techniques and methods to prevent and treat complications related to single ventricle palliation surgery.
  Demonstrate the modified single-patch operation for patients with cAVSD.
- Describe the differences between the single-patch, two-patch, and modified single-patch techniques.
- List the advantages of the modified single-patch technique.
- Identify different strategies for dealing with bilateral superior venae cavae.
- Recognize strategies for dealing with excessive pulmonary blood flow during transplantation for children with a previous Fontan procedure.
- Describe techniques for dealing with abnormalities of situs.

10:45 am - 11:15 am
Navigating Through Challenges During Norwood Procedures
*James Jaggers
Children's Hospital Colorado, Aurora, CO

11:15 am - 11:45 am
Dealing With Problems During AV Canal Defect Repair
*Carl L. Backer
Ann & Robert H. Lurie Children's Hospital, Chicago, IL

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11:45 am - 12:15 pm
Technical Challenges With Pediatric Heart Transplantation
*Kirk R. Kanter
Emory University School of Medicine, Atlanta, GA

INTERDISCIPLINARY CARE PROVIDER BREAKOUT *Mangrove I-II*

Management of the Postoperative Cardiothoracic Patient: The First 24 Hours
Moderator: *James St. Louis
Educational Objectives: Upon completion of this program participants will be able to:

- Apply goal directed hemodynamic management to optimize cardiac output.
- Discuss the open chest protocol.
- Assess the requirements for an APP to function in the CVICU to be successful.
- Identify the value of competency requirements for APPs in the CVICU.
- Describe specific ways in which changing traditional practice patterns to data-driven protocols can lead to improved patient outcomes.
- Identify components of the cardiac output and factors that impact cardiac output (preload, afterload, contractility.
- List the components of oxygen delivery vs oxygen consumption and how this is monitored.
- Recognize routine issues that impact post-operative care of the pediatric patient who has undergone cardiac surgery.

10:45 am - 10:50 am
Introduction
*James St. Louis
Children's Mercy Hospital, Kansas City, MO

10:50 am - 11:05 am
Principles of Postoperative Management of the Cardiothoracic Patient: The First 24 Hours
Nevin M. Katz
Johns Hopkins University, Baltimore, MD

11:05 am - 11:20 am
Postoperative Management of the Adult Cardiac Patient: A Practical Perspective
Jason Lucas
Piedmont Heart Institute, Atlanta, GA

11:20 am - 11:35 am
Postoperative Management of the Thoracic Patient: A Practice Perspective
*Benjamin Wei
University of Alabama, Birmingham, AL

11:35 am - 11:50 am
Postoperative Management of the Congenital Patient: A Practice Perspective
Stacy Reynolds
Children's Mercy Hospital, Kansas City, MO

11:50 am - 12:15 pm
Panel Discussion
*James St. Louis, Nevin M. Katz, Jason Lucas, Benjamin Wei, Stacy Reynolds

12:15 pm -1:30 pm
Break – Visit Exhibits
Orchid Ballroom/Foyer

POSTGRADUATE PROGRAM

ETHICS DEBATE *Royal Palm Ballroom IV-VIII*

1:30 p.m. – 2:30 p.m.
Educational Objectives: Upon completion of this program participants should be able to:

- Describe the arguments for and against double booking operations;
- Work with hospital administrators to develop appropriate OR scheduling procedures.

CME Credits Available: 1.0

Should Hospital Policy Forbid Surgeons to Schedule Concurrent Cases in the Operating Room
Moderator: *Robert M. Sade, Medical University of South Carolina, Charleston, SC
Pro: Richard Whyte
Beth Israel Deaconess Medical Center, Boston, MA
Con: ***D****Vinod H. Thourani
Emory University, Atlanta, GA

2:05 pm – 2:30 pm
Discussion

2:30 pm - 3:00 pm
Break – Visit Exhibits
Orchid Ballroom/Foyer

FIRST SCIENTIFIC SESSION

THURSDAY, NOVEMBER 10, 2016

3:00 pm - 5:30 pm
Royal Palm Ballroom IV-VIII
(Presentations are limited to seven minutes, followed by two minutes of discussion from a selected discussant and an additional six minutes of discussion open to the audience.)

CME Credits Available: 2.5
Moderators: *Andrea J. Carpenter and ***D****Daniel L. Miller

3:00 pm – 3:15 pm (page 62)
1. **Early Surgical Intervention in Patients With Mitral Valve Infective Endocarditis and Acute Stroke: Implications for Timing of Surgery**
   Mehrdad Ghoreishi, Nate Foster, Sam Maghami, Chetan Pasrija, Brody Wehman, Murtaza Dawood, Bartely P. Griffith, ***D****James S. Gammie
   University of Maryland School of Medicine, Baltimore, MD
   Discussant: *Vinay Badhwar, *West Virginia University Hearth and Vascular Institute, Morgantown, WV*

3:15 pm - 3:30 pm (page 64)
2. **Outcomes of Adult Extracorporeal Membrane Oxygenation With Outside Facility Transfer: A Regional Referral Center Experience**
   David Ranney, Nawar Al-Rawas, Desiree Bonadonna, Babatunde Yerokun, Michael Mulvihill, Michael Weykamp, Rathnayaka Mudiyanselage K. Gunasingha, Raquel Bartz, John Haney, ***D****Mani A. Daneshmand
   Duke University Medical Center, Durham, NC
   Discussant: ***D****Joseph B.Zwischenberger, *University of Kentucky, Lexington, KY*

3:30 pm - 3:45 pm (page 66)
3. **Aortic Root Replacement for Children With Loeys-Dietz Syndrome**
   Nishant Patel, Todd C. Crawford, J. Trent Magruder, Diane Alejo, Harry C. Dietz, Narutoshi Hibino, *Duke E. Cameron, *Luca A. Vricella
   Johns Hopkins Medical Institutions, Baltimore, MD
   Discussant: *Jorge D. Salazar, *Boston Children's Hospital, Boston, MA*

3:45 pm - 4:00 pm (page 68)
4. **Neonatal Aortic Arch Reconstruction With Splanchnic and Cerebral Perfusion Avoids Deep Hypothermia and Supports Recovery of Extracardiac Organs**
   *David Bichell, Clinton D. Morgan, Venessa L. Pinto, Ashly Westrick, Chevis N. Shannon, *Karla Christian, *Bret A. Mettler
   Vanderbilt University, Nashville, TN
   Discussant: *E .Dean McKenzie*, Texas Children's Hospital, Houston, TX*

4:00 pm – 4:15 pm (page 70)
5. **The Changing Spectrum of Tracheostomy Related and Post Intubation Tracheal Stenosis: Implications for Surgical Treatment**
   Samuel Kim, Charles Hsu, Alex G. Little
   University of Arizona, Tucson, AZ
   Discussant: ***D****Daniel L. Miller, *WellStar Health System, Marietta, GA*

4:15 pm - 4:30 pm (page 72)
6. **Contemporary Practice Patterns and Outcomes of Surgery for Acute Type A Aortic Dissection: An Analysis of a Multi-Institutional Regional STS Database**
   *Robert B. Hawkins[1], Emily A. Downs[1], *J.H. Mehaffey[1], Lily Johnston[1], *Damien LaPar[1], Clifford Fonner[2], Leora Yarboro[1], ***D***Gorav Ailawadi[1], Ravi Ghanta[1]
   [1]University of Virginia, Charlottesville, VA; [2]Virginia Cardiac Surgery Quality Initiative, Falls Church, VA
   Discussant: ***D****Ourania Preventza, *Baylor College of Medicine/Texas Heart Institute, Houston, TX*

*STSA Member ***D*** Relationship Disclosure

FIRST SCIENTIFIC SESSION

4:30 pm - 4:45 pm (page 72)

7. Determinants of Hospital Variation in Pneumonia Rates After Coronary Artery Bypass Grafting: An Analysis of 324,085 Consecutive CABG Patients

*Alexander A. Brescia[1], ***D****J.S. Rankin[2], Derek Cyr[3], *Jeffrey P. Jacobs[4], *Richard L. Prager[1], Min Zhang[1], Roland Matsouaka[3], Steven D. Harrington[5], Rachel S. Dokholyan[3], *Steven Bolling[1], Astrid Fishstrom[1], David M. Shahian[6], Donald S. Likosky[1]

[1]University of Michigan, Ann Arbor, MI; [2]Cardiothoracic Surgery Associates , Nashville, TN; [3]Duke Clinical Research Institute, Durham, NC; [4]Johns Hopkins University School of Medicine, Baltimore, MD; [5]Henry Ford Macomb Hospitals, Clinton Township, MI; [6]Harvard Medical School, Boston, MA

Discussant: ***D****Jay D. Pal, *University of Washington, Seattle, WA*

4:45 pm – 5:00 pm (page 76)

8. Improved Lymph Node Staging in Early Stage Non-Small Cell Lung Cancer in the National Cancer Database

Seth B. Krantz[1,2], Waseem Lutfi[1], Kristine Kuchta[1], Chi-Hsiung Wang[1], Ki Wan Kim[1,2], *John Howington[3]

[1]NorthShore University Health System, Evanston, IL; [2]University of Chicago Pritzker School of Medicine, Chicago, IL; [3]Saint Thomas Healthcare, Nashville, TN

Discussant: ***D****Robert J. Cerfolio, *University of Alabama, Birmingham, AL*

5:00 pm – 5:15 pm (page 78)

9. Causes and Patterns of Unplanned Readmissions After Anatomic Lung Resection: Comparison of Thoracoscopic vs. Open Approaches

Rohun Bhagat[1,5], Austin N. Ward[2], Elizabeth Juarez-Colunga[3,4], Michael R. Bronsert[4], Natalia O. Glebova[1], William G. Henderson[3,4], David A. Fullerton1, Michael J. Weyant[1], John D. Mitchell[1], Jeremiah Martin[2], Robert Meguid[1]

[1]University of Colorado School of Medicine, Aurora, CO; [2]University of Kentucky, Lexington, KY; [3]University of Colorado School of Public Health, Aurora, CO; [4]University of Colorado School of Medicine, Aurora, CO; [5]University of Rochester, Rochester, NY

Discussant: *Richard K. Freeman, *St. Vincent Hospital and Health System, Indianapolis, IN*

5:15 pm - 5:30 pm (page 80)

10. Bilateral Internal Mammary Artery Use Can Be Safely Taught Without Increasing Morbidity or Mortality

Chetan Pasrija, Mehrdad Ghoreishi, Aakash Shah, Michael Rouse, Zachary Kon, Bradley S. Taylor

University of Maryland, Division of Cardiac Surgery, Baltimore, MD

Discussant: *John S. Ikonomidis, *Medical University of South Carolina, Charleston,SC*

5:30 pm- 6:00 pm

2016 Cardiothoracic Surgery Jeopardy Competition for North America Finals in the General Session Room – *Royal Palm Ballroom IV-VIII*

BASIC SCIENCE FORUM

FRIDAY, NOVEMBER 11, 2016

7:45 am – 12:00 pm
EXHIBITS OPEN
Orchid Ballroom/Foyer

Basic Science Forum
7:00 am - 7:50 am
Royal Palm Ballroom IV-VIII
(Presentations are limited to five minutes, followed by two minutes of discussion from a selected discussant and an additional one minute of discussion open to the audience.)

CME Credits Available: 0.75
Moderators: *Min P. Kim and *T. Brett Reece
Resident Moderator: Lily Johnston

7:00 am - 7:08 am (page 82)
1B. Serum-Based Biomarker Panel May Predict Recurrence in Resected T1-2N0 Non-Small Cell Lung Cancer
Christopher W. Seder, Andrew Arndt, Lia Jordano, Sanjib Basu, Cristina Fhied, Selina Sayidine, Gary Chmielewski, William H. Warren, Michael Liptay, Jeffrey Borgia
Rush University Medical Center, Chicago, IL
Discussant: Virginia Litle, *Boston University, Boston, MA*

7:08 am - 7:16 am (page 84)
2B. Ex Vivo Lung Perfusion Rehabilitates Sepsis-Induced Lung Injury
*J.H. Mehaffey, Eric Charles, Ashish Sharma, Dustin Money, *Curtis Tribble, Victor Laubach, Mark Roeser, *Irving L. Kron
University of Virginia, Charlottesville, VA
Discussant: ***D****Joshua Sonett, *New York Presbyterian Hospital/Columbia University, New York, NY*

7:16 am - 7:24 am (page 86)
3B. A Novel Murine Model of Marfan Syndrome Accelerates Aortopathy and Cardiomyopathy
Nicholas Cavanaugh, Lan Qian, William J. Kutschke, Ella J. Born, *Joseph W. Turek
University of Iowa Carver College of Medicine, Iowa City, IA;
Discussant: *Luca Vricella, *Johns Hopkins Univesity, Baltimore, MD*

7:24 am - 7:32 am (page 88)
4B. Erythropoietin Attenuation of Spinal Cord Ischemia Injury is cR-Receptor Dependent
Lisa S. Foley, Joshua Mares, ***D***Joseph C. Cleveland, Michael J. Weyant, David A. Fullerton, *T.B. Reece
University of Colorado, Aurora, CO
Discussant: ***D****Scott LeMaire, *Baylor College of Medicine, Houston, TX*

7:32 am - 7:40 am (page 90)
5B. Selective Localization of a Novel Dendrimer Nanoparticle in an Ischemia-reperfusion Model of Myocardial Infarction
J. Trent Magruder, Todd C. Crawford, Yi-An Lin, Fan Zhang, Joshua C. Grimm, Rangaramanujam Kannan, Sujatha Kannan, *Christopher M. Sciortino
Johns Hopkins University School of Medicine, Baltimore, MD
Discussant: *John W. Hammon, *Wake Forest University School of Medicine, Winston-Salem, NC*

*STSA Member ***D*** Relationship Disclosure

BASIC SCIENCE FORUM

7:40 am - 7:48 am (page 92)

6B. C-kit+ Cardiac Stem Cells Enhance Neonatal Right Ventricular Performance After Pulmonary Artery Banding

Brody Wehman, Nicholas Pietris, Osama T. Siddiqui, Tieluo Li, Rachana Mishra, Sudhish Sharma, *Sunjay Kaushal

University of Maryland School of Medicine, Baltimore, MD

Discussant: *John Mayer, *Boston Children's Hospital, Boston, MA*

7:50 am - 8:00 am

Break – Visit Exhibits

Orchid Ballroom/Foyer

SECOND SCIENTIFIC SESSION

FRIDAY, NOVEMBER 10, 2016

8:00 am - 10:00 am
Royal Palm Ballroom IV-VIII
(Presentations are limited to seven minutes, followed by two minutes of discussion from a selected discussant and an additional six minutes of discussion open to the audience.)

CME Credits Available: 2.0
Moderators: *Charles B. Huddleston and ***D*** *Himanshu J. Patel

8:00 am - 8:15 am (page 94)
11. Variability in Integrated Cardiothoracic Surgery Training Program Curriculum
Elizabeth H. Stephens[1], Dustin Walters[3], Asad Shah[2], Walter DeNino[4], Amanda Eilers[5], Vakhtang Tchantchaleishvili[6], Andrew Goldstone[7], Ryan Shelstad[8], Tarek Malas[9], Erin A. Gillaspie[10], Marisa Cevasco[11], Amy Fiedler[12], Scott Halbreiner[13], Kevin Koomalsingh[14], Damien LaPar[15]
[1]Columbia, New York, NY; [2]Duke, Durham, NC; [3]University of Washington, Seattle, WA; [4]MUSC, Charleston, SC; [5]University of Texas San Antonio, San Antonio, TX; [6]University of Rochester, Rochester, NY; [7]University of Pennsylvania, Philadelphia, PA; [8]University of Colorado, Denver, CO; [9]Ottawa Heart Institute, Ottawa, Ontario, Canada; [10]Mayo Clinic, Rochester, MN; [11]Brigham and Women's Hospital, Boston, MA; [12]Massachusetts General Hospital, Boston, MA; [13]Cleveland Clinic, Cleveland, OH; [14]Cedars Sinai, Los Angeles, CA; [15]University of Virginia, Charlottesville, VA
Discussant: ***D****Richard Lee, *St. Louis University, St. Louis, MO*

8:15 am - 8:30 am (page 96)
12. Concomitant Atrial Fibrillation Ablation Remains Underutilized Despite No Additive Risk
Lily E. Johnston[1], Emily A. Downs[1], *Damien LaPar[1], *Irving L. Kron[1], *Jeffrey B. Rich[2], ***D****Alan Speir[3], Mohammed Quader[4], ***D***Jonathan Philpott[2], ***D****Gorav Ailawadi[1]
[1]University of Virginia, Charlottesville, VA; [2]Sentara Heart Hospital, Norfolk, VA; [3]INOVA Heart and Vascular Institute, Fairfax, VA; [4]Virginia Commonwealth University, Richmond, VA
Discussant: *Theresa Luu, *Marietta, GA*

8:30 am - 8:45 am (page 98)
13. Impact of DiGeorge Syndrome on Early and Late Outcomes of Surgical Repair of Conotruncal Cardiac Anomalies
*Bahaaldin Alsoufi, Courtney McCracken, *Kirk R. Kanter, Subhadra Shashidharan, *Brian Kogon
Emory University School of Medicine, Atlanta, GA
Discussant: *Andrew Lodge, *Duke University Medical Center, Durham, NC*

8:45 am - 9:00 am (page 100)
14. Pulmonary Artery Aneurysms: Presentation and Operative Outcomes
Janani Reisenauer, Sameh Said, *Hartzell Schaff, Heidi Connolly, Joseph Maleszewski, *Joseph Dearani
Mayo Clinic, Rochester, MN
Discussant: *Brian Kogon, *Emory University, Atlanta, GA*

9:00 am - 9:15 am (page 102)
15. Surgical Outcomes in Clinical Stage IIIA – N2 Positive, Older Lung Cancer Patients in The Society of Thoracic Surgeons Database
Daniel J. Boffa1, *Felix Fernandez[2], Andrzej Kosinski[3], Sunghee Kim[3], Mark Onaitis[3], ***D***Patricia Cowper[3], *Jeffrey P. Jacobs[4], *Cameron Wright[5], *Joe B. Putnam[6], Anthony P. Furnary[7]

*STSA Member ***D*** Relationship Disclosure

SECOND SCIENTIFIC SESSION

[1]Yale University School of Medicine, New Haven, CT; [2]Emory University, Atlanta, GA; [3]Duke Clinical Research Institute, Durham, NC; [4]Johns Hopkins, St Petersburg, FL; [5]Massachusetts General Hospital, Boston, MA; [6]Baptist Medical Center, Jacksonville, FL; [7]Starr-Wood Cardiac Group, Portland, OR
Discussant: *David R. Jones, *Memorial Sloan Kettering Cancer Center, New York, NY*

9:15 am - 9:30 am (page 104)

16. Pilot Study to Incorporate Patient Reported Outcomes Associated With Lung Cancer Surgery into The Society of Thoracic Surgeons Database
*Onkar V. Khullar[1], Mohammad H. Rajaei[1], *Seth Force[1], Jose Binongo[2], Yi Lasanajak[2], Scott Robertson[3], *Allan Pickens[1], *Manu S. Sancheti[1], Joseph Lipscomb[1,4], Theresa W. Gillespie[1], *Felix Fernandez[1]
[1]Emory University School of Medicine, Atlanta, GA; [2]Rollins School of Public Health, Emory University, Atlanta, GA; [3]Georgia Tech, Atlanta, GA; [4]Rollins School of Public Health, Emory University, Atlanta, GA;
Discussant: *Elizabeth David, UC Davis Medical Center, Sacramento, CA

9:30 am - 9:45 am (page 106)

17. Outcomes of Reoperative Mitral Valve Replacement in Patients With Prior Mitral Valve Repair and Replacement: A Benchmark for Future Valve-in-Valve Transcatheter Mitral Valve Replacement
Julius I. Ejiofor, Anthony V. Norman, Siobhan McGurk, James Rawn, Hari R. Mallidi, Sary F. Aranki, Prem Shekar, ***D***Tsuyoshi Kaneko
Brigham and Women's Hospital, Harvard Medical School, Boston, MA
Discussant: ***D****J. Scott Rankin, WVU Heart & Vascular Institute, *West Virginia University, Morgantown, WV*

9:45 am - 10:00 am (page 108)

18. Contemporary Outcomes for Low-risk Surgical Aortic Valve Replacement: A Benchmark for Evaluating Transcatheter Aortic Valve Technology
Lily E. Johnston[1], Emily A. Downs[1], Robert B. Hawkins[1], Mohammed Quader[2], ***D****Alan Speir[3], *Jeffrey B. Rich[4], Ravi Ghanta[1], Leora Yarboro[1], ***D***Gorav Ailawadi[1]
[1]University of Virginia, Charlottesville, VA; [2]Virginia Commonwealth University, Richmond, VA; [3]INOVA Heart and Vascular Institute, Fairfax, VA; [4]Sentara Heart Hospital, Norfolk, VA
Discussant: *Chad Stasik, *University of Texas Health Science Center, San Antonio, TX*

10:00 a.m. – 10:30 a.m.
Break – Visit Exhibits
Orchid Ballroom/Foyer

GENERAL SESSION (All attendees and guests welcome)

FRIDAY, NOVEMBER 11, 2016
10:30 am – 12:00 pm
Royal Palm Ballroom IV-VIII

CME Credits Available: 1.5
Moderator: *S. Adil Husain

10:30 am - 10:50 am
Kent Trinkle Education Lectureship: Evolution of Thoracic Surgical Training in the US
*William A. Baumgartner
Johns Hopkins University, Baltimore, MD

10:50 am – 11:20 am
President's Invited Lecturer: The Future of Cardiothoracic Surgery: Why and How to Embrace Innovation
*Michael J. Mack
Baylor Health Care System, The Heart Hospital Baylor Plano Research Center, Plano, TX

11:20 am – 12:00 pm
Presidential Address: We Stand on the Shoulders of Giants: Let's Look Up
*Andrea J. Carpenter
University of Texas Health Science Center, San Antonio, TX

12:00 pm
All Attendee Lunch
Sunset Veranda

12:45 pm – 4:00 pm
EXHIBITS OPEN

12:45 pm – 2:00 pm
Break – Visit Exhibits

1:00 pm – 2:00 pm
Dessert in the Exhibit Hall
Orchid Ballroom/Foyer

*STSA Member ***D*** Relationship Disclosure

THIRD SCIENTIFIC SESSION A

FRIDAY, NOVEMBER 11, 2016

2:00 pm – 3:30 pm
Simultaneous Cardiac, General Thoracic, and Congenital Breakout Sessions

CME Credits Available: 1.5

Attendees select to participate in one of the following three breakout sessions:

ADULT CARDIAC BREAKOUT *Royal Palm Ballroom IV-VIII*

(Presentations are limited to seven minutes, followed by two minutes of discussion from a selected discussant and an additional six minutes of discussion open to the audience.)

Moderators: Dawn S. Hui and *Chad N. Stasik
Resident Moderator: Scott Johnson

2:00 pm - 2:15 pm (page 110)
19. Risk Factors for Late Aortic Valve Dysfunction Following the David V Valve Sparing Root Replacement
Jiro Esaki[1], ***D****Brad Leshnower[2], Jose Binongo[2], Yi Lasanajak[2], LaRonica McPherson[2], *Robert Guyton[2], *Edward P. Chen[2]
[1]Otsu Red Cross Hospital, Otsu, Japan; [2]Emory University, Atlanta, GA
Discussant: *John S. Ikonomidis, *Medical University of South Carolina, Charleston, SC*

2:15 pm - 2:30 pm (page 112)
20. Whole Body Perfusion Strategy for Aortic Arch Repair Under Moderate Hypothermia: Simultaneous Antegrade Cerebral Perfusion and Lower Body Perfusion
Christopher L. Tarola, Katie L. Losenno, Jill J. Gelinas, Philip M. Jones, Phil Fernandes, Stephanie A. Fox, Bob Kiaii, ***D***Michael Chu
Western University, London, Ontario, Canada
Discussant: ***D****Joseph Coselli, *Baylor College of Medicine/Texas Heart Institute, Houston, TX*

2:30 pm - 2:45 pm (page 114)
21. Moderate Hypothermia and Unilateral Selective Antegrade Cerebral Perfusion is a Safe Perfusion Strategy for Extended Arch Replacement in Patients With Acute Aortic Dissection
*William B. Keeling, ***D****Brad Leshnower, Jose Binongo, *Eric L. Sarin, *Ed Chen
Emory University, Atlanta, GA
Discussant: ***D****Anthony Estrera, *University of Texas Houston Medical School, Houston, TX*

2:45 pm - 3:00 pm (page 116)
22. Frozen Elephant Trunk is Not the "Bad Boy" Compared With the Traditional Elephant Trunk: Current Trends and Lessons Learned Using the Simplified US Version of the FET
D*Ourania Preventza[1,2], Jessica Mayor[1,2], Katherine Simpson[1,2], Julius Carillo[1,2], Matt D. Price[1,2], *Kim I. de la Cruz[1,2], *Lorraine D. Cornwell[2], Shuab Omer[1,2], Arin C. Jobe[1,2], ***D****Scott A. LeMaire[1,2], ***D****Joseph S. Coselli[1,2]
[1]Texas Heart Institute, Houston, TX; [2]Baylor College of Medicine, Houston, TX
Discussant: ***D****Tomas Martin, *Cardiovascular Surgeons PA, Orlando, FL*

3:00 pm - 3:15 pm (page 118)
23.Transcatheter Aortic Valve Implantation for Patients With Bicuspid Aortic Valves: Still a Contraindication?
Mirko Doss, ***D***Won Kim, Thomas Walther
Kerckhoff Heart Center, Bad Nauheim, Germany
Discussant: ***D****Vinod Thourani, *Emory University, Atlanta GA*

*STSA Member ***D*** Relationship Disclosure

3:15 pm - 3:30 pm (page 120)

24. Statewide Impact of Transcatheter Aortic Valve Replacement on Surgical Aortic Valve Replacement

*Robert B. Hawkins[3], Lily Johnston[3], Emily A. Downs[3], *J.H. Mehaffey[3], Clifford Fonner[1], *Damien LaPar[3], Leora Yarboro[3], *Ravi Ghanta[3], Mohammed Quader[2], ***D********Alan Speir[4], Jeffrey B. Rich[1], ***D********Gorav Ailawadi[3]
[1]Virginia Cardiac Surgery Quality Initiative, Falls Church, VA; [2]Virginia Commonwealth University, Richmond, VA; [3]University of Virginia, Charlottesville, VA; [4]INOVA Heart and Vascular Institute, Falls Church, VA

Discussant: *Richard Prager, *University of Michigan, Ann Arbor, MI*

GENERAL THORACIC BREAKOUT *Royal Palm Ballroom II-III*

(Presentations are limited to seven minutes, followed by eight minutes of discussion.)

Moderators: *Elizabeth A. David and *Richard K. Freeman
Resident Moderator: David Ranney

2:00 pm - 2:15 pm (page 122)

25. Multi-institutional Validation of a Modified Thoracic Revised Cardiac Risk Index (m-ThRCRI) for Predicting Cardiac Complications Following Lung Resection

Daniel C. Thomas, Brian N. Arnold, Joshua E. Rosen, Michelle C. Salazar, ***D********Frank C. Detterbeck, Justin D. Blasberg, Daniel J. Boffa, Anthony W. Kim
Yale School of Medicine, New Haven, CT

2:15 pm - 2:30 pm (page 124)

26. Is Repeat Pulmonary Metastasectomy Indicated for Soft Tissue Sarcoma?

Neel P. Chudgar, Murray F. Brennan, Kay See Tan, ***D***Rodrigo R. Munhoz, Peter R. Bucciarelli, Sandra P. D'Angelo, Manjit S. Bains, *Matthew Bott, James Huang, *James M. Isbell, ***D********Daniela Molena, ***D***Bernard J. Park, Valerie W. Rusch, Prasad S. Adusumilli, William Tap, *David R. Jones
Memorial Sloan Kettering Cancer Center, New York, NY

2:30 pm - 2:45 pm (page 126)

27. Pilot Study Percutaneous Cryotherapy for Stage IA Lung Cancer

Frank A. Baciewicz[1,2], Lance K. Heilbrun[2], Deborah Hackstock[2], Fulvio Lonardo[4], Peter Littrup[2,3]
[1]WSU, Detroit, MI; [2]Karmanos Cancer Center, Detroit, MI; [3]Brown Medical Center, Providence, RI; [4]Wayne State University, Detroit, MI

2:45 pm - 3:00 pm (page 128)

28. Evaluation of Esophageal Anastomotic Integrity With Serial Pleural Amylase Levels

D*****Daniel L. Miller, *Gerald A. Helms, *William R. Mayfield
WellStar Health System, Marietta, GA

3:00 pm - 3:15 pm (page 130)

29. Management of Anastomotic Leaks After Esophagectomy

Joshua L. Manghelli, David Blitzer, Adam Hicks, Karen Rieger, *DuyKhanh Ceppa, Thomas J. Birdas
Indiana University School of Medicine, Indianapolis, IN

3:15 pm - 3:30 pm (page 132)

30. Hospitalization Costs Following Surgery in High-Risk Patients With Early Stage Lung Cancer

*Manu S. Sancheti, Ray Chihara, Sebastian Perez, *Felix Fernandez, *Allan Pickens, *Seth Force
Emory University, Atlanta, GA

THIRD SCIENTIFIC SESSION A

CONGENITAL BREAKOUT *Acacia I-III*

(Presentations are limited to seven minutes, followed by two minutes of discussion from a selected discussant and an additional six minutes of discussion open to the audience.)

Moderators: *James St. Louis and *Mark Plunkett

2:00 pm - 2:15 pm (page 134)

31. Need for Pulmonary Arterioplasty at the Time of Bidirectional Cavopulmonary Anastomosis is an Independent Predictor of Poor Surgical Outcome
John D. Cleveland[1,2], Susana Tran[1], Cheryl Takao[1], Winfield J. Wells[1], Vaughn A. Starnes[1,2], S R. Kumar[1,2]
[1]Children's Hospital, Los Angeles, Los Angeles, CA; [2]University of Southern California, Los Angeles, CA
Discussant: *Carl Backer, *Ann and Robert H. Lurie Children's Hospital of Chicago, Chicago, IL*

2:15 pm - 2:30 pm (page 136)

32. Major Aortopulmonary Collateral Arteries in Patients With Anatomy Other Than Pulmonary Atresia With Ventricular Septal Defect
William L. Patrick, *Richard D. Mainwaring, Olaf Reinhartz, Rajesh Punn, Theresa Tacy, Frank L. Hanley
Stanford University School of Medicine, Stanford, CA
Discussant: *Jeffrey P. Jacobs, *Johns Hopkins All Children's Heart INstitutin, St. Petersburg, FL*

2:30 pm - 2:45 pm (page 138)

33. Current Results of Multistage Single Ventricle Palliation of Patients With Double Inlet Left Ventricle
*Bahaaldin Alsoufi, *Kirk R. Kanter, Subhadra Shashidhara, *Brian Kogon
Emory University School of Medicine, Atlanta, GA
Discussant: *Ross M. Ungerleider, *Wake Forest University, Winston-Salem, NC*

2:45 pm - 3:00 pm (page 140)

34. Use of Heparin Coated Polytetrafluoroethylene Grafts Reduces Mortality in Neonates Receiving Systemic-to-Pulmonary Shunts
Adeel Ashfaq[1], Amit Iyengar[1], Brian Reemtsen[2]
[1]David Geffen School of Medicine at UCLA, Los Angeles, CA; [2]Mattel Children's Hospital, Los Angeles, CA
Discussant: *Joseph Turek, *Carver College of Medicine, Iowa City, IA*

3:00 pm - 3:15 pm (page 142)

35. Surgical Strategy Toward Bi-ventricular Repair for Severe Ebstein's Anomaly in Neonates and Early Infancy
Shu-Chien Huang, Yihsharng Chen
National Taiwan University Hospital, Taipei, Taiwan
Discussant: *Christopher Knott-Craig, *Le Bonheur Children's Hospital, Memphis, TN*

3:15 pm - 3:30 pm (page 144)

36. Arch Augmentation via Median Sternotomy for Repair of Coarctation of Aorta With Associated Arch Hypoplasia is a Safe and Durable Procedure
W.H. Gray[1,2], Winfield J. Wells[1,2], Vaughn A. Starnes[1,2], S.R. Kumar[1,2]
[1]University of Southern California, Los Angeles, CA; [2]Children's Hospital, Los Angeles, Los Angeles, CA
Discussant: *Robert J. Dabal, *University of Alabama, Birmingham, AL*

3:30 p.m. – 4:00 p.m.
Break – Visit Exhibits
Orchid Ballroom/Foyer

*STSA Member ***D*** Relationship Disclosure

THIRD SCIENTIFIC SESSION B

FRIDAY, NOVEMBER 11, 2016

4:00 pm – 5:00 pm
Simultaneous Cardiac, General Thoracic, and Congenital Breakout Sessions

CME Credits Available: 1.0

Attendees select to participate in one of the following three breakout sessions:

ADULT CARDIAC BREAKOUT *Royal Palm Ballroom IV-VIII*

(Presentations are limited to seven minutes, followed by two minutes of discussion from a selected discussant and an additional six minutes of discussion open to the audience.)

Moderators: *D** *Faisal G. Bakaeen and *Bryan S. Helsel
Resident Moderator: Amanda Eilers

4:00 pm - 4:15 pm (page 146)
37. Similar Outcomes in Diabetic Patients After CABG With Single ITA Plus Radial Artery Grafting & Bilateral ITA Grafting
Sajjad Raza, ***D***Eugene Blackstone, Marijan Koprivanac, Penny Houghtaling, Lars G. Svensson, Joseph F. Sabik
Cleveland Clinic, Cleveland, OH
Discussant: *Walter H. Merrill, *Vanderbilt University Hospital, Nashville, TN*

4:15 pm - 4:30 pm (page 148)
38. Diagnosis and Surgical Management of Pericardial Constriction After Cardiac Surgery
Justin Van Meeteren, *Hartzell Schaff, *Joseph Dearani, Kevin Greason, ***D****Richard Daly
Mayo Clinic, Rochester, MN
Discussant: *D*Douglas Johnston, *The Cleveland Clinic, Foundation, Cleveland, OH*

4:30 pm - 4:45 pm (page 150)
39. Incidence, Risk Factors, and Outcomes of Conversion from Off-pump Coronary Artery Bypass Grafting to On-pump Coronary Artery Bypass Grafting: A Report from the STS Adult Cardiac National Database
*William B. Keeling[1], ***D****Vinod H. Thourani[1], ***D****Gorav Aliawadi[2], Sunghee Kim[3], Derek Cyr[3], *Vinay Badhwar[4], *Jeffrey P. Jacobs[5], J.M. Brennan[3], James Meza[3], Roland Matsouaka[3], *Michael E. Halkos[1]
[1]Emory University, Atlanta, GA; [2]University of Virginia, Charlottesville, VA; [3]Duke Clinical Research Institute, Durham, NC; [4]University of Pittsburgh, Pittsburgh, PA; [5]Johns Hopkins All Children's Hospital, St. Petersburg, FL
Discussant: *D**Faisal G. Bakaeen, *Cleveland Clinic, Cleveland, OH*

4:45 pm - 5:00 pm (page 152)
40. Surgical Ablation of Atrial Fibrillation in the United States
*Vinay Badhwar[1], ***D****Niv Ad[2], ***D****J.S. Rankin[1], Maria Grau-Sepulveda[3], ***D****Ralph J. Damiano[4], *Patrick M. McCarthy[5], ***D****A.M. Gillinov[6], ***D****Vinod H. Thourani[7], *Rakesh M. Suri[6], *Jeffrey P. Jacobs[8], ***D****James L. Cox[4]
[1]West Virginia University, Morgantown, WV; [2]Inova Heart and Vascular Institute, Fairfax, VA; [3]Duke Clinical Research Institute, Durham, NC; [4]Washington University, St. Louis, MO; [5]Northwestern University, Chicago, IL; [6]Cleveland Clinic, Cleveland, OH; [7]Emory University, Atlanta, GA; [8]Johns Hopkins University, Baltimore, MD
Discussant: *D*Gorav Ailawadi, *University of Virginia, Charlottesville, VA*

*STSA Member ***D*** Relationship Disclosure

THIRD SCIENTIFIC SESSION B

GENERAL THORACIC BREAKOUT *Royal Palm Ballroom II-III*

(Presentations are limited to seven minutes, followed by eight minutes of discussion.)

Moderators: *Linda W. Martin and ***D****Basil Nasir

4:00 pm - 4:15 pm (page 154)

41. Transcervical Extended Mediastinal Lymphadenectomy (TEMLA) – Experience from a North American Cancer Center
*Saikrishna Yendamuri[1], Athar Battoo[1], Mark Hennon[1], Chukwumere Nwogu[1], ***D***Elisabeth Dexter[1], Miriam Huang[1], *Anthony Picone[1], *Todd L. Demmy[2]
[1]Roswell Park Cancer Institute, Buffalo, NY; [2]Cancer Institute of New Jersey, New Brunswick, NJ

4:15 pm - 4:30 pm (page 156)

42. Transversus Abdominis Plane (TAP) Block Improves Perioperative Outcomes After Esophagectomy Compared to Thoracic Epidural (TE)
Gal Levy[1], Mark Cordes[2], Ralph W. Aye[1], Alexander S. Farivar[1], ***D***Brian E. Louie[1]
[1]Swedish Medical Center and Cancer Institute, Seattle, WA; [2]Swedish Hospital, Seattle, WA

4:30 pm - 4:45 pm (page 158)

43. Office-Based Spirometry: A New Model of Care in Preoperative Assessment for Low-Risk Pulmonary Resections
Jessica L. Hudson, Jennifer Bell, *A. Sasha Krupnick, *Daniel Kreisel, ***D****Traves D. Crabtree, *G. Alexander Patterson, *Bryan F. Meyers, *Varun Puri
Washington University School of Medicine, St. Louis, MO

4:45 pm - 5:00 pm (page 160)

44. Video-Thoracoscopic Management of Post-Pneumonectomy Empyema
Domenico Galetta, Alessandro Borri, Roberto Gasparri, Francesco Petrella, Lorenzo Spaggiari
European Institute of Oncology, Milan, Italy

CONGENITAL BREAKOUT *Acacia I-III*

(Presentations are limited to seven minutes, followed by two minutes of discussion from a selected discussant and an additional six minutes of discussion open to the audience.)

Moderators: *Karla Christian and *Kristine J. Guleserian

4:00 pm - 4:15 pm (page 162)

45. Medium-Term Outcomes After Implantation of Expanded-Polytetrafluoroethylene Valved Conduit (ePTFE VC) for Right Ventricular Outflow Tract
*Yoshio Ootaki (Otaki), Allison Welch, Michael J. Walsh, Michael Quartermain, *Ross M. Ungerleider
Wake Forest Baptist Health, Winston-Salem, NC
Discussant: ***D****James A. Quintessenza, *All Children's Hospital, St. Petersburg, FL*

*STSA Member ***D*** Relationship Disclosure

4:15 pm - 4:30 pm (page 164)

46. Efficacy of an Extracellular Matrix in Systemic Loading Conditions in Congenital Heart Disease Surgical Repair

Adeel Ashfaq[1], Amit Iyengar[1], Oh Jin Kwon[1], Saad Soroya[1], Son Nguyen[1], Ryan Ou[1], Brian Reemtsen[2]

[1]David Geffen School of Medicine at UCLA, Los Angeles, CA; [2]Mattel Children's Hospital, Los Angeles, CA

Discussant: *Lauren Kane, Texas Children's Hospital, *Baylor College of Medicine, Houston, TX*

4:30 pm - 4:45 pm (page 166)

47. Brom (Multisinus) Aortoplasty for Supravalvar Aortic Stenosis

Michael C. Monge[1,2], *Carl L. Backer[1,2], Osama Eltayeb[1,2], Joyce T. Johnson[1,2], Andrada R. Popescu[1,2], Cynthia K. Rigsby[1,2], John M. Costello[1,2] *[1]Ann & Robert H. Lurie Children's Hospital, Chicago, IL; [2]Northwestern University Feinberg School of Medicine, Chicago, IL*

Discussant: *James St. Louis, *Children's Mercy Hospital, Kansas City, MO*

4:45 pm - 5:00 pm (page 168)

48. A New Kaolin Impregnated Hemostatic Sponge (QuikClot®) is Effective for Intraoperative Hemostasis in Norwood Operation

Takeshi Shinkawa, Carl Chipman, Jessica Holloway, Xinyu Tang, Jeffrey M. Gossett, Michiaki Imamura

University of Arkansas for Medical Sciences, Little Rock, AR

Discussant: *Charles B. Huddleston, *St. Louis University School of Medicine, St. Louis, MO*

5:00 p.m. – 6:00 p.m.
STSA ANNUAL BUSINESS MEETING (Members Only)
Royal Palm Ballroom IV-VIII

6:00 pm – 7:00 pm
Resident's Reception
Acacia IV-VI

7:00 pm – 9:00 pm
President's Mixer
Sunset Veranda

*STSA Member ***D*** Relationship Disclosure

THIRD SCIENTIFIC SESSION B

SATURDAY, NOVEMBER 12, 2016

Cardiothoracic Coding and Reimbursement Update for 2017
Royal Palm Ballroom IV-VIII
7:00 am – 8:00 am

CME Credits Available: 1.0
Moderator: *Jeffrey P. Jacobs

Educational Objectives: Upon completion of this program participants will be able to:

- Identify new CPT and ICD-10 diagnosis codes related to cardiothoracic surgery for 2017
- Recognize changes to Medicare related to MIPS and bundled payments starting in 2017.
- Describe the documentation and reporting requirements for G-codes required for all post-operative care Starting in 2017

7:00 am - 7:20 am
Cardiothoracic CPT Coding Changes

DJoseph C. Cleveland
University of Colorado, Aurora, CO

*Richard K. Freeman
St. Vincent Hospital and Health System, Indianapolis, IN

7:20 am - 7:30 am
ICD-10 Diagnoses Coding Changes
*Jeffrey P. Jacobs
All Children's Heart Institute, St. Petersburg, FL

7:30 am - 7:50 am
Overview of MIPS and Bundled Payments

7:50 am – 8:00 am
Q&A

FOURTH SCIENTIFIC SESSION A

SATURDAY, NOVEMBER 12, 2016

8:00 am - 9:00 am
Simultaneous Cardiac, General Thoracic, Congenital, and Transplant Breakout Sessions

CME Credits Available: 1.0

Attendees select to participate in one of the following four breakout sessions:

ADULT CARDIAC BREAKOUT *Royal Palm Ballroom IV-VIII*
(Presentations are limited to seven minutes, followed by eight minutes of discussion.)

Moderators: *Tom C. Nguyen and ***D****Ourania Preventza

8:00 am - 8:15 am (page 170)
49. Midterm Results of Hybrid Arch Repair With Zone 0 Stent Graft Deployment
Seyed Hossein Aalaei Andabili[3], *Charles T. Klodell[1], Teng Lee[1], Philip Hess[2], Tomas Martin[3], ***D***Adam Beck[1], ***D***Robert Feezor[1], Salvatore Scali[1], *Thomas M. Beaver[1]
[1]University of Florida, Gainesville, FL; [2]Indiana University, Indianapolis, IN; [3] Florida Hospital Orlando, Orlando, FL

8:15 am - 8:30 am (page 172)
50. Transmyocardial Laser Revascularization (TMR) for Class IV Angina: 30-Day Outcomes from a Contemporary, Multi-Center Patient Registry
D*V. Seenu Reddy, Keith Allen, Eric Peck, *Thomas Pollard, Robert Still, Joseph Wilson
Centennial Hospital, Nashville, TN

8:30 am - 8:45 am (page 174)
51. Intermediate Outcomes After Conservative Repair of Type A Aortic Dissection
Fernando Fleischman, James M. Tatum, Daniel Logsdon, W.H. Gray, Robbin G. Cohen, Amy Hackmann, Mark J. Cunningham, Vaughn A. Starnes, ***D***Michael E. Bowdish
University of Southern California, Los Angeles, CA

8:45 am - 9:00 am (page 176)
52. Timing of Operation for Tricuspid Regurgitation After Heart Transplant
*A. Michael Borkon, Kaitlyn Carl, Sanjeev Aggarwal, *Keith B. Allen, Alex Pak, John R. Davis, Eric Thompson, Jingyan Wang, Andrew Kao
Mid America Heart Institute of Saint Luke's Hospital, Kansas City, MO

GENERAL THORACIC BREAKOUT *Royal Palm Ballroom II-III*
(Presentations are limited to seven minutes, followed by eight minutes of discussion.)

Moderators: ***D****Traves Crabtree and *DuyKhanh Ceppa
Resident Moderator: Christine Jenkins

8:00 am - 8:15 am (page 178)
53. Atrial Resection Without Cardiopulmonary Bypass for Lung Cancer: Experience from a Single Institution
Domenico Galetta[1], Alessandro Borri1, Roberto Gasparri[1], Francesco Petrella[1], Lorenzo Spaggiari[1]
[1]European Institute of Oncology, Milan, Italy

*STSA Member ***D*** Relationship Disclosure

FOURTH SCIENTIFIC SESSION A

8:15 am - 8:30 am (page 180)

54. Comparing Outcomes After Pulmonary Resection for Lung Cancer Between Veterans Administration Medical Center and an Academic Medical Center

Travis Geraci1, Vanessa Baratta[1], John Young[1], Ann-Marie Dunican[2], Richard Jones[3], Thomas Ng[1]

[1]Warren Alpert Medical School of Brown University, Providence, RI; [2]Providence VAMC, Providence, RI; [3]Warren Alpert Medical School of Brown University, Providence, RI

8:30 am - 8:45 am (page 182)

55. Perioperative Outcomes of Patients Undergoing Pulmonary Lobectomy on Clopidogrel

Scott Atay[1], Arlene Correa[1], *Wayne L. Hofstetter[1], *Reza J. Mehran[1], *David C. Rice[1], Jack A. Roth[1], *Boris Sepesi[1], Stephen G. Swisher[1], *Ara Vaporciyan[1], *Garrett Walsh[1], *Mara Antonoff[1]

[1]University of Texas, MD Anderson Cancer Center, Houston, TX

8:45 am - 9:00 am (page 184)

Current Surgeon Practices

Siyuan Cao[1], Gail Darling[2], *Stephen C. Yang[1]

[1]The Johns Hopkins Medical Institution, Baltimore, MD; [2]General Thoracic Surgery Club Clinical Trials Group/University of Toronto, Toronto, Ontario, Canada

CONGENITAL BREAKOUT *Acacia I-III*

(Presentations are limited to seven minutes, followed by two minutes of discussion from a selected discussant and an additional six minutes of discussion open to the audience.)

Moderators: *Jeffrey P. Jacobs and *Randy Stevens

8:00 am - 8:15 am (page 186)

57. AvalonElite DLC Provides Reliable Total Cavopulmonary Assist in Failing Fontan Sheep Model Using Valved Extracardiac Conduit

Cheng Zhou[1], ***D***Dongfang Wang[1], ***D***Cherry Ballard-Croft[1], Guangfeng Zhao[2], Stephen Topaz[2], ***D****Joseph Zwischenberger[1]

[1]University of Kentucky, Lexington, KY; [2]W-Z Biotech, LLC, Lexington, KY

Discussant: *Umar Boston, *Le Bonheur Children's Hospital, Memphis, TN*

8:15 am - 8:30 am (page 188)

58. Influence of Weight at Time of First Palliation on Survival in Patients With Single Ventricle

TK Susheel Kumar[1], Sushitha Surendran[1], Jeffrey A. Towbin[1], Jerry Allen[1], James B. Tansey[1], *Umar Boston[1], David Zurakowski[2], *Christopher J. Knott-Craig[1]

[1]Lebonheur Children's Hospital, Memphis, TN; [2]Boston Children's Hospital, Boston, MA

Discussant: *James Gangemi, *UVA Medical Center, Charlottesville, VA*

8:30 am - 8:45 am (page 190)

59. Repair of Transposition of the Great Arteries With Intact Ventricular Septum – Results With a Standardized Method of Coronary Transfer

*Kirk R. Kanter

Emory University School of Medicine, Atlanta, GA

Discussant: *Constantine Mavroudis, *Florida Hospital for Children, Orlando, FL*

8:45 am - 9:00 am (page 192)

60. Neonatal Transfer Does Not Impact Mortality Within a Regionalized Pediatric Cardiac Surgery Network

Michael F. Swartz, George M. Alfieris

University of Rochester, Rochester, NY

Discussant: *Dilip Nath, *Children's National Medical Center, Washington, DC*

*STSA Member ***D*** Relationship Disclosure

TRANSPLANT BREAKOUT *Mangrove I-II*

(Presentations are limited to seven minutes, followed by eight minutes of discussion.)

Moderators: *Chadrick R. Denlinger and ***D****Jay D. Pal
Resident Moderator: Jesse Madden

8:00 am - 8:15 am (page 194)

61. Lung Transplant Outcomes in Patients With Re-Vascularized Coronary Artery Disease
Jinwen Sui, *Scott B. Johnson, *Daniel T. DeArmond, Nitin Das, *Ian A. Makey
University of Texas San Antonio, San Antonio, TX

8:15 am - 8:30 am (page 196)

62. Donation After Cardiac Death Donors: A Single Center Experience
Joseph Costa, Sowmya Sreekandh, Lori Shah, Hilary Robbins, Kashif Raza, Selim Arcasoy, ***D****Joshua R. Sonett, Frank D'Ovidio
Columbia University Medical Center, New York, NY

8:30 am - 8:45 am (page 198)

63. Minimally Invasive Left Ventricular Assist Device (LVAD) Implantation Reduces Blood Product Utilization After Heart Transplant
*Denis Gilmore[2], Shi Huang[1], Yulia Khalina[2], Monica Djunaidi[2], Mary Keebler[3], Mark Wigger[3], ***D****Simon Maltais[4], Ashish Shah[2], Matthew Danter[2]
[1]Vanderbilt Medical Center, Nashville, TN; [2]Vanderbilt Medical Center, Nashville, TN; [3]Vanderbilt Medical Center, Nashville, TN; [4]Mayo Clinic, Rochester, MN

8:45 am - 9:00 am (page 200)

64. Is There a Difference in Bleeding After Left Ventricular Assist Device Implant: Centrifugal Versus Axial?
Ann C. Gaffey[1], Carol W. Chen[1], Jennifer J. Chung[1], Jason Han[1], Joyce Wald[2], Michael A. Acker[1], Pavan Atluri[1]
[1]University of Pennsylvania, Philadelphia, PA, Uganda; [2]University of Pennsylvania, Philadelphia, PA, United States

9:00 am - 9:30 am
Break

HAROLD URSCHEL HISTORY LECTURESHIP

Harold Urschel History Lectureship *Royal Palm Ballroom IV-VIII*

CME Credits Available: 0.25
Moderator: *John W. Hammon

9:30 am - 9:50 am (page 202)
65. A Surprising Alliance: Two Giants of the 20th Century
*Robert M. Sade
Medical University of South Carolina, Charleston, SC

FOURTH SCIENTIFIC SESSION B

SATURDAY, NOVEMBER 12, 2016

9:50 am - 10: 50 am
Royal Palm Ballroom IV-VIII

CME Credits Available: 1.0
Moderators: *David R. Jones and *S. Adil Husain

9:50 am - 10:05 am (page 204)
66. Individual Assessment of Frailty Parameters in High- And Extreme-Risk Patients Who Underwent Transcatheter Aortic Valve Replacement
Jessica Forcillo[1], Jose F Condado Contreras[1], Yi-An Ko[2], Michael Yuan[2], Vasilis Babaliaros[1], ***D***Brad Leshnower[1], ***D***Chandan Devireddy[1], *Eric L. Sarin[1], James P Stewart[1], Hanna A Jensen[1], Peter C Block[1], *Robert Guyton[1], ***D***Vinod H. Thourani[1]
[1]Emory University, Atlanta, GA; [2]Rollins School of Public Health-Emory University, Atlanta, GA

10:05 am - 10:20 am (page 206)
67. Surgeon Leadership in the Operating Room: What Behaviors Best Support Surgical Teamwork?
Juliana Stone[3], Francesca Gino[2], Emma L. Aveling[3], Morgan Shields[3], Cameron Wright[1], *Thor Sundt[1], Sara Singer[3,1]
[1]Massachusetts General Hospital, Boston, MA; [2]Harvard Business School, Boston, MA; [3]Harvard TH Chan School of Public Health, Boston, MA

10:20 am - 10:35 am (page 208)
68. Laparoscopic Synthetic Patch and Hepatic Buttress Repair of an Intrapericardial Diaphragmatic Hernia After Convergent "Hybrid" Maze Procedure
Andrew J. Kaufman[1], Eugene Kahn[2], Jon Villena[2], Justin Steele[2], Raja Flores[1]
[1]Icahn School of Medicine at Mount Sinai, New York, NY; [2]Mount Sinai Beth Israel, New York, NY

10:35 am - 10:50 am (page 210)
69. Left Ventricular Outflow Tract Obstruction After Transcatheter Mitral Valve-in-Ring Implantation: A Word of Caution
*Sameh Said, Sorin Pislaru, Kunal Kotkar, ***D***Charanjit Rihal, William Mauermann, *Hartzell Schaff, *Joseph Dearani
Mayo Clinic, Rochester, MN

HOW TO DO IT *Royal Palm Ballroom IV-VIII*
SATURDAY, NOVEMBER 12, 2016
10:50 am - 11:50 am

CME Credits Available: 2.0
Educational Objectives: Upon completion of this program participants will be able to:
- Demonstrate insight into axillary artery cannulation, purpose and indications, and distinguish it from other cannulation sites.
- Describe the role of axillary artery cannulation when providing antegrade cerebral perfusion during surgery on the proximal aorta (ie, the ascending aorta and transverse aortic arch).
- Indicate the related risks of using axillary artery cannulation to provide antegrade cerebral perfusion.
- Discuss benefits of harvesting an IMA using skeletonized technique
- Discuss pitfalls to avoid with skeletonized technique
- Identify best patients in whom to utilized this approach

*STSA Member ***D*** Relationship Disclosure

FOURTH SCIENTIFIC SESSION B

10:50 am – 11:05 am
Hyperthermic Intrathoracic Chemotherapy for Pleural Malignancies
D*Daniel L. Miller
WellStar Health System, Marietta, GA

11:05 am – 11:20 am
Axillary Artery Cannulation: Workhorse and Gold Standard
D*Ourania Preventza
Texas Heart Institute/Baylor College of Medcine, Houston, TX

11:20 am - 11:35 am
3-D Printing
*Shanda Blackmon
Mayo Clinic, Rochester, MN

11:35 am – 11:50 am
How to Harvest a Skeletonized IMA
Dawn S. Hui
St. Louis University Hospital, St. Louis, MO

12:00 pm
PROGRAM ADJOURNS

*STSA Member ***D*** Relationship Disclosure

NOTES:

NOTES:

SCIENTIFIC PAPERS

1V. Robotic Repair of Mitral Commissural Endocarditis With a Bridging Patch Technique

*Unless otherwise noted in this program book or verbally by the speakers, speakers have no relevant financial relationship to disclose and will only be presenting information on devices, products, or drugs that are FDA approved for the purposes they are discussing. Authors listed with a **D** next to their name have indicated that they have a financial or other relationship with a healthcare-related business or other entity to disclose.*

Authors: Takashi Murashita, Kevin J. Tveter, ***D****J. S. Rankin, Lawrence M. Wei, *Vinay Badhwar

Author Institution(s): *West Virginia University Medical Center, Morgantown, WV*

Objectives: Mitral valve reconstruction is now the primary surgical approach in mitral endocarditis, with better early and late outcomes than prosthetic valve replacement. However, certain pathologies can be difficult, and reports of extension to a robotic platform have been limited. This video illustrates robotic repair of mitral commissural endocarditis, using a novel "bridging patch" technique.

Methods: A 20 year-old female college student presented with a febrile illness, heart failure, severe MR (with a posterior leaflet vegetation), and positive blood cultures for Streptococcus Viridans. After 4 days of intravenous penicillin, the patient underwent mitral valve repair, using a 4-port robotic system. The endocarditis had destroyed both anterior and posterior leaflet tissue at the posterior commissure, and was associated with a large vegetation. Involved leaflet tissue was resected, which left a large defect at the posterior commissure. The defect was closed with a patch of fresh autologous pericardium that bridged the gap in the commissure, and a # 28 mitral ring was inserted.

Results: After repair, the valve was completely competent with a mean valve gradient of 4 mmHg. The patient recovered uneventfully, and resumed college with no cardiac symptoms.

Conclusion: In a difficult endocarditis situation affecting both mitral leaflets at the posterior commissure, successful robotic repair was achieved using a bridging patch technique. Normal valve function was restored, suggesting this method could be useful in future cases of mitral commissural endocarditis.

NOTES:

2V. Extracardiac Valved Conduit for Calcific Mitral Stenosis

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Authors: Justin Van Meeteren, *Hartzell Schaff

Author Institution(s): *Mayo Clinic, Rochester, MN*

Objectives: Calcific mitral valve stenosis with severe mitral annular calcification may present a difficult challenge to the surgeon. Several techniques for mitral valve replacement have been described for these complicated cases including wide debridement of the calcium with reconstruction of the annulus; another reported method is anchoring the prosthetic valve to atrial tissue. We present our technique for bypass of the calcified mitral valve with an extracardiac valved conduit; the method is simple and appears to have low perioperative risk.

Methods: In the video we present a patient with severe aortic stenosis, severe mitral valve disease with both stenosis and regurgitation, and coronary artery disease. Extensive calcification of the mitral valve and annulus complicated the procedure due to calcium extending through the myocardium.

Results: The patient underwent aortic valve replacement, correction of mitral regurgitation, bypass of the mitral valve with an extracardiac conduit, and coronary artery bypass. The video demonstrates details of constructing the conduit for mitral valve bypass, and postoperative images are shown.

Conclusion: Bypass of the mitral valve with a valved conduit is another option for treatment of severe calcific mitral stenosis with annular calcification. The procedure avoids risks of paravalvular leakage and bleeding that may develop with extensive debridement of the mitral annulus.

NOTES:

3V. Management of the Small Aortic Root Using the 'Floating Valve Technique

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Authors: Jonathan M. Hemli, Yuriy Dudiy, Derek R. Brinster

Author Institution(s): *Lenox Hill Hospital, New York, NY*

Objectives: Dealing with the small aortic root is always a challenging clinical problem, particularly in the reoperative setting, in which scarring and fibrosis of surrounding tissues reduces the flexibility of the left ventricular outflow tract. In this situation, it may not always be possible to implant an adequately sized new valve prosthesis, thus resulting in a degree of patient-prosthesis mismatch, and leading to high trans-valvular gradients postoperatively. We demonstrate our preferred solution for addressing this difficult condition

Methods: Our technique for negotiating the small aortic root is demonstrated in a 31 year-old female patient who underwent aortic and mitral valve replacement in the not-too-distant past, and who now presented with unacceptably high gradients across her old 17 mm mechanical aortic valve.

Results: As illustrated in the video presentation, a 23 mm mechanical aortic valve was able to be secured within a 26 mm Valsalva graft. The valve was sited within the graft in an extra-anatomic position, "floating" within the sinus segment, rather than being positioned at the level of the annulus. This allowed us to implant a significantly larger valve than would otherwise have been possible. Postoperatively, the patient had a peak gradient of only 12 mmHg across the new aortic prosthesis.

Conclusion: Positioning the new aortic valve in a "floating" position within the sinus segment of the aortic graft allows a significantly larger prosthesis to be implanted than would otherwise be possible based on the diameter of the aortic annulus alone. We suggest that surgeons consider this technique when attempting to negotiate the small aortic root.

NOTES:

4V. Combined Pulmonary Artery Sleeve Resection / Left Upper Lobectomy and Extended Resection of the Thoracic Aorta After TEVAR for T4 Lung Cancer

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Authors: Raymond Lee, Gopal Singh, John Vandenberge, Jason Glotzbach, ***D***Issac George, ***D****Joshua R. Sonett

Author Institution(s): *NY Presbyterian Hospital / Columbia University, New York, NY*

Objectives: The therapeutic approach for advanced stage lung cancer is controversial, specifically in the surgical management of tumors invading the great vessels and mediastinum. We present a case in which we performed a left upper lobectomy and sleeve resection of the left pulmonary artery and extended resection of the thoracic aortic wall after the placement of an endoluminal prosthesis (TEVAR).

Methods: 77 year-old who had CT scan of the chest for routine surveillance due to 30 pack year smoking history. The CT scan revealed a spiculated mass in the medial left upper lobe (3.6 X 2.7), abutting the aortic arch. A PET CT showing the mass was FDG avid (SUV 14.2), clinical Stage, IIIA (T4NoMo). The mass was inseparable from the aortic arch, and Left Main pulmonary artery. Induction chemotherapy was initiated in anticipation of subsequent operative resection. To facilitate a safe resection of the aortic arch we performed preoperative thoracic endograft stenting (TEVAR) one week prior to the planned operative resection.

Results: She underwent mediastinoscopy and left thoracotomy with left upper lobectomy with pulmonary artery sleeve resection. The adventitia of the thoracic aorta was completely dissected free of the invasive tumor, followed by mediastinal and hilar lymphadenectomy. An intercostal muscle flap was positioned between the left pulmonary artery and bronchial staple line. Post-operative course was uneventful.

Conclusion: The use of induction therapy and extended resection of the pulmonary artery and aorta for advanced T4 tumors may be performed safely and may be aided with the use of prophylactic TEVAR. Tumors that invade the great vessels and mediastinum maybe approached after careful preoperative planning and extended resection should be considered for carefully selected patients.

NOTES:

5V. Tetralogy of Fallot with Ebstein's Anomaly Correction in a Neonate

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Authors: *Shu-Chien Huang, Ling-Yi Wei

Author Institution(s): *National Taiwan University Hospital, Taipei, Taiwan*

Objectives: We reported a 27 day-old male baby, who was 3.7 kg and was diagnosed of tetralogy of Fallot with Ebstein's anomaly. The initial presentations were respiratory distress and hypotension. Cyanosis was also noted after his PDA is closure. We present the surgical technique to repair the rare and severe anomaly.

Methods: Under standard cardiopulmonary bypass, we performed tricuspid valve reconstruction via both right ventricular outflow tract and right atrial approach. The tricuspid valve is downward displacement to the apex and right ventricular outflow tract. The anterior leaflet attached on the free wall of right ventricle and at the lower edge of the ventricular septal defect. The posterior leaflet is the only movable part. We detached and mobilized the tricuspid valve. Reattachment the valve to the normal position of tricuspid annulus was performed. VSD was repaired with Dacron patch after myomectomy, and right ventricular outflow tract was reconstructed with autologous pericardial patch. ASD was closed partially with a small fenestration.

Results: Post-operative echo showed mild tricuspid regurgitation without residual VSD nor RVOT stenosis. Post-operative course was smooth. After extubation on the post-operative day 14, the SpO2 was around 90% ~ 95% under room air without signs of heart failure.

Conclusion: We performed total correction of Tetralogy of Fallot with anomaly and pulmonary stenosis in a neonate. Post-OP course was quite good. Early repair for this rare and severe anomaly is feasible.

NOTES:

6V. Right Axillary Thoracotomy for Transatrial Repair of Congenital Heart Defects: VSD, Partial AV Canal with Mitral Cleft, PAPVR/Warden, Cor Triatriatum and ASD

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Authors: *Ali Dodge-Khatami, *Jorge D. Salazar

Author Institution(s): *Children's Heart Center, University of Mississippi Medical Center, Jackson, MS*

Objectives: When wanting to avoid a median sternotomy, the muscle-sparing right axillary thoracotomy has successfully been used for the transatrial repair of more simple congenital heart defects. With additional surgical experience using this approach, the spectrum of defects amenable to a quality repair has expanded.

Methods: Between 2008-2016, 48 patients (26 ASD, 10 ventricular septal defects [VSD] including 3 with double –chambered right ventricle [DCRV], 8 Warden operations for partial anomalous pulmonary venous return [PAPVR], 3 partial atrio-ventricular canals with mitral valve cleft, and 1 cor triatriatum) underwent surgical repair through the right chest, using either induced ventricular fibrillation or aortic cross-clamping with cardioplegic arrest. The attached surgical video shows closure of a ventricular septal defect in a 10 month-old infant girl.

Results: Age ranged between 4 months-18 years, and weight from 5.5-82 kg. There was no mortality, no residual defects or peri-operative complications.

Conclusion: The muscle-sparing right axillary approach is a safe and reproducible technique to repair congenital heart defects typically accessible through the right atrium. In our experience, compared to other thoracic incisions, the approach is far away from breast tissue which is easily spared with minimal potential for future asymmetrical breast growth, no muscles are sacrificed with rapid functional recovery of the right arm and shoulder, and the cosmetic results highly appreciated by parents and patients alike. With gained expertise and surgeon comfort, the same high standards as through a median sternotomy are maintained without compromising repair quality.

NOTES:

SURGICAL MOTION PICTURES

7V. Repair of Aortic Valve, Large Periaortic Abscess and LV-PA Fistula in a 5 Year-Old With Acute Bacterial Endocarditis

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Authors: Matthew Johnston, *Yoshio Ootaki, Michael Quartermain, Eduardo Goenaga-Diaz, Allison Welch, *Ross M. Ungerleider

Author Institution(s): *Wake Forest University, Winston Salem, NC*

Objectives: Patient is a 5 year-old who presents with acute right hemispheric stroke, aphasia, fevers and hemodynamic instability. Blood cultures are positive for Strept Viridans. Echocardiography confirms small aneurysm near right and left coronary cusps with shunt from left ventricular outflow tract (LVOT) to pulmonary artery (PA). Initial course on antibiotics with improved hemodynamics and clearing of blood cultures, though continued tachycardia and respiratory difficulty. Repeat echo demonstrates rapidly enlarging aneurysm and increased LVOT to PA shunt.

Methods: Operation performed on cardiopulmonary bypass (CPB) with moderate hypothermia and single dose cardioplegia. LV vent and bilateral branch PA occlusion at inception of CPB. Findings: 1) destruction of part of left coronary leaflet of aortic valve and disintegration of commissure between left and right coronary leaflets; 2) large hole in LVOT communicating to main PA via walled off aneurysm between aorta and PA. Movie shows findings and repair of aortic valve, unroofing of aneurysm and patch closure of holes in LVOT and main PA.

Results: Uneventful postoperative course with extubation on post-operative day (POD) 2, transfer to step down unit on POD 3 and transfer to outpatient rehab (for stroke recovery) on POD 9. Repeat echo with mild residual aortic insufficiency, no residual shunt and elimination of aneurysm, with good ventricular function. Patient recovering right side strength and some speech by time of discharge.

Conclusion: Rapid increase in size of periaortic aneurysm in face of clearing blood cultures is an indication for urgent surgery. Aortic valve repair is possible by preserving remaining valve tissue and conforming annulus to "fit." Movie also nicely demonstrates how a large disruption in LVOT can be "walled off" by inflammatory tissue. Aortic insufficiency with LVOT-PA communication requires immediate LV venting and branch PA occlusion at inception of CPB.

NOTES:

8V. Repair of Incarcerated Type IV Hiatal Hernia with Intrathoracic Stomach, Herniated Omentum, Small Bowel and Transverse Colon Can be Safely Achieved via Laparoscopic Approach

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Authors: Farzaneh Banki

Author Institution(s): *University of Texas Health Science Center Houston, Memorial Hermann Southeast Esophageal Disease Center, Houston, TX*

Objectives: To demonstrate the safety and feasibility of laparoscopic repair of an incarcerated type IV hiatal hernia.

Methods: The laparoscopic approach was selected to treat a patient with a large type IV hiatal hernia with intrathoracic stomach, herniated omentum, small bowel and transverse colon.

Results: Laparoscopic repair was performed without intraoperative complications. Two cm tension free intra-abdominal length was obtained with mediastinal dissection and without the need for Collis gastroplasty. Crural closure was reinforced using A-Cell mesh and a Toupet fundoplication was performed. The patient did well and was discharged on postoperative day 3, tolerating a full liquid diet. She was seen on POD 14 and was doing well.

Conclusion: Large type IV hiatal hernia with intrathoracic stomach, herniated omentum, small bowel and transverse colon can be repaired laparoscopically without perforation or leak. Adequate tension free intra-abdominal esophageal length can be achieved without the need to perform a Collis gastroplasty.

NOTES:

9V. Video-Assisted Thoracoscopic Resection of Right Upper Lobe Lung Cancer with Chest Wall Involvement

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Authors: Erin A. Gillaspie, *Shanda H. Blackmon

Author Institution(s): *Mayo Clinic, Rochester, MN*

Objectives: Lung cancers with chest wall invasion have classically been approached in an open fashion. We describe a minimally invasive approach to a right upper lobe lung cancer involving ribs 2-5.

Methods: Patient was a 53 year-old male smoker who presented with right posterior chest wall pain. Patient was discovered to have a 3.7 cm mass arising from the right upper lobe and extending into right posterior chest wall. Imaging revealed avidity in 2 level 10R lymph nodes, but no distant metastases. Biopsy confirmed a poorly differentiated squamous cell carcinoma. Neoadjuvant treatment was administered and restaging demonstrated a good tumor response.

Results: A thoracoscopic resection was performed through 3 ports: anterior 4th intercostal space (ICS) utility incision, and 8th ICS anterior and posterior ports. The hilum was dissected anteriorly and upper lobe vessels were transected. An energy device scored around the region of chest wall involvement to delineate the margins of resection. The ribs were divided anteriorly and posteriorly with a rongeur and an endoscopic Kerrison. The lobectomy was completed by dividing the bronchus and fissure to expose the posterior chest wall. The posterior dissection was completed, intercostal muscles were divided and specimen was separated from attachments to overlying serratus. The en bloc specimen was removed though the utility port. The defect was measured and a Gore-Tex patch secured into place with a trans-fascial tacking device. Recovery was uneventful and the patient was discharged on day 2.

Conclusion: Final pathology revealed <5% viable cells. Final stage was a ypT3N0M0 (IIB) squamous cell carcinoma, R0 resection. At follow-up the patient was doing well, had no chest wall pain and repeat imaging had no evidence of disease. Thoracoscopic resection of a lung cancer with chest wall involvement can be accomplished safely with accelerated recovery and significant reduction in the pain and morbidity.

NOTES:

FIRST SCIENTIFIC SESSION

1. Early Surgical Intervention in Patients with Mitral Valve Infective Endocarditis and Acute Stroke: Implications for Timing of Surgery

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Authors: Mehrdad Ghoreishi, Nate Foster, Sam Maghami, Chetan Pasrija, Brody wehman, Murtaza Dawood, Bartely P. Griffith, ***D****James S. Gammie

Author Institution(s): *University of Maryland School of Medicine, Baltimore, MD*

Discussant: *Vinay Badhwar, *West Virginia University Medical Center, Morgantown, WV*

Objectives: According to current guidelines, mitral valve (MV) surgery for infective endocarditis (IE) should be delayed for at least 4 weeks in cases of newly diagnosed stroke. We investigated the outcomes of early surgical intervention (within a week) for MV IE among patients with acute preoperative stroke compared to those without stroke.

Methods: From 2003 to 2015, 314 patients underwent surgery for MV IE. Patients with history of chronic stroke (n=50) were excluded. Patients were categorized into 2 groups: those with preoperative acute stroke: 27% (70/264), and those without preoperative stroke: 73% (194/264). Both preoperative and postoperative strokes were confirmed in all patients with brain computed tomography and/or magnetic resonance imaging and comprehensive examination by a neurologist. Operative mortality and rate of stroke after surgery were compared between the two groups.

Results: The mean age was 50±15 years and 64% (168/264) were male. Mean time from admission to operation was 4±4 days. 29% (76/264) of patients had more than one valve involved and 14% (38/264) had a history of MV surgery (Table). Findings on preoperative brain imaging among patients with preoperative stroke were acute infarct 63% (44/70), infarct with hemorrhage 13% (9/70), hemorrhage 11% (8/70), abscess 4% (3/70), and normal in 9% (6/70). Overall operative mortality was 6% (16/264). Perioperative mortality was 6% (4/70) among patients with preoperative stroke and 6% (12/194) with no stroke (P=0.88). New postoperative strokes occurred in 4% (10/264) and the rate was not significantly different between the 2 groups: 4% (3/70) among patients with preoperative acute stroke and 4% (7/194) among patients with no stroke (P=0.79).

Conclusions: MV surgery for patients with IE and acute stroke can be performed early with a low risk of postoperative neurologic complication. Surgical intervention for MV infective endocarditis complicated by acute embolic stroke should not be delayed.

Variable	Patients (N = 264)
EF (mean, %)	56 + 12
Renal failure - dialysis	19% (51 / 264)
Afib	16% (43 / 264)
IVDA	27% (71 / 264)
Endocarditis	100% (264)
MV	71% (188 / 264)
MV+AV	24% (64 / 264)
MV+TV	4% (10 / 264)
MV+AV+TV	1% (2 / 264)
Previous cardiac surgery	18% (47 / 264)
Previous Mitral valve surgery	14% (39 / 264)
Repair	5% (14 / 264)
Replacement	9% (25/264)
MV operation	100% (264)
Repair	53% (140 / 264)
Replacement	47% (124 / 264)
Mechanical	78% (96 / 124)
Bioprosthesis	22% (28 / 124)
Concomitant operations	56% (147 / 264)
CABG	11% (29 / 264)
AV operation	28% (74 / 264)
TV surgery	14% (36 / 264)
Root reconstruction	3% (8 / 264)
Microbiology	100% (264)
Staphylococcus aureus	37% (98 / 264)
Streptococci viridans	18% (48 / 264)
Culture Negative endocarditis	17% (46 / 264)
Other Streptococci groups	9% (24 / 264)
Entrococcus species	8% (20 / 264)
HACEK	5% (13 / 264)
Coagulase negative staphylococci	2% (5 / 264)
Staphylococcus epidermidis	2% (4 / 264)
Fungal	2% (6 / 264)

NOTES:

2. Outcomes of Adult Extracorporeal Membrane Oxygenation with Outside Facility Transfer: A Regional Referral Center Experience

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Authors: David Ranney, Nawar Al-Rawas, Desiree Bonadonna, Babatunde Yerokun, Michael Mulvihill, Michael Weykamp, Rathnayaka Mudiyanselage K. Gunasingha, Raquel Bartz, John Haney, ***D****Mani A. Daneshmand

Author Institution(s): *Duke University Medical Center, Durham, NC*

Discussant: ***D****Joseph B. Zwischenberger, *University of Kentucky, Lexington, KY*

Objectives: As the number of hospitals and adult patients utilizing extracorporeal membrane oxygenation (ECMO) increases, there is a proportional increase in referral to high volume centers for ongoing management. The outcomes of these patients are not well characterized and guidelines for referral patterns are lacking. This study describes the experience of a single high-volume adult ECMO center and the outcomes of its patients transferred prior to or after cannulation.

Methods: A single-center, retrospective study was performed that included adult patients (age ≥ 18) undergoing ECMO cannulation between June 2009 and December 2015. Patient characteristics and outcomes were acquired from the medical record. Multiple logistic regression was used to identify predictors of survival to hospital discharge; Kaplan-Meier methods were used to depict overall survival.

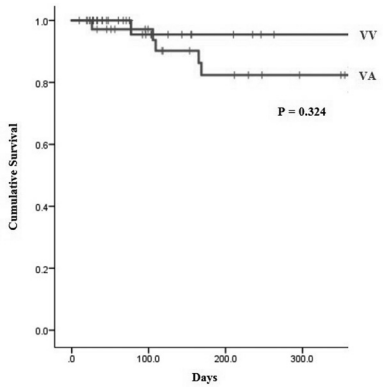
Results: Of 133 total patients, 77 (57.9%) underwent veno-arterial (VA) ECMO and 56 (42.1%) veno-venous (VV) ECMO (Table 1). Forty of the 133 (30.1%) were cannulated prior to transport. Patients resided from 53 outside facilities from 11 U.S. states. Median transport distance was 88.8 miles (range 0.2 – 1,434). Cardiogenic shock was the most common indication for ECMO (N=69, 51.9%), 34 (49.3%) of these requiring VA ECMO within 7 days of cardiac surgery. ECMO was indicated in 60 (45.1%) patients due to respiratory failure, 53 (88.3%) of these related to ARDS. Median duration of ECMO was 6 days (range 1–32.5). Age was found to be a negative predictor of survival to hospital discharge (OR 0.965, 95% CI 0.938 – 0.993; p =0.014). Of hospital survivors, overall one-year survival was 82.4% after VA ECMO and 95.5% after VV ECMO (Figure 1).

Conclusions: Outcomes are favorable following transport to a high volume ECMO center. Establishment of infrastructure for short and long distance ECMO transport is imperative for the efficient and successful ongoing management of these patients.

NOTES:

Patient and Transport Characteristics

	Total (N=133)
Age (years)	54.4 (19-83.5)
Male gender	83 (62.4%)
Race	
White	79 (59.4%)
Black	31 (23.3%)
Other	23 (17.3%)
BMI	29.1 (14.6-78.2)
Mode of ECMO	
VV	56 (42.1%)
VA	77 (57.9%)
Cardiogenic Shock	69 (51.9%)
Post-cardiotomy	34 (25.6%)
Cardiac arrest	28 (21.1%)
Acute MI	15 (11.3%)
Pre-ECMO MCS	47 (35.3%)
Respiratory Failure	60 (45.1%)
ARDS (influenza)	15 (11.3%)
ARDS (lung infection, non-influenza)	14 (10.5%)
ARDS (non-infectious)	24 (18.0%)
Mixed Shock	6 (4.5%)
Sepsis	2 (1.5%)
Distance from OSH, median (miles)	88.8 (0.2-1,434)
Cannulation at OSH	40 (30.1%)
Cannulation conversion after transport	14 (10.5%)
ECMO circuit malfunction	12 (9.0%)
Duration of ECMO, median (days)	6 (1-32.5)
Hospital LOS, median (days)	28 (1-702)
Survival to decannulation	94 (70.7%)
Survival to hospital discharge	76 (57.1%)



One-Year Survival of Survivors to Hospital Discharge

3. Aortic Root Replacement for Children With Loeys-Dietz Syndrome
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Authors: Nishant Patel, Todd C. Crawford, J. Trent Magruder, Diane Alejo, Harry C. Dietz, Narutoshi Hibino, *Duke E. Cameron, *Luca A. Vricella

Author Institution(s): *Johns Hopkins Medical Institutions, Baltimore, MD*

Discussant: *Jorge D. Salazar, *Boston Children's Hospital, Boston, MA*

Objectives: Loeys-Dietz syndrome (LDS) is an aggressive aortopathy with proclivity for aortic aneurysm rupture/dissection at smaller diameters than other connective tissue disorders. We reviewed our experience in children with LDS to validate our guidelines for root replacement (ARR).

Methods: We reviewed all children (<18 years) with a diagnosis of LDS who had ARR at our institution. Endpoints included mortality, complications and need for further interventions.

Results: Thirty-four children with LDS underwent ARR. Mean age was 10 years and 15 (44%) were female. Mean preoperative root diameter was 4 cm (z score 7.8). Three (9%) had composite ARR with a mechanical prosthesis and 31 (91%) had a valve-sparing ARR. Concomitant procedures included arch replacement in 2 (6%), aortic valve repair in 1 (3%), atrial septal defect closure in 7 (21%), and patent foramen ovale closure in 16 (47%) children. There was no operative mortality. Two (6%) children required late replacement of the ascending aorta, 5 (15%) required arch replacement, 1 (3%) required mitral valve replacement, and 2 (6%) developed coronary button aneurysms/pseudoaneurysms requiring repair. Two children developed progressive aortic insufficiency following a Florida Sleeve procedure requiring redo valve-sparing ARR, and 2 developed progressive aortic insufficiency requiring aortic valve replacement following a valve-sparing procedure. No children suffered thromboembolism or endocarditis. There were 2 (6%) late deaths.

Conclusions: These data confirm the aggressive aortopathy of LDS and the concern for aortic catastrophe, even in children with smaller root dimensions. Valve-sparing ARR should be performed when feasible to avoid the risks of prostheses. Serial imaging of the arterial tree is critical given the propensity for dissection/aneurysm and rate of re-intervention. Concomitant arch replacement should be considered in selected children, but more data are required to make definitive recommendations.

NOTES:

4. Neonatal Aortic Arch Reconstruction With Splanchnic and Cerebral Perfusion Avoids Deep Hypothermia and Supports Recovery of Extracardiac Organs

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Authors: *David Bichell, Clinton D. Morgan, Venessa L. Pinto, Ashly Westrick, Chevis N. Shannon, *Karla Christian, *Bret A. Mettler

Author Institution(s): *Vanderbilt University, Nashville, TN*

Discussant: *E. Dean McKenzie, Texas Children's Hospital, Houston, TX

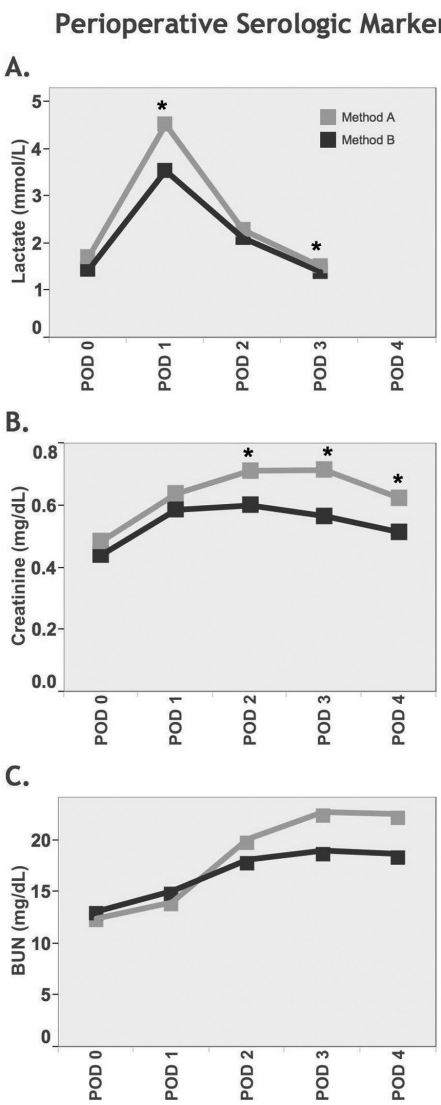
Objectives: Neonatal aortic arch reconstruction, typically performed with deep hypothermia (DH) and selective cerebral perfusion (SCP), leaves splanchnic organ protection dependent on deep hypothermia alone. A novel method of direct in-field descending aortic perfusion during neonatal arch reconstruction permits the avoidance of deep hypothermia. We hypothesize that direct splanchnic perfusion at mild hypothermia will contribute to improved postoperative extracardiac organ recovery.

Methods: Eighty-eight consecutive biventricular patients <90 days old, undergoing aortic arch reconstruction with cardiopulmonary bypass (CPB) were included. Patients were grouped according to perfusion method A (SCP with DH at18-20°C), or method B (cerebral and splanchnic perfusion at moderate hypothermia at 30-32°C). Patient characteristics, perioperative clinical and serologic data were analyzed. Univariate analyses were used to describe patient characteristics. Analysis of Variance (ANOVA) was applied to serologic data. Significance was assigned for $p < 0.05$.

Results: Of 85 hospital survivors (96.6% survival), 25 underwent method A and 60 underwent method B. The average age at surgery was 17.1 ± 20.9 days, and average weight 3.2 ± 0.6 Kg, with no significant variation between groups. Method B patients had shorter CPB time (130 ± 38.4 vs 163.0 ± 55.8, $p=0.01$), shorter descending aortic cross clamp times (22.9 ± 8.32 min vs 60.8 ± 27.48 min), less frequent delayed sternal closures (10% vs 48%, $p=0.0002$), significantly lower peak postoperative serum lactate ($p=0.02$), lower postoperative serum creatinine ($p=0.02$). There were no significant differences seen in ascending aortic cross-clamp time, ventilator time, or LOS.

Conclusions: A simplified method of direct splanchnic perfusion during neonatal aortic arch reconstruction avoids the use of deep hypothermia and provides renal protection at least as effective as deep hypothermia.

NOTES:



Perioperative markers of renal recovery after aortic arch reconstruction using Method A (gray line): deep hypothermia with selective cerebral perfusion, or Method B (black line): direct splanchnic and cerebral perfusion with mild hypothermia. A. perioperative serum lactate, B. perioperative serum creatinine, C. perioperative blood urea nitrogen. Points where graph divergence achieves significance is denoted by *.

5. The Changing Spectrum of Tracheostomy Related and Post Intubation Tracheal Stenosis: Implications for Surgical Treatment

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Authors: Samuel Kim, Charles Hsu, Alex G. Little

Author Institution(s): *University of Arizona, Tucson, AZ; University of Arizona, Tucson, AZ*

Discussant: ***D**** Daniel L. Miller, *WellStar Health System, Marietta, GA*

Objectives: Identify the changing characteristic patterns and location of stenosis after tracheostomy or intubation and to assess the risk factors associated with peri-operative complication and restenosis following primary resection and reconstruction.

Methods: Retrospective review was performed (1/2012-3/2015) on patients with symptomatic tracheal stenosis treated at University of Arizona Medical Center due to prolonged intubation and tracheostomy. Demographics, surgical approach and outcome were obtained. Analysis was performed using chi square test, Kaplan-Meier estimate of survival, Cox proportional hazards survival analysis, and univariate and multivariate logistic regression.

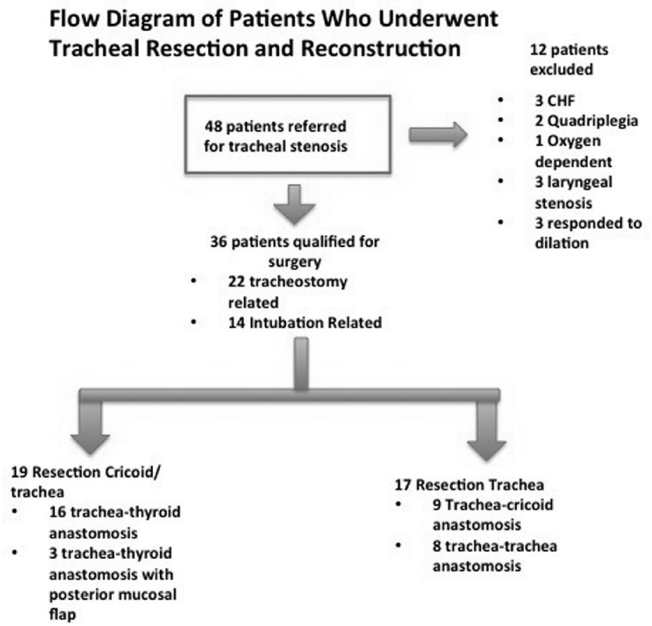
Results: 48 patients were referred for surgical resection and 36 patients underwent primary resection and reconstruction. 72% of patients had prior endobronchial treatments for stenosis such dilation. 14 patients had tracheal stenosis related to prior intubation and 22 had tracheostomy related stenosis (16 percutaneous, 6 open tracheostomy). 52.8% of all patients had a stenosis proximal to or involving the cricoid. 72.7% of those with tracheostomy related stenosis had the stenosis at or proximal to cricoid while only 21.4% of the patients with intubation related stenosis had a stenosis at similar location. 19 patients underwent laryngo-tracheal resection, and 17 patients had tracheal resection. Mean length of resection was 3.6 cm. Body mass index >35 was associated with increased peri-operative complications (p=0.012). In multivariate analysis, patients age <30 at surgery had an increased relative risk of recurrence.

Conclusions: Recent advancement of percutaneous tracheostomy has increased the numbers of patients presenting with more proximal tracheal stenosis, necessitating more complex subglottic resection and reconstruction. The anastomotic and overall complication rate remains low despite more complex operation.

NOTES:

Comparison Between Tracheostomy Related Stenosis vs. Intubation Related Stenosis

N (%)	Intubation Related Stenosis (N=14)	Tracheostomy Related Stenosis (N=22)	P Value
BMI	_	_	_
<35 kg/m2	13 (92.9)	17 (77.3)	0.221
<35 kg/m2	1 (7.1)	5 (22.7)	
Co-Morbidity	_	_	_
None	6 (42.9)	18 (81.8)	0.016
Any	8(57.1)	4(18.2)	0.236
DM	5(35.7)	4(18.2)	0.068
ESRD	2(14.3)	0 (0.0)	0.303
CRF	2(14.3)	1 (4.6)	0.003
COPD	5(35.7)	0 (0.0)	0.956
CAD	2(14.3)	3 (13.6)	
Location Stenosis	_	_	_
Cricoid/Proximal	3(21.4)	16(72.7)	0.003
1st-3rd tracheal ring	11(78.6	6(27.3)	
Type of Surgery	_	_	_
Laryngotracheal	5(35.7)	14 (63.6)	0.1
Tracheal resection	9 (64.3)	8(36.4)	
Length of Resection	_	_	_
Mean, (SD) cm	_	_	_
≤3.5cm	3.9 (0.8)	3.4 (0.8)	0.062
>3.5cm	6(42.9)	16 (72.7)	0.073
	8(57.1)	6(27.3	



6. Contemporary Practice Patterns and Outcomes of Surgery for Acute Type A Aortic Dissection: An Analysis of a Multi-Institutional Regional STS Database

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Authors: *Robert B. Hawkins[1], Emily A. Downs[1], *J H. Mehaffey[1], Lily Johnston[1], *Damien LaPar[1], Clifford Fonner[2], Leora Yarboro[1], ***D***Gorav Ailawadi[1], Ravi Ghanta[1]

Author Institution(s): *[1]University of Virginia, Charlottesville, VA; [2]Virginia Cardiac Surgery Quality Initiative, Falls Church, VA*

Discussant: ***D***Ourania Preventza, *Texas Heart Institute, Houston, TX; Baylor College of Medicine, Houston, TX*

Objectives: The surgical management of acute Type A aortic dissection is evolving and many aortic centers of excellence are reporting improved outcomes. We hypothesize that similar trends exist in a statewide consortium of hospitals, with more extensive aortic operations being performed and overall outcomes improving.

Methods: Records for 914 patients who underwent aortic operations (2003 to 2012) for acute Type A aortic dissection were extracted from a regional Society of Thoracic Surgeons (STS) database. Patients were stratified by tertiles based on operative year. Differences in operative characteristics and outcomes were analyzed by univariate analysis while risk factors for mortality were determined by logistic regression.

Results: Surgery for Type A aortic dissection is increasing in extent and complexity (Table 1). The frequency of aortic root repair has increased from 16% in the early era to 67% currently ($p<0.0001$). Similarly, aortic arch operations increased from 27% to 37% ($p<0.0001$). Consequently, bypass and cross-clamp times have increased (Table 1). Cerebral perfusion is utilized in 86% of circulatory arrest cases, most frequently antegrade (57%). While operative mortality remained unchanged (16-19%), composite major morbidity decreased from 69% to 54% ($p<0.0001$) with notable decreases in permanent stroke and renal failure (Table 1). Logistic regression modeling indicates predictors of operative mortality are age (OR=1.03; $p<0.0001$) and renal failure requiring dialysis (OR=2.89; $p<0.0001$). Importantly, extent of aortic operation did not increase risk of mortality.

Conclusions: Extent of aortic surgery and use of cerebral perfusion has increased for acute Type A aortic dissection surgery in contemporary "real-world" practice. Operative mortality remains significant, but improved compared to historical outcomes. Major morbidity has decreased, most notably permanent stroke and renal failure.

*STSA Member ***D*** Relationship Disclosure

		Surgical Era			
	Overall	Early (2003-2008)	Middle (2009 -2012)	Current (2013-2015)	
Operative characteristics	(n = 914)	(n = 309)	(n = 320)	(n = 285)	p value
CPB time (min; median, IQR)	178.5 (139-233)	171 (133-218)	176 (134-229)	186.5 (153-243)	0.001
Cross clamp time (min; median, IQR)	105 (76-150)	97 (73-134.5)	106 (76-158)	112 (80-158)	0.0138
Circulatory arrest	541 (79.9%)	57 (79.2%)	256 (80.0%)	228 (80.0%)	0.9862
Circulatory arrest with cerebral perfusion	242 (82.9%)	†	48 (73.9%)	194 (85.5%)	0.0284
Cerebral perfusion type					0.4972
Antegrade	133 (55.4%)	†	23 (47.9%)	110 (57.3%)	
Retrograde	91 (37.9%)	†	21 (43.8%)	70 (36.5%)	
Both antegrade and retrograde	16 (6.7%)	†	4 (8.3%)	12 (6.3%)	
Cerebral perfusion time (min; median, IQR)	28.5 (20-40)	†	24.5 (19-36)	29.5 (20-40)	0.0839
Lowest temperature (Celsius; median, IQR)	20.4 (18-25)	†	20 (18-26.3)	20.6 (18-24.7)	0.4307
Extent of Aortic Surgery					
Aortic root repair	365 (39.9%)	49 (15.9%)	126 (39.4%)	190 (66.7%)	<0.0001
Aortic arch repair	272 (29.8%)	83 (26.9%)	83 (25.9%)	106 (37.2%)	0.0041
Outcomes					
Operative Mortality	158 (17.3%)	59 (19.1%)	52 (16.3%)	47 (16.5%)	0.585
Major morbidity‡	561 (61.4%)	210 (68.0%)	193 (60.3%)	158 (55.4%)	0.0066
Permanent stroke	77 (8.6%)	34 (11.0%)	31 (6.7%)	12 (4.4%)	0.0128
Renal failure requiring dialysis	117 (14.5%)	42 (20.4%)	38 (11.9%)	37 (13.1%)	0.0185

CPB = cardiopulmonary bypass; IQR = interquartile range ǂNot captured in STS database during this era ǂ Major morbidity includes: permanent stroke, cardiac arrest, renal failure requiring dialysis, deep sternal wound infection, prolonged ventilation, reoperation for any reason

NOTES:

7. Determinants of Hospital Variation in Pneumonia Rates After Coronary Artery Bypass Grafting: An Analysis of 324,085 Consecutive CABG Patients

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Authors: *Alexander A. Brescia[1], ***D***J. S. Rankin[2], Derek Cyr[3], *Jeffrey P. Jacobs[4], *Richard L. Prager[1], Min Zhang[1], Roland Matsouaka[3], Steven D. Harrington[5], Rachel S. Dokholyan[3], *Steven Bolling[1], Astrid Fishstrom[1], David M. Shahian[6], Donald S. Likosky[1]

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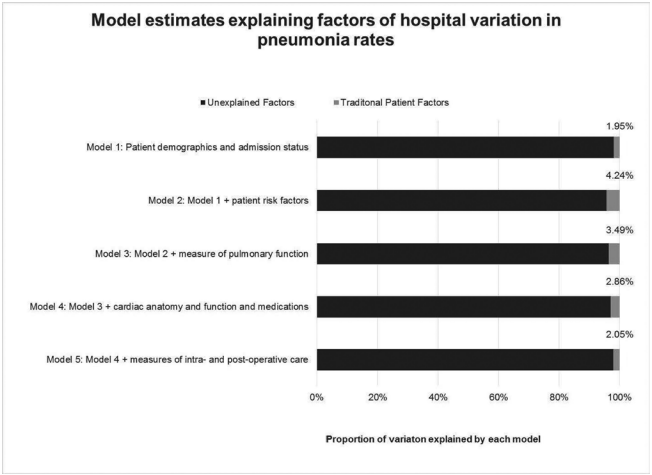
Discussant: ***D****Jay D. Pal, *University of Washington, Seattle, WA*

Objectives: Adults with congenital heart disease (ACHD) may present with end-stage heart failure necessitating orthotopic heart transplant (OHT). We sought to review the UNOS experience with this unique cohort with emphasis on surgical outcomes and survival.

Methods: From the UNOS registry, 737 ACHD recipients out of 26993 OHT patients (2.7%) who underwent OHT were queried to analyze early and late outcomes and compare to non-congenital recipients (NCR) over a fifteen-year period (2000-2014).

Results: More ACHD patients underwent OHT in the most recent era (3%; 2010-2014) as compared to the earlier period (2.5%; 2000-2004; p=0.03). ACHD recipients were more likely female (40% vs 24%; p<0.01), younger (mean age 35 vs 53 years; p<0.01), less likely with left ventricular assist device support (2% vs 14%; p<0.01) and spent more time on wait-list (mean 305 vs 216 days; p<0.01) when compared to NCR. When compared to the NCR in same time period, the ACHD cohort had longer post-operative length of stay (mean 28 vs 19 days; p<0.01), higher perioperative hemorrhage (3% vs 0.6%; p<0.01), higher operative mortality (11.5% vs 4.5%; p<0.001), higher incidence of liver failure (2.6% vs 0.8%; p<0.01) and higher need for dialysis (20% vs 9%; p<0.01). Re-transplantation rate was 2.3% during the follow up period (median 4 years) with overall estimated survival of 80%, 67% and 56% at 1,5 and 10 years respectively. Survival was significantly better in the most recent era (p <0.001).

Conclusions: Although the survival for OHT in ACHD has progressively improved over the past fifteen years, it is still associated with increased morbidity and operative mortality when compared to NCR.


Model estimates explaining factors of hospital variation in pneumonia rates
Unexplained Factors
Traditonal Patient Factors
Model 1: Patient demographics and admission status
1.95%
Model 2: Model 1 + patient risk factors
4.24%
Model 3: Model 2 + measure of pulmonary function
3.49%
Model 4: Model 3 + cardiac anatomy and function and medications
2.86%
Model 5: Model 4 + measures of intra- and post-operative care
2.05%
0%
20%
40%
60%
80%
100%
Proportion of variaton explained by each model

NOTES:

8. Improved Lymph Node Staging in Early Stage Non-Small Cell Lung Cancer in the National Cancer Database

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Discussant: ***D**** Robert J. Cerfolio, *University of Alabama At Birmingham, Birmingham, AL*

Objectives: Mediastinal lymph node assessment for non-small cell lung cancer (NSCLC) varies widely among centers. Our aim was to assess the quality of lymph node assessment in Stage I NSCLC, and determine what factors are associated with improved lymph node harvest.

Methods: We queried the NCDB to identify all patients with clinical Stage I NSCLC who underwent segmentectomy or lobectomy between 2004-2013. Patients were stratified into three groups based on the number of lymph nodes assessed (0-5, 6-15, >15).

Results: There were 51,545 patients who met inclusion criteria. From 2004 to 2013, mean lymph node counts increased from 8.1 to 10.0 (p<0.001). There was a significant decrease in the percent of patients with 0-5 nodes assessed (41.1% vs.31.1%, p<0.001) and a significant increase in those with >15 nodes assessed (10.1% vs. 17.0%, p<0.001). Compared to community centers, patients at academic centers were less likely to have 0-5 nodes assessed (27.2% vs. 43.5%,p<0.001). Independent predictors of >15 nodes assessed were increasing year, age >65, male sex, non African-American race, academic or high volume centers, lobectomy, and clinical T2 (all p<0.001).

Patients with >15 nodes assessed showed significantly more nodal upstaging than patients with 6-15 or 0-5 nodes (18.2% vs. 13.2% vs. 7.4%, respectively, p<0.001). Multivariable logistic regression analysis demonstrated significantly higher odds of nodal upstaging for each additional node assessed, up to fourteen nodes (all p<0.001). Assessing >14 nodes did not consistently increase the odds of upstaging. Having only 0-5 nodes assessed was associated with a worse overall survival.

Conclusions: The number of mediastinal lymph nodes assessed has increased significantly over the past decade but still varies widely by facility type. The optimum number of nodes to remove remains controversial, however, this data shows that there is a staging benefit up to 14 nodes assessed.

NOTES:

9. Causes and Patterns of Unplanned Readmissions After Anatomic Lung Resection: Comparison of Thoracoscopic vs. Open Approaches

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Authors: Rohun Bhagat[1,5], Austin N. Ward[2], Elizabeth Juarez-Colunga[3,4], Michael R. Bronsert[4], Natalia O. Glebova[1], William G. Henderson[3,4], David A. Fullerton[1], Michael J. Weyant[1], John D. Mitchell[1], Jeremiah Martin[2], Robert Meguid[1]

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Discussant: *Richard K. Freeman, *St Vincent's Health and Hospital System/ Indiana Heart Institute. Indianapolis, IN*

Objectives: Hospital readmissions are increasingly viewed as a marker of inferior healthcare quality and penalized with decreased reimbursement. The timing of, and the reasons for unplanned postoperative readmissions after anatomic lung resections (ALR) are not well understood. We examine unplanned readmission following thoracoscopic (VATS) vs. open ALR to identify opportunities to improve patient care.

Methods: We analyzed the ACS NSQIP dataset (2012-14) to characterize 30-day unplanned postoperative readmissions after VATS vs. open ALR identified by CPT codes. Reasons for and timing of readmission are presented.

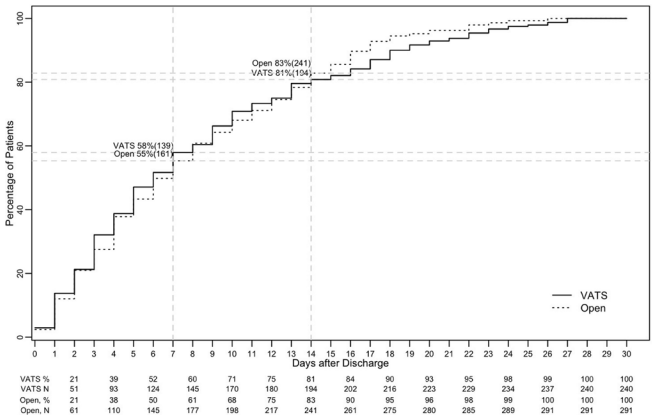
Results: Of 9075 patients who underwent ALR, 51% (4626) were VATS (86% lobectomies, 14% segmentectomies, <1% pneumonectomies), and 49% (4,449) were open (84% lobectomies, 8% segmentectomies, 8% pneumonectomies). Mean length of stay (LOS) after VATS was 4.9 days (standard deviation (SD) 4.3) vs. 6.9 days (SD 6.0) after open, p<0.001. 12% (538) of VATS experienced ≥1 complication, vs. 21% (954) of open, p<0.001. 7% (316) of VATS experienced unplanned readmissions, vs. 8% (367) of open, p=0.01. Causes of readmission are reported in the Table. 29% (154) of complications for VATS occurred after discharge, vs. 19% (183) for open, p=0.7. 57% (96/169) of infectious complications for VATS occurred after discharge, vs. 44% (88/200) for open, p=0.6. Timing of unplanned readmission was similar for VATS and open (Figure).

Conclusions: Open ALR had nearly twice the complication rate but only a slightly higher readmission rate than VATS. More complications in VATS patients occurred after discharge than in open patients. Most infections in VATS patients occurred after discharge. Increased post-discharge complications in VATS patients may be due to decreased LOS. The majority of readmissions after ALR occurred within 2 weeks. Follow-up within the first few days after discharge may help identify patients at risk of unplanned readmission and facilitate intervention.

Reasons for unplanned related postoperative readmissions.*

Reason for Unplanned Readmission	Total n (%)	VATS n (%)	Open n (%)
Cases	527	288 (55%)	239 (45)
Pulmonary	228 (55)	144 (50%)	144 (60%)
Infectious	90 (17%)	60 (21%)	30 (13%)
Cardiac/ Transfusion	40 (8%)	22 (8%)	18 (8%)
Venous Thromboembolic	24 (5%)	15 (5%)	9 (4%)
Other	25 (5%)	13 (5%)	12 (5%)
Gastrointestinal	20 (4%)	12 (4%)	8 (3%)
Pain	18 (3%)	10 (3%)	8 (3%)
Metabolic Derangement	11 (2%)	7 (2%)	4 (2%)
Renal	6 (1%)	3 (1%)	3 (1%)
Dehydration	5 (1%)	2 (1%)	3 (1%)

*Reasons for readmission of 28 of VATS and 128 of open anatomic lung resection patients not available.



Time from discharge to unplanned readmission following anatomic lung resections via VATS vs. open approach, in days. Log rank test p=0.39

NOTES:

10. Bilateral Internal Mammary Artery Use Can Be Safely Taught Without Increasing Morbidity or Mortality

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Authors: Chetan Pasrija, Mehrdad Ghoreishi, Aakash Shah, Michael Rouse, Zachary Kon, Bradley S. Taylor

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Discussant: *John S. Ikonomidis, *Medical University of South Carolina, Charleston, SC*

Objectives: Evidence shows a clear survival benefit with the use of bilateral internal mammary arteries (BIMA) compared to a single internal mammary artery (SIMA). BIMA is often not used or taught because of a perceived increase in operative time and complexity. We aimed to evaluate the effect of resident performance in BIMA cases on operative time, morbidity, and mortality.

Methods: From 10/2012 to 4/2015, all patients undergoing isolated coronary artery bypass grafting (CABG) were reviewed. Cases were stratified based on the use of SIMA vs. BIMA, and resident teaching vs. non-resident teaching case. Mammary artery harvest time was approximated by incision to heparin administration time. Primary outcomes were deep sternal wound infection (DSWI), renal failure (RF), stroke, readmission rates for pleural effusion, and mortality. Secondary outcomes included mammary harvest, cardiopulmonary bypass (CPB), and operative time.

Results: 416 cases were identified. BIMA compared to SIMA use in resident cases was associated with a longer operative and CPB time but didn't impact morbidity or mortality. BIMA use in non-resident cases had no significant difference in total operative or CPB time. In fact, within the non-resident group, a subset analysis of 2 or 3 vessel CABG actually showed a significantly shorter CPB time in the BIMA group (83±25vs69±14min, $p<0.01$). Outcomes, mammary harvest time, and operative time are detailed in Table 1. Overall, 30 day and 1-year mortality was similar in the two groups (SIMA: 1.53%, 1.89%, BIMA: 0%, 0%, p=NS). The rate of DSWI was minimal in both cohorts (0.9% vs. 0%, p=NS). Readmission for pleural effusions was significantly lower in the SIMA group compared to the BIMA group (0.6% vs 3.7%, $p=0.05$).

Conclusions: BIMA use can be effectively performed without an increase in operative or CPB time. In resident teaching cases, BIMA use may increase operative time, but can be safely taught without impacting morbidity or mortality.

	Non-Resident Teaching Case			Resident Teaching Case		
	SIMA	BIMA	p-value	SIMA	BIMA	p-value
N	192	40		143	41	
Average Vessels Grafted	3.2±0.8	3.3±0.9	p=NS	3.2±0.9	3.6±0.8	p=NS
Mammary Harvest Time (min)	23±9	46±20	p<0.001	33±14	65±17	p<0.001
CPB Time (min)	84±24	81±21	p=0.39	80±24	98±26	p<0.001
Operative Time (min)	209±43	214±39	p=0.45	209±46	263±47	p<0.001
Renal Failure (N)	11	2	p=NS	0	1	p=NS
Stroke or TIA (N)	0	1	p=NS	0	0	p=NS
DSWI (N)	3	0	p=NS	0	0	p=NS
Readmission w Pleural Effusion (N)	1	1	p=NS	1	0	p=NS
30 day Mortality	1.6%	0%	p=NS	1.5%	0%	p=NS
1-year Mortality	2.0%	0%	p=NS	1.5%	0%	p=NS

NOTES:

1B. Serum-Based Biomarker Panel May Predict Recurrence in Resected T1-2N0 Non-Small Cell Lung Cancer

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Author Institution(s): *Rush University Medical Center, Chicago, IL*

Discussant: Virginia R. Litle, *Boston Medical Center, Boston, MA*

Objectives: A significant proportion of patients who undergo anatomic resection for T1-2N0 non-small cell lung cancer (NSCLC) will die of disease recurrence within 5 years. The ability to risk-stratify patients for recurrence may help individualize treatment and surveillance regimens. We hypothesized that a serum-based biomarker panel would be capable of identifying T1-2N0 NSCLC patients at greatest risk for recurrence.

Methods: An institutional biorepository of over 1,500 cases was used to identify patients with resected T1-2N0 NSCLC. Clinical and radiographic data were collected from patient charts and imaging studies. Pre-treatment serum specimens were evaluated in a blinded manner for 42 biomarkers that sampled biological processes associated with metastatic progression, including angiogenesis, energy metabolism, apoptosis, and inflammation. Receiver-operating characteristics curves and log-rank tests were used to evaluate individual biomarkers with respect to recurrence, followed by a random forest analysis to generate and cross-validate a multi-analyte panel to risk-stratify patients for recurrence.

Results: 150 patients with resected T1-2N0 NSCLC were identified for analysis with a median follow-up of 50.6 months. This included 69 males and 81 females with a median age of 69.5 years and a median smoking history of 30 pack-years. There were 47 cases of recurrence with a median time to recurrence of 16.1 months. A 7-analyte panel consisting of HE4, IGFBP-1, -HCG, follistatin, prolactin, angiopoietin-2, and HGF optimally identified patients with disease recurrence with an accuracy of 71% (AUC=0.631), sensitivity 29.8%, specificity 89.3%, PPV 56%, and NPV 73.6%.

Conclusions: Serum-based biomarkers may be useful for identifying T1-2N0 NSCLC patients at greatest risk for recurrence after lung resection.

NOTES:

2B. Ex Vivo Lung Perfusion Rehabilitates Sepsis-Induced Lung Injury

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Author Institution(s): *UVA, Charlottesville, VA*

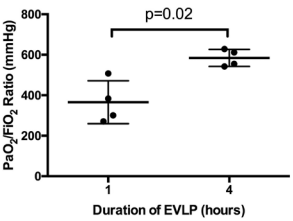
Discussant: ***D****Joshua R. Sonett, *Columbia University, New York, NY*

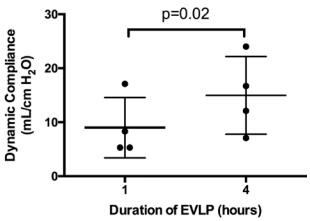
Objectives: Sepsis is the number one cause of lung injury in adults. Ex vivo lung perfusion (EVLP) is gaining clinical acceptance for donor lung evaluation and rehabilitation, and may expand the use of marginal organs for transplantation. We hypothesized that four hours of normothermic EVLP would improve compliance and oxygenation in a porcine model of sepsis-induced lung injury.

Methods: We utilized a porcine lung injury model using intravenous lipopolysaccharide (LPS) to induce a systemic inflammatory response. Two groups (n=4 animals/group) received a 2-hour infusion of LPS via the external jugular vein. Serial blood gases were performed every 30 min until the PaO2/FiO2 ratio dropped below 150 on two consecutive readings. Lungs were then randomized to treatment with 4 hours of normothermic EVLP with Steen solution or 4 additional hours of in vivo perfusion (control). Airway pressures and blood gases were recorded for calculation of dynamic lung compliance and PaO2/FiO2 ratios. EVLP was performed according to the NOVEL trial protocol with hourly recruitment maneuvers and oxygen challenge.

Results: All animals reached a PaO2/FiO2 ratio <150 mmHg within 3 hours after start of LPS infusion. Animals in the control group had continued decline of oxygenation and compliance during the 4-hour in vivo perfusion period with three of the four animals dying within 4 hours due to severe hypoxia. As shown in Figure 1, the EVLP group demonstrated significant improvements in oxygenation and dynamic compliance from hour 1 to hour 4.

Conclusions: EVLP can successfully rehabilitate LPS-induced lung injury in this preclinical porcine model. Thus EVLP may provide a reliable means to rehabilitate many types of acute lung injury through other mechanisms including targeted drug therapy.





NOTES:

3B. A Novel Murine Model of Marfan Syndrome Accelerates Aortopathy and Cardiomyopathy hort-term Unloading by Left Ventricular Assist Device After Acute Myocardial Infarction Attenuates Left Ventricular Remodeling and Dysfunction Through Inhibition of MMP-2-mediated Apoptosis

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Author Institution(s): [1]*University of Iowa Carver College of Medicine, Iowa City, IA;*

Discussant: *Luca A. Vricella, *Johns Hopkins University, Baltimore, MD*

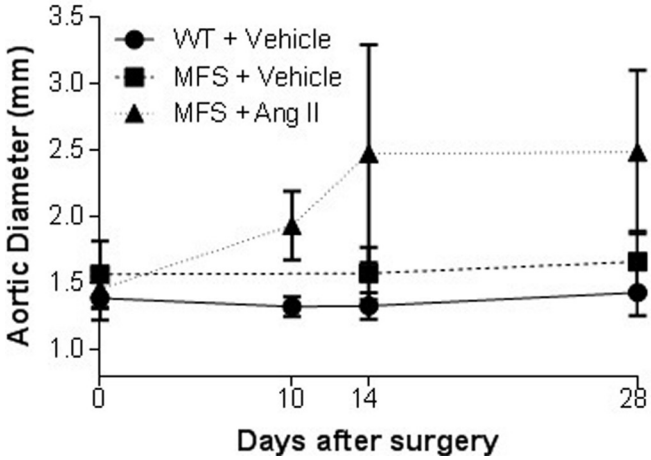
Objectives: Marfan syndrome (MFS) represents a genetic disorder with variable phenotypic expression. The main cardiovascular sequelae of MFS include aortic aneurysm/dissection and cardiomyopathy. While significant advances in the understanding of TGF- signaling have led to promising therapeutic targets for the treatment of the most devastating effects resulting from aortic pathology, clinical studies have tempered this optimism. In particular, these studies suggest the existence of additional signaling pathways that play a significant role in disease progression. To date, studies aimed at elucidating molecular mechanisms involved in MFS -induced disease progression have been hampered by the lack of an accelerated disease model.

Methods: C57BL/6J (Wild-type) and Fbn1C1039G/+(MFS) mice underwent subcutaneous, cervical osmotic mini-pump installation with either sodium chloride (in Wild-type mice, n=20; in MFS mice, n=7) or angiotensin, II (4.5 mg/kg/day) (in MFS mice; n=15) for up to 28 days. Interval measurements of mouse hemodynamics were obtained throughout the experiment. Aortas and hearts were analyzed by transthoracic echocardiography and histopathology.

Results: This accelerated murine MFS model replicates increased mortality from MFS-related maladies (63% mortality at 28 days versus 0% for non-accelerated MFS mice). Aortic diameters in accelerated MFS mice were significantly enlarged at 10 days after mini-pump implantation (Figure 1) and correlated with a higher degree of elastin fragmentation. Accelerated MFS mice also demonstrated dilated cardiomyopathy at 14 days (Table 1), even in the absence of aortic insufficiency, suggesting an intrinsic etiology.

Conclusions: A novel in vivo model consisting of subcutaneously delivered angiotensin, II in MFS mice reproducibly causes accelerated aortic aneurysm formation and cardiomyopathy within 14 days of implantation. This model allows for better investigation of the sequelae of MFS via rapid experimental processes.

	Wild Type + Vehicle	MFS + Vehicle	MFS + Angiotensin II
End Diastolic Volume (uL)	35.32 ± 2.28	34.05 ± 2.45	68.14 ± 13.12
Ejection Fraction (%)	80.16 ±1.74	85.55 ± 1.22	66.56 ± 6.06
Heart Mass (mg): Body Weight (g)	0.05066 ± 0.0015	0.05518 ± 0.0030	0.09419 ± 0.0111


WT + Vehicle
MFS + Vehicle
MFS + Ang II
Aortic Diameter (mm)
3.5
3.0
2.5
2.0
1.5
1.0
0
10
14
28
Days after surgery

NOTES:

4B. Erythropoietin Attenuation of Spinal Cord Ischemia Injury is cR-Receptor Dependent

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Authors: Lisa S. Foley, Joshua Mares, ***D***Joseph C. Cleveland, Michael J. Weyant, *David A. Fullerton, *T. B. Reece

Author Institution(s): *University of Colorado, Aurora, CO*

Discussant: ***D****Scott A. LeMaire, *Baylor College of Medicine, the Texas Heart Institute, and Baylor St. Luke's Medical Center, Houston, TX*

Objectives: Paraplegia from spinal cord ischemia reperfusion (IR) remains an elusive and devastating complication of complex aortic operations. Erythropoietin (EPO) attenuates this injury in models of spinal cord ischemia. Upregulation of the cR subunit of the EPO receptor is associated with neuron survival following ischemic injury. The purpose of this study was to examine whether EPO-mediated neuroprotection was dependent on cR expression. We hypothesized that isolated spinal cord neurons subjected to oxygen glucose deprivation (OGD) would mimic IR injury in aortic surgery and that EPO treatment attenuates this injury in a cR-dependent fashion.

Methods: Lentiviral vectors with cR knockdown sequences were created and tested on neuron cell lines and the virus with greatest cR knockdown was selected. Spinal cords from perinatal C57/BL6 mice were harvested and neurons cultured for 5 days. Neurons were treated with knockdown or nonsense virus and transfected cells selected with puromycin. Three groups (cR knockdown, lentiviral nonsense control, no virus control, n=8 of each) were subjected to one hour of OGD in a humidified hypoxic chamber. Viability was assessed with MTT assay. cR receptor expression was quantified by Western blot.

Results: EPO significantly preserved neuronal viability following OGD treatment (mean 0.82 ± 0.04 vs. 0.61 ± 0.01, $p<0.01$). Additionally, EPO-mediated neuronal preservation was similar in the nonsense virus and cells not treated with virus (mean 0.82 ± 0.04 vs. 0.80 ± 0.05, $p=0.77$). EPO attenuation of neuronal injury was lost in cR knockdown cells compared to nonsense controls (mean 0.46 ± 0.03 vs. 0.80 ± 0.05, $p<0.01$).

Conclusions: EPO attenuates neuronal loss following OGD in a cR-dependent fashion. This receptor holds immense clinical promise as a target for future pharmacotherapies treating spinal cord IR injury.

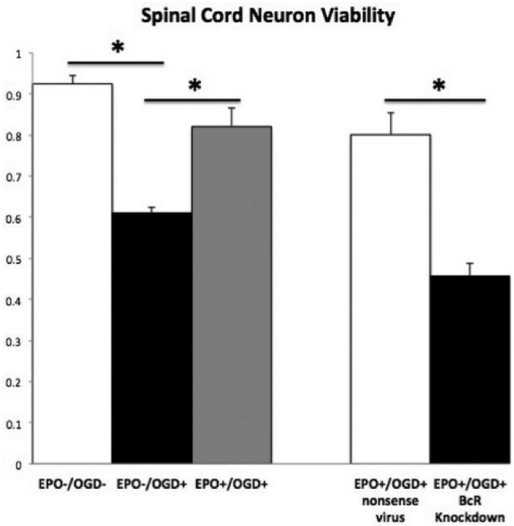

Figure 1: EPO preserved neuronal viability following OGD treatment (mean 0.82 ± 0.04 vs. 0.61 ± 0.01, p<0.01). This attenuation of injury was lost in βcR knockdown compared to nonsense controls (mean 0.46 ± 0.03 vs. 0.80 ± 0.05, p<0.01).

NOTES:

5B. Selective Localization of a Novel Dendrimer Nanoparticle in an Ischemia-reperfusion Model of Myocardial Infarction

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Authors: J. Trent Magrude1, Todd C. Crawford, Yi-An Lin2, Fan Zhang, Joshua C. Grimm, Rangaramanujam Kannan, Sujatha Kannan, *Christopher M. Sciortino

Author Institution(s): *Johns Hopkins University School of Medicine, Baltimore, MD*

Discussant: *John W. Hamman, *Wake Forest Baptist Medical Center, Winston-Salem, NC*

Objectives: Dendrimer nanoparticle therapies represent promising new approaches to drug delivery, particularly in diseases associated with inflammatory injury. However, their application has not been fully explored in models of acute myocardial infarction and reperfusion injury.

Methods: White male New Zealand rabbits underwent left thoracotomy with 30-minute temporary LAD occlusion and infarction confirmed by EKG and histology ("MI" rabbits, n=9), or left thoracotomy and pericardial opening for 30 minutes but no LAD occlusion (control or "C", n=9) rabbits. Following the 30-minute period, dendrimer ("G6-Cy5", 6.7 nm diameter) was administered and the chest closed in layers. Animals were sacrificed at 3h (n=3 MI, 3 C), 24h (3 MI, 3 C), or 48h post-surgery (3 MI, 3 C). Of note, one 3h MI rabbit expired from cardiogenic shock prior to 3 hours and was excluded from analysis.

Results: As compared to controls, MI rabbits had twofold G6-Cy5 uptake in the myocardial anterior wall as compared to the same region in non-infarcted control rabbits at 24 hours post-surgery ($p<0.05$; Table 1). This trend was also present at 3h and 48h (p<some nonsignificant value here), and was qualitatively evident on confocal microscopy (Figure 1). Renal, hepatic, and splenic G6Cy5 accumulation was noted in both groups. The observed G6-Cy5 half-life in serum was approximately 12 hours, with 22% of the injected G6-Cy5 dose remaining at 48 hours; no inter-group differences were seen.

Conclusions: This is the first known study to demonstrate selective localization of a dendrimer-drug delivery system in infarcted as compared to normal myocardium. Subsequent studies will assess the efficacy of a dendrimer-drug conjugate in ameliorating reperfusion injury following myocardial ischemia and infarction.

Table 1. G6-Cy5 dendrimer tissue concentrations.

Concentrations shown in ug per g tissue	24h sacrifice		48h sacrifice	
	MI	Control	MI	Control
Heart - normal	4.44	2.61	4.38	4.00
Heart - anterior wall	6.00*	2.85	6.38	3.95
Lung	2.27	2.35	2.05	2.72
Liver	2.55	1.61	2.20	3.89
Spleen	8.27	5.43	2.25	6.43
Kidney	16.07	11.45	12.54	10.34
Brain	0.73	0.65	0.48	0.65

Table 1 – G6-Cy5 dendrimer concentrations in ug/g tissue for MI and control rabbits at 24 and 48 hours-post surgery. * denotes significant difference from control rabbits ($p<0.05$).

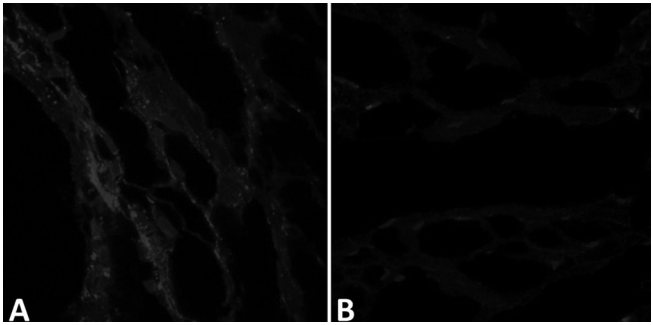

Figure 1 – Confocal microscopy showing G6-Cy5 dendrimer accumulation (red fluorescence) in ischemic anterior wall region (A) as compared to normal myocardium (B). Blue stain is DAPI (stains DNA).

NOTES:

6B. C-kit+ Cardiac Stem Cells Enhance Neonatal Right Ventricular Performance After Pulmonary Artery Banding

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Authors: Brody Wehman, Nicholas Pietris1, Osama T. Siddiqui1, Tieluo Li, Rachana Mishra1, Sudhish Sharma, *Sunjay Kaushal

Author Institution(s): *University of Maryland School of Medicine, Baltimore, MD*

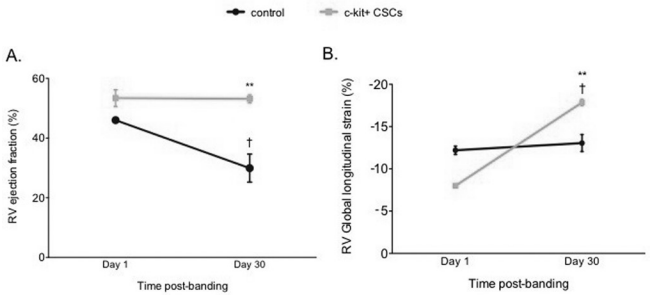
Discussant: John Mayer, *Boston Children's Hospital, Boston, MA*

Objectives: Right ventricular dysfunction is a major contributor to morbidity and mortality in patients with complex congenital heart disease (CHD), with limited treatment options. C-kit+ cardiac stem cells (CSCs) are shown to be safe and effective in large animal models and an early phase clinical trial for adult patients with ischemic heart disease, yet have not been evaluated in a preclinical model of RV dysfunction which is a salient feature of many forms of CHD.

Methods: Human c-kit+ CSCs were generated from right atrial appendage biopsies obtained during routine congenital cardiac surgeries. Immunosuppressed Yorkshire swine (6-9kg) underwent pulmonary artery banding to induce RV dysfunction. Thirty minutes after banding, pigs received intramyocardial injection into the RV free wall with c-kit+CSCs (1 million cells, n=5) or control (phosphate-buffered saline, n=5). RV function was monitored with serial transthoracic echocardiography and myocardial strain analysis. Pigs were euthanized at 30 days post-banding.

Results: Banding was calibrated to a consistent rise in RV: systemic pressure ratio across both groups (post-banding: CSCs=0.76±0.06, control=0.75±0.03). At 30 days post-banding the CSCs group demonstrated less RV dilatation and a significantly greater RV ejection fraction than the control group (p=0.002, Figure). Additionally, measures of RV myocardial strain including global longitudinal strain and strain rate were significantly greater in the CSCs group at four weeks relative to control (p=0.004 and p=0.01, respectively). The RV free wall in the CSCs group had a significantly greater percentage of viable myocardium as compared to the control group (97.9±0.81% vs. 91.2± 2.5%, p=0.02).

Conclusions: Intramyocardial injection of c-kit+ CSCs results in enhanced RV performance relative to control at 30 days post-banding in neonatal pigs. This model is important for further evaluation of c-kit+ CSCs, including long-term efficacy.



Echocardiographic findings following right ventricular (RV) injection of human c-kit+ cardiac stem cells (CSCs) or control (saline) in the setting of pulmonary artery banding (PAB). A) RV ejection fraction was preserved in the CSCs group at 30 days post-banding compared to immediately post-banding, and was significantly greater than the control group (**p<0.01), which experienced a significant decline in function over the study period (†p<0.01). B) RV global longitudinal strain improved significantly in the CSCs group from baseline post-banding values (†p<0.05) and was significantly greater at 30 days relative to control values (**p<0.01).

NOTES:

11. Variability in Integrated Cardiothoracic Surgery Training Program Curriculum

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Authors: Elizabeth H. Stephens[1], Dustin Walters[3], Asad Shah[2], Walter DeNino[4], Amanda Eilers[5], Vakhtang Tchantchaleishvili[6], Andrew Goldstone[7], Ryan Shelstad[8], Tarek Malas[9], Erin A. Gillaspie[10], Marisa Cevasco[11], Amy Fiedler[12], Scott Halbreiner[13], Kevin Koomalsingh[14], Damien LaPar[15]

Author Institution(s): *[1]Columbia, New York, NY; [2]Duke, Durham, NC; [3]University of Washington, Seattle, WA; [4]MUSC, Charleston, SD; [5]University of Texas San Antonio, San Antonio, TX; [6]University of Rochester, Rochester, NY; [7]University of Pennsylvania, Philadelphia, PA; [8]University of Colorado, Denver, CO; [9]Ottawa Heart Institute, Ottawa, Ontario, Canada; [10]Mayo Clinic, Rochester, MN; [11]Brigham and Women's Hospital , Boston, MA; [12]Massachusetts General Hospital, Boston, MA; [13]Cleveland Clinic, Cleveland, OH; [14]Cedars Sinai, Los Angeles, CA; [15]University of Virginia, Charlottesville, VA*

Discussant: ***D****Richard Lee, *Saint Louis University, St. Louis, MO*

Objectives: The development of curricula that appropriately progresses a resident from medical school graduate to fully-trained cardiothoracic surgeon is a key challenge for integrated cardiothoracic training programs. This study examined variability and perceived challenges in integrated curricula.

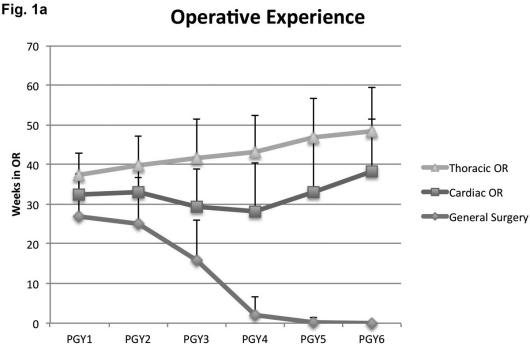
Methods: Responses to the 2016 TSDA/TSRA survey that accompanies the in-training exam (ITE) taken by current cardiothoracic surgery residents were analyzed. Descriptive statistics were utilized to examine trends in participant responses.

Results: General surgery experience decreased during training, while cardiac operative experience increased (Fig. 1a). Rotations in a wide variety of adjunct fields were common (Fig. 1b). The vast majority (87%) of residents had dedicated cardiothoracic intensive care unit (ICU) rotations, while surgical ICU and cardiac care unit rotations were less common (68% and 42%, respectively). An array of surgical sub-specialty rotations were reported, most commonly vascular (94%) and acute care surgery (88%, Fig. 1c), with a wide range of duration (i.e., 0-44 weeks for vascular). Importantly, 52% felt competition with general surgery residents for experience and 22.5% of general surgery rotations were at hospitals without general surgery residents. Perceived challenges included optimization of rotations (78%), faculty allowing residents to perform case components (60%), faculty teaching in the operating room (29%), and surgical experience on general surgery rotations (19%).

Conclusions: Significant variation exists in integrated curricula. Optimization of rotations, access to surgical experience and integration with general surgery training programs appear the most significant perceived challenges among trainees. These data suggest that optimization of early clinical and surgical experience within institutions should improve trainee preparedness for senior cardiothoracic surgery training.

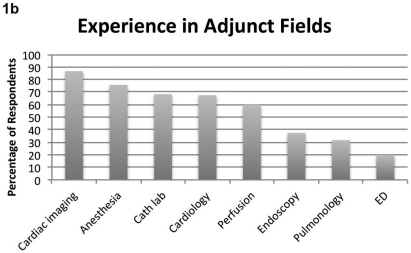
*STSA Member ***D*** Relationship Disclosure

Fig. 1a



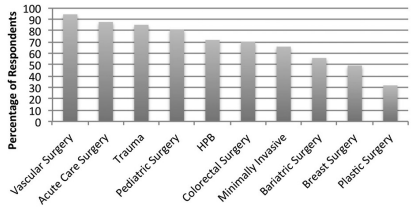
PGY=post-graduate year, OR=operating room, error bars indicate standard deviation.

Fig. 1b



Cath=catheterization, ED=emergency department.

Fig. 1c



HPB=hepatobiliary.

NOTES:

12. Concomitant Atrial Fibrillation Ablation Remains Underutilized Despite No Additive Risk

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Authors: Lily E. Johnston[1], Emily A. Downs[1], Damien LaPar[1], *Irving L. Kron[1], *Jeffrey B. Rich[2], ***D***Alan Speir[3], Mohammed Quader[4], ***D***Jonathan Philpott[2], ***D***Gorav Ailawadi[1]

Author Institution(s): *[1]University of Virginia, Charlottesville, VA; [2]Sentara Heart Hospital, Norfolk, VA; [3]INOVA Heart and Vascular Institute, Fairfax, VA; [4]Virginia Commonwealth University, Richmond, VA*

Discussant: *Theresa D. Luu, *Emory University, Atlanta, GA*

Objectives: Historically, only 40% of patients with atrial fibrillation (AF) undergo ablation at the time of concomitant cardiac surgery. The objective of this study was to examine if utilization of concomitant surgical ablation has increased, and to determine its additive risks and costs.

Methods: Patients with preoperative AF undergoing cardiac surgery from a multi-institution STS database (2008-2015) were stratified based on whether they received a concomitant AF procedure. Propensity matching (1:1) based on comorbidities, procedures, and institution was performed. Mortality and composite major morbidity were evaluated.

Results: Of 7,091 patients with a pre-existing AF, 3,101 (43.7%) underwent a concomitant AF ablation procedure. Over time, there was no change in utilization of AF ablation procedures (p=0.1). Patients receiving concomitant AF treatment were, in general, healthier, younger (68 vs 72 years, p<0.001), and had less comorbidities (p<0.001). Propensity matching yielded two well-balanced groups of 1,402 patients each (median STS PROM: 2.46% vs 2.60%, p=0.2). The risk of mortality (OR 0.56, 95% CI 0.41-0.80, p=0.001) and major morbidity (OR 0.72, 95% CI 0.61-0.85, p<0.001) were lower in the AF-treated group. Post-operative stroke and prolonged ventilation were also lower in the treated group, while pacemaker implantation, readmission, and post-operative length of stay were similar between groups (see table). Median total hospital costs were higher in patients receiving an AF corrective procedure, likely due to the costs of ablation devices.

Conclusions: Intraoperative treatment of AF remains under-utilized. AF ablation can be performed with negligible additional risk, albeit with increased costs. Recent randomized evidence demonstrating effectiveness of ablation in restoring sinus rhythm may increase its utilization in the future.

Postoperative Outcomes of Concomitant AF Procedures in Unmatched and Matched Cohorts

	All			Propensity-Matched		
Outcome, N (%)	Untreated (N=3,990)	AF Procedure (N=3,101)	p-value	Untreated (N=1,402)	AF Procedure (N=1,402)	p-value
30-day mortality	276 (6.9)	102 (3.3)	<0.001	101 (7.2)	60 (4.3)	0.001
Major Morbidity	1,203 (30)	615 (20)	<0.001	430 (31)	340 (24)	<0.001
Stroke	100 (2.5)	45 (1.5)	0.002	44 (3.1)	24 (1.7)	0.014
Prolonged Ventilation	931 (23)	433 (14)	0.001	325 (23)	248 (18)	<0.001
Need for Pacemaker	138 (3.5)	129 (4.2)	0.1	59 (4.2)	70 (5.0)	0.3
30-day Readmission	502 (14)	378 (13)	0.2	174 (14)	163 (12)	0.3
Length of Stay, median (IQR)	8 (5-13)	7 (5-10)	<0.001	8 (5-13)	8 (6-12)	0.2
Total Costs, median (IQR)	$46,753 ($32,202-$74,863)	$44,222 ($33,859-$61,659)	<0.001	$46,652 ($31,608-$77,829)	$50,550 ($38,236-$72,484)	<0.001

NOTES:

13. Impact of DiGeorge Syndrome on Early and Late Outcomes of Surgical Repair of Conotruncal Cardiac Anomalies

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Authors: *Bahaaldin Alsoufi, Courtney McCracken, *Kirk R. Kanter, Subhadra Shashidharan, *Brian Kogon

Author Institution(s): *Emory University School of Medicine, Atlanta, GA*

Discussant: *Andrew J. Lodge, *Duke University Medical Center, Durham, NC*

Objectives: We aim to describe the impact of 22q11.2 deletion (DiGeorge) syndrome on clinical characteristics, postoperative course, early and late outcomes of neonates undergoing surgery for conotruncal anomalies.

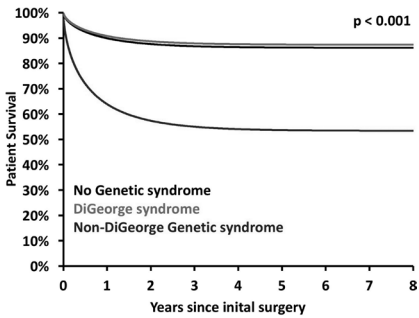
Methods: Retrospective review of 224 neonates who underwent surgery for interrupted aortic arch (n=67), truncus arteriosus (n=85) or ductal-dependent pulmonary atresia / ventricular septal defect (n=72) was performed (2002-12). Patients were divided into 3 groups: NG (n=119, no genetic syndromes), DG (n=64, DiGeorge), NDG (n=41, non-DiGeorge genetic syndromes). Outcomes between groups were compared.

Results: In comparison with NG group, DG group had longer durations of mechanical ventilation (148 vs. 102 h, p=0.006), ICU stay (268 vs. 159 h, p<0.001) and hospital stay (19.3 vs. 11.5 d, p<0.001). On adjusted analysis, there was a nonsignificant trend for increased unplanned reoperation (OR 2.8 (0.8-10.3), p=0.117) but no increased ECMO use (OR 1.5 (0.3-6.5), p=0.610), hospital mortality (OR 0.8 (0.1-4.2), p=0.743) or decreased late survival (HR 0.9 (0.4-2.1), p=0.822). In comparison to NG group, NDG group had longer durations of mechanical ventilation (190 vs. 102 h, p<0.001), ICU stay (236 vs. 159 h, p=0.007) and hospital stay (21.5 vs. 11.5 d, p<0.001); and increased unplanned reoperation (OR 3.7 (1.1-12.5), p=0.032), ECMO use (OR 4.4 (1.1-17.6), p=0.038), hospital mortality (OR 4.2 (1.2-14.5), p=0.021) and diminished late survival (HR 4.0 (2.1-8.1), p=<0.001).

Conclusions: DiGeorge syndrome in neonates with conotruncal anomalies is associated with prolonged recovery and increased resource utilization. However, despite a trend for increased unplanned reoperation, there is no significant impact on early or late survival. In comparison, other genetic syndromes are associated with increased unplanned reoperation, ECMO use, hospital mortality and diminished late survival. These findings are important for family counseling and risk stratification.

Comparison of patients' characteristics and postoperative details between NG, DG and NDG groups.

	Overall N = 224	No Genetic Syndrome N = 119	Non-DiGeorge Genetic Syndromes N=41	DiGeorge Syndrome N=69	p-value
Age (Days), Median (25th - 75th)	6 (4 - 11)	6 (4 - 9)	8 (5 - 19)	6 (4 - 10)	0.074
Male Gender, N (%)	130 (58%)	71 (60%)	24 (59%)	35 (55%)	0.807
Weight (kg), Median (25th - 75th)	2.9 (2.5 - 3.1)	2.9 (2.5 - 3.3)	2.7 (2.3 - 3.0)	3.1 (2.7 - 3.4)	0.099
Weight ≤ 2.5 kg, N (%)	57 (25.5%)	30 (25.2%)	14 (34.2%)	13 (20.3%)	0.283
Premature, N (%) [n = 217]	53 (24%)	27 (24%)	16 (41%)	10 (16%)	0.015
ECMO Requirement	15 (6.7%)	6 (5.0%)	5 (12.2%)	4 (6.3%)	0.283
Unplanned Reoperation	22 (9.8%)	8 (6.7%)	8 (19.5%)	6 (9.4%)	0.059
Hospital Mortality	17 (7.6%)	8 (6.7%)	7 (17.1%)	2 (3.1%)	0.027
Duration of Mechanical Ventilation, hours Median (25th - 75th)	117 (69 - 198)	97 (53 - 161)	167 (80 - 382)	126 (77 - 260)	0.004
ICU Length of Stay, hours Median (25th - 75th)	167 (116 - 311)	145 (97 - 216)	179 (104 - 509)	243 (141 - 440)	0.001
Post-operative Length of Stay, days Median (25th - 75th)	13 (9 - 23)	10 (8 - 16)	19 (9 - 46)	18 (12 -32)	<0.001



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14. Pulmonary Artery Aneurysms: Presentation and Operative Outcomes
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Authors: Janani Reisenauer, Sameh Said, *Hartzell Schaff, Heidi Connolly, Joseph Maleszewski, *Joseph Dearani

Author Institution(s): *Mayo clinic , Rochester, MN*

Discussant: *Brian Kogon, *Emory University School of Medicine, Atlanta, GA*

Objectives: Pulmonary artery (PA) aneurysms are rare. To better understand presentation and results of surgical treatment, we reviewed our experience with surgical management of PA aneurysms.

Methods: We reviewed all patients with pulmonary artery aneurysms undergoing cardiac surgery between 1995 and 2015.

Results: There were 38 patients (24 females, 63%) whose mean age was 46 ± 15 years. Symptoms included dyspnea in 18 (47%), fatigue in 2 (5%), palpitations in 2 (5%), and syncope in 2 (5%). Indication for surgery was the aneurysm in 14 patients (37%), pulmonary valve regurgitation in 17 (45%) and PV stenosis in 4 (11%). Aneurysms were located in the main pulmonary artery in 35 (92%) with branch involvement in 5. Mean aneurysm diameter was 5.8 ± 1.8 cm. Congenital heart disease was present in 36 patients (95%),namely pulmonary stenosis and/or regurgitation (23, 64%) and tetralogy of Fallot (8, 21%). A dysplastic pulmonary valve was identified in 25 patients (66%). The average right ventricular systolic pressure (RVSP) was 45.8 ± 21.2 mmHg, and 31 patients had aneurysms with high pulmonary artery pressure (RVSP>30 mmHg). Operative strategies included reduction arterioplasty in 30 patients and graft interposition in 8. Length of stay was 6.0 ± 2.2 days. Morbidity included atrial fibrillation/flutter in 7 patients, pericardial effusion in 1 patient and pulmonary embolism in 1 patient. Late mortality occurred in 3 patients, all non-cardiac. Late reoperations occurred in 8%, due to endocarditis of the prosthetic pulmonary valve in 1 patient, recurrent pulmonary regurgitation in 1 patient requiring percutaneous valve implantation, and severe mitral stenosis in another.

Conclusions: The majority of surgical PA aneurysms occur in the setting of congenital heart disease and high pulmonary artery pressure. Repair can be done with low morbidity and mortality and is advised for symptomatic patients and for select asymptomatic patients with high-pressure aneurysms.

12 cm high pressure main pulmonary artery aneurysm

NOTES:

15. Surgical Outcomes in Clinical Stage IIIA – N2 Positive, Older Lung Cancer Patients in The Society of Thoracic Surgeons Database

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Discussant: *David R. Jones, *Memorial Sloan-Kettering Cancer Center, New York, NY*

Objectives: The role of surgery in older patients with clinical stage, IIIA – N2 positive (c, IIIA-N2) lung cancer is controversial, in part because of variability in short and long-term outcomes. The objective of this study was to characterize the management of c, IIIA-N2 lung cancer in the Society of Thoracic Surgeons (STS) General Thoracic Surgery Database (GTSD).

Methods: The STS-GTSD was linked to Medicare data and queried for patients >65 years of age that underwent surgery for c, IIIA-N2 lung cancer between 2002 and 2012.

Results: 1,011 surgically-managed, olderc, IIIA-N2 patients were identified including 628 (62%) treated with initial surgery, 116 (11%), with induction chemotherapy, and 259 (26%) with induction chemoradiation (Table). In 2012 invasive mediastinal staging was performed in 74% (48/65) of induction patients, but only 34% (30/87) of initial surgery patients. Overall 42% of initial surgery c, IIIA-N2 patients were clinically over-staged in the mediastinum (final pStage I or, II). In the induction group 45% were ypStage I or, II, representing either response to induction therapy, or clinical over-staging. VATS was less common in the induction group (18% vs. 34% p <.001) and only 8% had a pneumonectomy. Overall 90-day mortality was similar for both initial surgery and induction therapy: wedge (6.5% vs. 9.1%), lobectomy (7.2% vs. 6.3%), pneumonectomy (15.9% vs. 8.8%). Kaplan Meier estimates of 5-year survival were similar between initial surgery (35%) and induction therapy (33%).

Conclusions: STS surgeons achieve excellent short and long-term results treating predominantly lobectomy-amenable c, IIIA-N2 lung cancer. However, prevalent over-staging and abstention from induction therapy suggest either "over-coding" of false positives on imaging, or variable compliance to current guidelines for c, IIIA-N2 lung cancer. Efforts are needed to improve clinical stage determination and guideline compliance in the GTSD for this cohort.

NOTES:

	Overall N = 1011	Initial Surgery N = 628	Induction Therapy N = 383	P value
Age (Median Years)	72	73	70	<.0001
Male (%)	54	56	51	.1586
White/Caucasian (%)	94	95	92	.1060
Year of Surgery (%) 2002-2004 2005-2008 2009-2012	 96 (10) 277 (27) 638 (63	 58 (9) 155 (25) 415 (66)	 38 (10) 122 (32) 223 (58)	
DLCO (median % predicted)	68	68	68	.8704
FEV1 (median % predicted)	81	79	83	.0242
Induction therapy (%) None Chemotherapy (< 6 months) Chemotherapy and radiation (<6 months) Radiation only			 0 116 (30) 259 (68) 8 (2)	
Pathologic Stage (7th edition AJCC) (%*) I II III IV Incomplete stage information	 286 (29) 147 (15) 533 (54) 24 (2) 21	 168 (27) 91 (14) 344 (56) 15 (2) 10	 118 (32) 56 (15) 189(51) 9 (2) 11	 .4427
EBUS or Mediastinoscopy done (%)** None EBUS only Mediastinoscopy/Chamberlain only Both EBUS and Mediastinoscopy	 74(49) 21(14) 49(32) 8(5)	 57(65) 10(12) 16(18) 4(5)	 17(26) 11(17) 33(51) 4(6)	 <.0001
Primary procedure (%) Wedge Resection Segmentectomy Lobectomy Sleeve lobectomy Bilobectomy Pneumonectomy Miscellaneous	 115 (11) 36 (4) 701 (69) 20 (2) 51 (5) 78 (8) 10 (1)	 93 (15) 28 (4) 415 (66) 13 (2) 28 (4) 44 (7) 7 (1	 22 (6) 8 (2) 286 (75) 7 (2) 23 (6) 34 (9) 3 (1)	 .0002
VATS Used for Primary Procedure (%)	281 (28)	213 (34)	68 (18)	<.0001
Operative mortality 30 day 90 day	 38 (3.8) 78 (7.7)	 23 (3.7) 49 (7.8)	 15 (3.9) 29 (7.6)	 .8369 .8939

* % of patients with complete staging information ** invasive mediastinal staging information only available for 2012 subgroup (N = 152)

Variable	Overall N = 1011	Initial Surgery N = 628	Induction Therapy N = 383	P value
Age (Median Years)	72	73	70	<.0001
Male (%)	54	56	51	.1586
White/Caucasian (%)	94	95	92	.1060
Year of Surgery (%)				
2002-2004	96 (10)	58 (9)	38 (10)	
2005-2008	277 (27)	155 (25)	122 (32)	
2009-2012	638 (63)	415 (66)	223 (58)	
DLCO (median % predicted)	68	68	68	.8704
FEV1 (median % predicted)	81	79	83	.0242
Induction therapy (%)				
None			0	
Chemotherapy (< 6 months)			116 (30)	
Chemotherapy and radiation (<6 months)			259 (68)	
Radiation only			8 (2)	
Pathologic Stage (7th edition AJCC) (%*)				.4427
I	286 (29)	168 (27)	118 (32)	
II	147 (15)	91 (15)	56 (15)	
III	533 (54)	344 (56)	189 (51)	
IV	24 (2)	15 (2)	9 (2)	
Incomplete stage information	21	10	11	
*% of patients with complete staging info				
EBUS or Mediastinoscopy done (%)**				<.0001
None	74(49)	57(65)	17 (26)	
EBUS only	21(14)	10(12)	11 (17)	
Mediastinoscopy/Chamberlain only	49(32)	16(18)	33 (51)	
Both EBUS and Mediastinoscopy	8(5)	4(5)	4(6)	
**only available in 2012 subgroup (n = 152)				
Primary procedure (%)				.0002
Wedge Resection	115 (11)	93 (15)	22 (6)	
Segmentectomy	36 (4)	28 (4)	8 (2)	
Lobectomy	701 (69)	415 (66)	286 (75)	
Sleeve lobectomy	20 (2)	13 (2)	7 (2)	
Bilobectomy	51 (5)	28 (4)	23 (6)	
Pneumonectomy	78 (8)	44 (7)	34 (9)	
Miscellaneous	10 (1)	7 (1)	3 (1)	
VATS Used for Primary Procedure (%)	281 (28)	213 (34)	68 (18)	<.0001
Operative mortality				
30 day	38 (3.8)	23 (3.7)	15 (3.9)	.8369
90 day	78 (7.7)	49 (7.8)	29 (7.6)	.8939

16. Pilot Study to Incorporate Patient Reported Outcomes Associated With Lung Cancer Surgery into the STS Database

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Discussant: *Elizabeth A. David, *David Grant Medical Center, Travis AFB, CA*

Objectives: Currently, cancer outcomes are routinely evaluated by morbidity and mortality. A critical gap in the STS Database is the absence of patient reported outcomes (PRO), which are important for comparison of treatments and guideline development. Our aim was to demonstrate the feasibility of integrating PRO into our institutional STS data for patients undergoing lung cancer surgery.

Methods: The NIH Patient Reported Outcome Measurement Information System (PROMIS) includes reliable, precise measures of PRO. We developed a survey for patients undergoing lung cancer resection from validated question banks within PROMIS. PRO data were prospectively collected electronically on tablet devices, stored in the PROMIS Assessment Center website, and merged with our institutional data. The survey was administered preoperatively, at the first post-operative visit, and at 6 months.

Results: 131 patients were enrolled over 16 months. 39 were excluded (31 non-lung cancer, 7 withdrew, 1 mortality). Of the 92 patients remaining, 47 had reached 6 month follow up. Procedures included 16 wedges, 10 segmentectomies, 62 lobectomies, and 4 pneumonectomies. Mean age was 65.9, 39% of patients were men, and 64% were white. At the time of the first postoperative visit, there was a significant increase over baseline in pain, fatigue, and sleep impairment, and a decrease in physical function (Table). By 6 months these improved towards baseline (Figure). Anxiety and depression, however, significantly improved after surgery and at 6 months.

Conclusions: It is feasible to collect PRO data from lung cancer surgery patients and integrate the results into a clinical database. This pilot serves as a model for widespread incorporation of PRO data into the STS Database. Future integration of such data would continue to position the STS National Database as the gold standard for clinical registries. This will be necessary for assessing overall patient recovery from different cancer therapies.

Patient reported outcomes - Preoperative baseline and Postoperative data

PROMIS Instrument	Baseline Measurement (N=92)	Initial Postoperative Follow-Up (N=92)		6 Month Follow-Up (N=47)	
	Mean ± SD*	Mean ± SD*	p value	Mean ± SD*	p value
Pain Intensity	40.5 ± 10.7	48.1 ± 8.1	<0.001	42.3 ± 9.8	0.03
Pain Interference	50.0 ± 10.8	58.5 ± 8.4	<0.001	51.2 ± 10.5	0.23
Physical Function	46.7 ± 9.3	38.9 ± 9.0	<0.001	42.8 ± 8.5	0.001
Anxiety/Fear	56.2 ± 9.1	51.6 ± 9.1	<0.001	48.0 ± 9.7	<0.001
Depression	49.3 ± 7.6	48.2 ± 7.5	0.13	46.6 ± 7.7	0.02
Fatigue	48.8 ± 10.2	52.4 ± 8.6	<0.001	49.8 ± 10.0	0.26
Sleep Related Impairment	48.1 ± 9.9	52.5 ± 8.9	<0.001	46.2 ± 9.4	0.12
Ability to Participate in Social Roles	54.8 ± 8.9	48.5 ± 8.9	<0.001	52.5 ± 9.7	0.05
Emotional Support	55.8 ± 7.2	56.2 ± 7.2	0.56	56.4 ± 7.2	0.76
Informational Support	57.4 ± 7.9	57.8 ± 7.4	0.53	58.0 ± 8.5	0.98

*For PROMIS instruments, the population mean for each outcome dimension has been normalized to be 50 on a 0-100 interval scale. When estimating the means and standard errors at each visit for each of the outcomes, a mixed-effects model was constructed to account for the within-subject covariance structure.

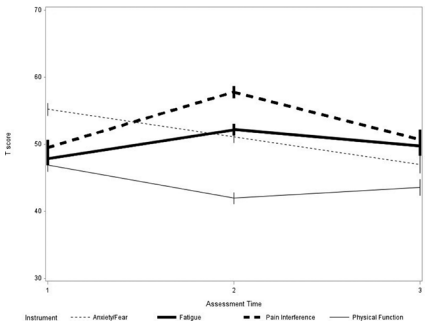

Figure: Patient reported outcomes at baseline (1), initial postoperative visit (2), and 6 months (3)

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17. Outcomes of Reoperative Mitral Valve Replacement in Patients With Prior Mitral Valve Repair and Replacement: A Benchmark for Future Valve-in-Valve Transcatheter Mitral Valve Replacement

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Discussant: Vinay Badhwar, *WVU Heart & Vascular Institute, West Virginia University, Morgantown, WV*

Objectives: With the emergence of transcatheter valve-in-valve/ring replacement for failed MV bioprostheses, comparative clinical benchmarks for surgical repeat MVR (re-MVR) are needed. However, there is a paucity of outcome data on patients undergoing re-MVR after previous repair (pMVP) or replacement (pMVR) procedures. We present in-hospital and survival outcomes of a twenty-year experience with re-MVR.

Methods: From 01/1992-06/2015, 520 adult patients underwent re-MVR; 273 had pMVP and 247 pMVR. Primary outcomes were operative mortality and long-term survival. Total follow-up time was 3777 patient-years.

Results: The mean age was 64±12yrs for pMVP and 63±15yrs for pMVR patients (p=0.281). The rate of endocarditis was higher for pMVR than for pMVP patients (27.1% vs 8.8%, p<0.001). PMVP were more likely to have concomitant CABG and valvular procedures (50.2% vs 46.2%, p<0.014), with longer median perfusion (180 vs 160mins, p<0.001) and cross-clamp times (118 v 100mins, p<0.005). Overall operative mortality was 37/520, 7%; 14/273, 5% for pMVP vs 23/247, 9% for pMVR (p=0.087). The groups had comparable rates of postoperative stroke (pMVP = 5.1% vs pMVR = 5.3%, p=1.0) and new pacemaker implantation (8.1% vs 8.5% respectively, p=0.88). PMVP patients had shorter hospitalizations (median 9d vs 11d, p≤0.001). Median unadjusted survival was 13.7yrs for pMVP and 8.3yrs for pMVR (p=0.001). A Cox proportional hazard analysis (Figure 1) showed that, pMVR (HR 1.395 95% CI = 1.073 – 1.813), renal failure (HR 1.531, 95% CI = 1.101 – 2.127() and endocarditis (HR 2.605, 95% CI=1.869 – 3.630) were associated with shortened survival after re-MVR.

Conclusions: Reoperative MVR is a high risk operation with pMVP patients having better long-term survival compared to pMVR. Our identified factors should be taken into taken into account for patients requiring re-MVR with a consideration for transcatheter valve-in-valve.

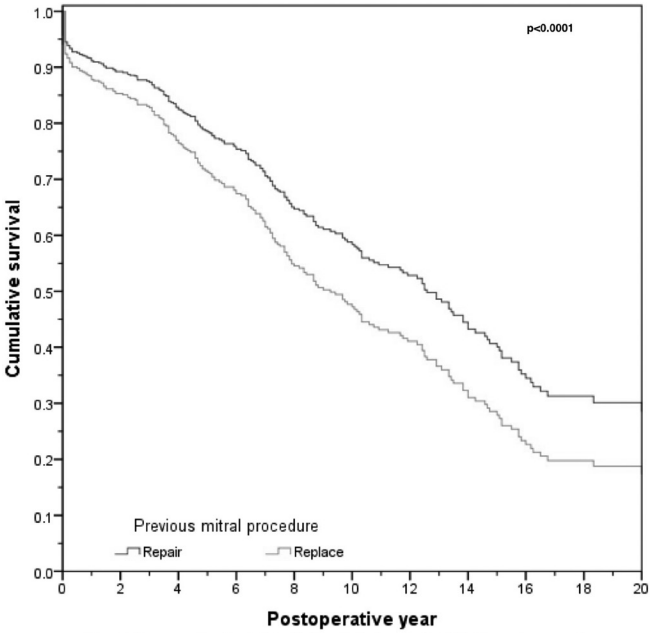

Figure 1: Cox proportional hazard model of longitudinal survival, stratified by previous procedure. Overall model performance -2 Log likelihood = 2653.049, Chisq = 100.991, df = 4, p<0.0001

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18. Contemporary Outcomes for Low-risk Surgical Aortic Valve Replacement: A Benchmark for Evaluating Transcatheter Aortic Valve Technology

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Discussant: *Chad N. Stasik, *University of Texas Health Science Center at San Antonio, San Antonio, TX*

Objectives: Two large, randomized trials are underway evaluating transcatheter aortic valve replacement (TAVR) against conventional surgical aortic valve replacement (AVR). We analyzed contemporary, real-world outcomes of surgical aortic valve replacement in low-risk patients to provide a practical benchmark of outcomes and cost for evaluating current and future TAVR technology.

Methods: From 2010 to 2015, 2,505 isolated AVR operations were performed for isolated severe aortic stenosis (AS) at 18 statewide cardiac institutions. Of these, 1,434 patients had a STS predicted risk of mortality (PROM) less than 4%, and met other clinical and hemodynamic criteria as outlined in the PARTNER 3 protocol, including 963 patients who were ≥65 years of age. Patients with endocarditis, end stage renal disease, EF<45%, and previous valve replacements were excluded. Outcomes of interest included operative mortality and perioperative adverse events.

Results: The STS PROM for the patients over age 65 was 1.63%, with a median age of 74 (IQR 69-79). The prevalence of preoperative risk factors and incidence of complications is shown in Table I. Operative mortality was 1.0%, permanent stroke was 1.3%, and pacemaker requirement was 4.6%. The most common adverse events were transfusion of 2 or more units of red blood cells (20%) and atrial fibrillation (32%). The median length of stay was 6 days (IQR 5-8). Median total hospital cost was $38,018 (IQR $30,632-$46,235). Examination of complications by age<65 vs. ≥65 demonstrated significantly lower need for transfusion (10.4%, p<0.001), atrial fibrillation (18.3%, p<0.001), and reoperation (2.5% vs 5.5%, p=0.012).

Conclusions: In the current era, low risk patients undergoing surgical AVR have excellent results. The most common complications were atrial fibrillation and bleeding. These real-world results should provide additional context for upcoming transcatheter clinical trial data.

Table 1

Variable	N=963
Preoperative Factors	
Patient Age, median (IQR)	74 (69, 79)
STS PROM, median (IQR)	.0163 (.0113, .0231)
Postoperative Outcomes	
Operative Mortality	10 (1.0%)
2+ PRBC Units	193 (20.0%)
Any Reoperation	53 (5.5%)
Atrial fibrillation	304 (31.6%)
Pacemaker	44 (4.6%)
All Renal adverse events	15 (1.6%)
Permanent stroke	13 (1.3%)
Major morbidity (Composite)	124 (12.9%)
Total cost ($), median (IQR)	38017.51 (30631.94, 46234.76)
Length of stay, median (IQR)	6 (5, 8)

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19. Risk Factors for Late Aortic Valve Dysfunction Following the David V Valve Sparing Root Replacement

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Discussant: *John S. Ikonomidis, *Medical University of South Carolina, Charleston, SC*

Objectives: Valve sparing root replacement (VSRR) is an established therapy for aortic root pathology. However, late aortic valve dysfunction requiring reoperation remains a primary concern of this procedure. This study examines risk factors for aortic insufficiency (AI) and aortic stenosis (AS) following the David V VSRR.

Methods: A retrospective review from 2005-2015 identified 282 patients who underwent VSRR. Cox proportional hazards model was used to determine risk factors of late AI and AS.

Results: The mean age of the series was 46.4 yrs. Sixty-four patients (22.7%) had bicuspid valves and 41 patients (14.5%) had Marfan syndrome. The incidence of reoperations was 9.6% (27 pts) and 42 cases (14.9%) were performed in the setting of acute type A dissection. Concomitant procedures were CABG in 31 patients (11.0%), and arch replacement in 154 patients (54.6%). Operative mortality was 2.8% (8 pts). 7-year survival and freedom from reoperation were 90.9% and 96.7%, respectively, 7-year freedom from >2+ AI and >1+ AI was 97.1% and 84.6%, respectively. 7-year freedom from greater than moderate AS and greater than mild AS was 98.8% and 79.8%, respectively. Univariate analysis showed early VSRR experience (2005-2006) & aortic root size >55 mm were associated with late AI while bicuspid valves, cusp repair & preoperative mild AS were associated with late AS. Multivariable analysis showed aortic root size >55 mm (HR 2.90; 95% CI 1.03, 8.20; p=0.04) to be an independent predictor of late AI while bicuspid valves (HR 22.2; 95% CI 2.48, 198.46; p=0.006) were an independent predictor of late AS.

Conclusions: VSRR can be performed with low operative risk and good overall long-term patient survival even in complex clinical settings. Durable valve function can be expected, however, aortic root size >55 cm and bicuspid valve anatomy represent independent risk factors for late aortic valve dysfunction following these procedures.

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20. Whole Body Perfusion Strategy for Aortic Arch Repair Under Moderate Hypothermia: Simultaneous Antegrade Cerebral Perfusion and Lower Body Perfusion

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Discussant: ***D****Joseph S. Coselli, *Texas Heart Institute, Houston, TX; Baylor College of Medicine, Houston, TX*

Objectives: Aortic arch reconstruction under moderate hypothermia is commonly performed with antegrade cerebral perfusion (ACP) for brain protection; however, hypothermia alone is often solely relied upon for visceral and lower body protection. We investigate whether adding simultaneous lower body perfusion to ACP (whole body perfusion - WBP) may ameliorate the metabolic derangements of moderate hypothermic circulatory arrest (MHCA).

Methods: Between 2008 and 2014, 106 consecutive patients underwent elective or emergent aortic arch surgery with MHCA and either ACP only (44 patients, 66±12 years, 30% (13) female) or WBP (62 patients, 61±15 years, 31% (19) female).

Results: Patient demographics are described in Table 1. Cardiopulmonary bypass (CPB) time, cross-clamp time, and ACP time were significantly longer in the WBP group (all p <0.0001). More patients in the WBP group underwent total arch replacement (p = 0.007). There were no significant differences between groups in 30-day mortality (ACP: 3 (6.8%), WBP: 2 (3.2%); p=0.65), stroke (ACP: 1 (2.3%), WBP: 1 (1.6%); p = 1.0), or renal failure (ACP: 2 (4.5%), WBP: 1 (1.5%); p=0.57). In the WBP group, there was a significant reduction in lactate at ICU admission (ACP 5.5 vs. WBP 3.5 mmol/L; p=0.002), time to lactate normalization (p=0.014), and median ICU length-of-stay (ACP 3 vs. WBP 1 days; p=0.049; Figure 1). There was no difference in postoperative creatinine (ACP: 104, WBP: 107 µmol/L; p=0.66). After multivariable regression adjustment, perfusion strategy still trended towards an independent predictor of ICU discharge time (p=0.09), however CPB time (p=0.02), age (p=0.012), and emergent surgery (p=0.02) were.

Conclusions: A WBP strategy during aortic arch reconstruction with MHCA may be associated with more rapid normalization of metabolic parameters and reduced ICU length of stay compared to using ACP alone. Further evaluation with a randomized trial is warranted.

NOTES:

Table 1: Patient demographics

Characteristics	Total (n=106) No (%) or mean (SD)	ACP only (n=44) No (%) or mean (SD)	WBP (n =62) No (%) or mean (SD)	p-value
Age (years)	63 (13)	66 (12)	61 (15)	0.039
Female	32 (30%)	13 (30%)	19 (31%)	1.0
NYHA III/IV	27 (25%)	15 (34%)	12 (19%)	0.11
LV Grade III/IV	11 (10%)	8 (18%)	3 (4.8%)	0.048
BMI	28 (5)	28 (4.4)	29 (5.3)	0.35
Max. aortic diameter (mm)	55 (8)	56 (10)	55 (7)	0.40
Tricuspid Aortic Valve	57 (54%)	29 (66%)	28 (45%)	
Bicuspid Aortic Valve	42 (40%)	13 (30%)	29 (47%)	0.115
Unicuspid Aortic Valve	7 (7%)	2 (5%)	5 (8%)	
Comorbidities				
Stroke	9 (8%)	4 (9%)	5 (8%)	1.0
TIA	11 (10%)	4 (9%)	7 (11%)	
Connective Tissue Disorder	8 (8%)	2 (4.5%)	6 (10%)	0.68
Coronary Artery Disease	23 (22%)	10 (23%)	13 (21%)	1.0
COPD	21 (20%)	11 (25%)	10 (16%)	0.33
Type II Diabetes Mellitus	10 (9%)	3 (7%)	7 (11%)	0.52
Dyslipidemia	43 (41%)	14 (32%)	29 (47%)	0.16
History of Tobacco Use	51 (48%)	23 (52%)	28 (45%)	0.56
Hypertension	74 (70%)	33 (75%)	41 (66%)	0.39
Atrial Fibrillation	18 (17%)	7 (16%)	11 (18%)	1.0
Peripheral Vascular Disease	15 (14%)	9 (20%)	6 (10%)	0.16
Redo Sternotomy	12 (11%)	2 (5%)	10 (16%)	0.12
Renal Failure	5 (5%)	2 (5%)	3 (5%)	1.0
Congestive Heart Failure	7 (7%)	3 (7%)	4 (6%)	1.0
Indication for Surgery				
Aneurysm	77 (73%)	27 (62%)	50 (81%)	0.004
Acute Aortic Dissection	17 (16%)	10 (23%)	10 (11%)	0.364
Chronic Aortic Dissection	4 (4%)	1 (2%)	3 (5%)	
Rupture*	8 (7%)	6 (13%)	2 (3%)	0.064

NHYA, New York Heart Association; TIA, transient ischemic attack; COPD, chronic obstructive pulmonary disease *Refers to rupture of ascending aortic aneurysm or acute type A aortic dissection, evidenced by extravasation of contrast from the aortic lumen or the presence of a pseudoaneurysm on CT scan.

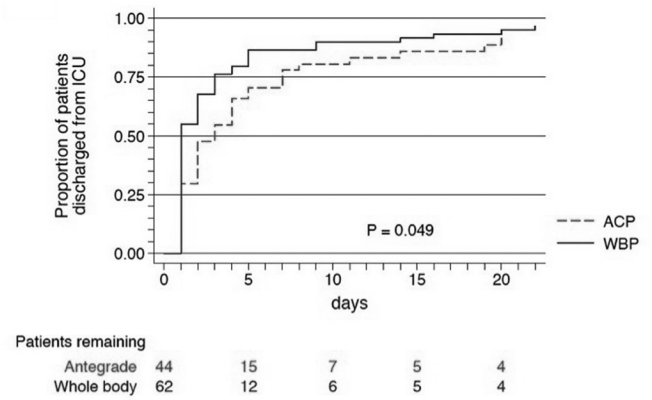

Figure 1: Kaplan-Meier curve identifying time to discharge from the ICU.

21. Moderate Hypothermia and Unilateral Selective Antegrade Cerebral Perfusion is a Safe Perfusion Strategy for Extended Arch Replacement in Patients With Acute Aortic Dissection

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Discussant: ***D****Anthony L. Estrera, *University of Texas Houston Medical School, Memorial Hermann Hospital, Houston, TX*

Objectives: Unilateral selective antegrade cerebral perfusion (uSACP) with moderate hypothermic circulatory arrest (MHCA) has been shown to be a safe and effective method of cerebral protection during surgery for acute Type A dissection (Type A). This study evaluates the safety of this strategy on outcomes following more extensive aortic arch reconstruction in patients with Type A.

Methods: A retrospective review from 2004–2014 of patients undergoing surgery for acute type A dissections using MHCA and SACP was performed. Cohorts were established based on extent of aortic resection: hemi-arch (HEMI) and transverse arch (TOTAL) groups were created. A propensity score-matched analysis of outcomes for TOTAL patients and HEMI patients was then conducted.

Results: 298 patients met inclusion criteria and were included for analysis (263 HEMI, 35 TOTAL). Preoperative comorbidities including age, stroke, diabetes, and renal failure were similar between groups (p>0.50). In-hospital mortality was 11.4% for the entire cohort [11.8% (31 pts) HEMI, 8.6% (3 pts) TOTAL; p=0.70], and the permanent stroke rate was 8.1% [8.0% (21 pts) HEMI, 8.6% (3 pts) TOTAL; p=0.75]. Median circulatory arrest time was 38.3±19.5 minutes (34.1±12.1 HEMI, 68.5±32.3 TOTAL; p<0.001). Lowest median circulatory arrest temperature was 25.8±3.1 degrees and not different between groups (25.8±3.2 HEMI, 26.1±2.6 TOTAL; p=0.57). No increase in operative mortality, temporary neurologic dysfunction, stroke, or renal failure was observed in the TOTAL group when compared to HEMI. Table 1 contains the results of 136 patients in the propensity score-matched analysis.

Conclusions: uSACP with MHCA remains a safe strategy for cerebral protection during emergent surgical repair of acute Type A and provides equivalent outcomes for both limited and more extensive aortic arch reconstruction. Based on this data, uSACP and MHCA may represent an optimal strategy for cerebral protection in this acute setting.

Table 1 - Propensity Score-Matched Postoperative Outcomes

	Total (N=35)	HEMI (N=101)	P value
Death	3 (8.8%)	10 (9.8%)	0.97
Stroke	3 (8.8%)	9 (8.8%)	0.89
Temporary Neurologic Deficit	2 (5.9%)	7 (6.9%)	0.98
Septicemia	1 (2.9%)	4 (3.9%)	0.98
Renal Failure	4 (11.8%)	16 (15.7%)	0.66
New Onset Dialysis	1 (2.9%)	14 (13.7%)	0.15
Prolonged Ventilation	16 (47.1%)	42 (41.2%)	0.55
Re-Exploration for Hemorrhage	3 (8.8%)	6 (5.9%)	0.48

NOTES:

22. Frozen Elephant Trunk is Not the "Bad Boy" Compared With the Traditional Elephant Trunk: Current Trends and Lessons Learned Using the Simplified US Version of the FET

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Authors: ***D****Ourania Preventza[1,2], Jessica Mayor[1,2], Katherine Simpson[1,2], Julius Carillo[1,2], Matt D. Price[1,2], *Kim I. de la Cruz[1,2], *Lorraine D. Cornwell[2], Shuab Omer[1,2], Arin C. Jobe[1,2], ***D****Scott A. LeMaire[1,2], ***D****Joseph S. Coselli[1,2]

Author Institution(s): *[1]Texas Heart Institute, Houston, TX; [2]Baylor College of Medicine, Houston, TX*

Discussant: ***D***Tomas, Martin, *Florida Hospital Orlando, Orlando, FL*

Objectives: It has been suggested that the frozen elephant trunk (FET) procedure incurs a greater risk of spinal cord ischemia than the traditional elephant trunk (t-ET) technique. We analyzed trends assessed, outcomes and lessons learned, and investigated whether using the simplified US version of the FET technique to treat complex arch pathology poses additional risk.

Methods: From 2010 to present we performed 129 consecutive elephant trunk procedures (t-ET, n=92, 71.3%; FET, n=37, 28.7%) for chronic dissecting (n=62, 48.1%) and atherosclerotic aneurysms (n=67, 51.9%). A stepwise logistic regression model using preoperative and intraoperative variables was created to analyze the outcomes.

Results: Operative mortality was 14.7% (t-ET, n=11, 12.0%; FET, n=8, 21.6%; P=0.16). Permanent stroke was 6.2% (t-ET, n=5, 5.4%; FET, n=3, 8.1%; P=0.69). Permanent spinal cord deficit was 4.7% (t-ET, n=3, 3.3%; FET, n=3, 8.1%; P=0.35). In the multivariate analyses for the entire period, the addition of FET was not an independent predictor of mortality, permanent stroke, or spinal cord deficit.

Conclusions: With the advent of endovascular technology, there is a clinical shift toward increased use of FET to eliminate or facilitate the second surgical stage in treating patients with extensive aortic pathology. The addition of FET to the surgical armamentarium does not pose additional risk but judicious use is advised nonetheless. The need for a single-piece endoprosthesis of FET instead of a customized FET may be considered.

NOTES:

23. Transcatheter Aortic Valve Implantation for Patients With Bicuspid Aortic Valves: Still A Contraindication?

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Authors: Mirko Doss, ***D***Won Kim, Thomas Walther

Author Institution(s): *Kerckhoff Heart Center, Bad Nauheim, Germany*

Discussant: ***D****Vinod Thourani, Emory University, Atlanta, GA

Objectives: The aim of this study was to evaluate the safety of transcatheter aortic valve implantation (TAVR) in patients with bicuspid aortic valves (BAV).

REGULATORY DISCLOSURE: This presentation describes the use of Acurate aortic bioprosthesis valves by Symetis, which has an FDA status of investigational.

Methods: 82 consecutive patients with stenotic BAV were treated with self-expanding (Core Valve, Symetis Acurate) and balloon expandable (Sapien 3, XT) transcatheter aortic valve prostheses, at our institution, from 2011 to 2014. Clinical outcomes were compared to a cohort of patients with tricuspid aortic stenosis (n=891) that received TAVI within the same time frame. Clinical endpoints were procedural complications, device success (VARC, II) and 30 day all-cause mortality.

Results: The groups were comparable with regards to pre-operative data: mean age (81.8±6.2 years), logistic Euroscore (24.2±12.6%), STS score (6.4±4.2%), mean aortic gradient (44±16.8 mmHg) and effective orifice area (0.7±0.2). 30 day mortality was lower in the BAV group (2% vs 8.4%, p=0.12). Device success rate was lower in patients with BAV (73.1% vs 87.1%, p=0.004). Procedural complications were higher in the BAV group with regards to: residual aortic regurgitation > grade, II (21.2% vs 7.8%, p=0.001), non-perpendicular deployment (30.2% vs 16.3%, p=0.002), malposition of the prosthesis (10.4% vs 3.5%, p=0.02) and the need for secondary valve in valve procedure (7.7% vs2.9%, p=0.05). The incidence of annular rupture (1.9% vs 0.5%) and conversion to open surgery (3.9% vs 2.5%) was comparable between the groups.

Conclusions: Treatment of BAV with TAVR bears significant procedural challenges. Although, 30 day mortality and valve function were similar to that of tricuspid aortic valves, BAV had significantly higher rates of procedural complications.

NOTES:

24. Statewide Impact of Transcatheter Aortic Valve Replacement on Surgical Aortic Valve Replacement

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Authors: *Robert B. Hawkins[3], Lily Johnston[3], Emily A. Downs[3], *J H. Mehaffey[3], Clifford Fonner[1], *Damien LaPar[3], Leora Yarboro[3], *Ravi Ghanta[3], Mohammed Quader[2], ***D***Alan Speir[4], Jeffrey B. Rich[1], ***D***Gorav Ailawadi[3]

Author Institution(s): *[1]Virginia Cardiac Surgery Quality Initiative, Falls Church, VA; [2]Virginia Commonwealth University, Richmond, VA; [3]University of Virginia, Charlottesville, VA; [4]INOVA Heart and Vascular Institute, Falls Church, VA*

Discussant: *Richard Prager, *University of Michigan, Ann Arbor, MI*

Objectives: Transcatheter aortic valve replacement (TAVR) represents a disruptive technology approved for high risk and inoperable patients. Internationally, some countries now perform more TAVR than surgical aortic valve replacement (SAVR). The purpose of this study was to determine if TAVR has negatively influenced SAVR volumes and altered the SAVR patient profile to those with fewer comorbidities.

Methods: A total of 11,547 SAVR patients were evaluated (2002-2015) from a statewide cohort. Patients were stratified by surgical era: pre-TAVR era (2002-2008, n=5,317), early-TAVR era (2009-2011, n=2,809), and commercial-TAVR era (2012-2015, n=3,421). Patient characteristics and outcomes were analyzed by univariate analysis.

Results: Throughout the study period, SAVR volumes increased with median volumes of 791 cases/year (pre-TAVR), 919 cases/year (early-TAVR) and 980 cases/year (commercial-TAVR, [p = 0.016]). TAVR implementation was associated with declining STS predicted risk of mortality among SAVR patients over time (Table 1). This was driven by fewer reoperative cases, higher ejection fraction, and more frequent elective cases in later eras. This decreasing risk profile occurred despite increasing frequency of diabetes, cerebrovascular disease, chronic lung disease, and heart failure (all p< 0.0001). Importantly, with increasing TAVR implementation, SAVR mortality remained excellent, while composite major morbidity improved (Table 1). These overall improvements come at the price of significantly longer ICU time and greater hospitalization costs (Table 1).

Conclusions: In a statewide database, SAVR volumes have not yet been negatively impacted by TAVR implementation. While the overall risk profile for SAVR patients decreased with TAVR implementation, SAVR patients now present with a higher prevalence of comorbid disease. Surgical morbidity and mortality outcomes for SAVR are excellent and continue to improve.

Table 1

		Surgical Era			
	Overall	Pre-TAVR	Early-TAVR	Commercial-TAVR	
Preoperative Characteristics	(n = 11,547)	(n = 5,317)	(n = 2,809)	(n = 3,421)	p value
STS PROM (median, IQR)	3.7% (1.7-5.4%)	3.8% (2.2-6.5%)	2.6% (1.4-4.7%)	2.4% (1.4-4.3%)	< 0.0001
STS PROMM (median, IQR)	18.3% (12.6-26.6%)	18.4% (12.6-27.8%)	18.7% (12.7-27.2%)	17.9% (12.6-25.9%)	0.0282
LVEF (median, IQR)	58 (50-63)	55 (45-60)	60 (50-63)	60 (53-63)	<0.0001
Elective	73.9% (8521)	72.6% (3854)	73.0% (2050)	76.5% (2617)	0.0001
Reoperative SAVR	12.8% (1299)	13.5% (534)	13.3% 372 (372)	11.5% (393)	0.0208
Outcomes	% (n)	% (n)	% (n)	% (n)	
Operative mortality	3.9% (450)	4.0% (213)	4.3% (121)	3.4% (116)	0.1516
Major morbidity‡	43.1% (4974)	44.3% (2349)	43.9% (1230)	40.8% (1395)	0.0037
Total cost (median)	$33,339.37	$25,847.56	$35,596.04	$43,175.59	< 0.0001
ICU stay (hrs; median, IQR)	48.2 (26.3-95)	48 (25.5-95)	48 (26-94)	49.7 (27.5-96)	0.0019
Length of stay (days; median, IQR)	6 (5-9)	6 (5-9)	6 (5-9)	6 (5-9)	0.2292
Operative mortality O:E	0.88	0.77	1.11	0.95	

STS PROM = society of thoracic surgeons predicted risk of mortality; PROMM = predicted risk of morbidity or mortality; LVEF = left ventricular ejection fraction; ICU = intensive care unit. ǂ Major morbidity includes: permanent stroke, cardiac arrest, renal failure requiring dialysis, deep sternal wound infection, prolonged ventilation, reoperation for any reason

NOTES:

25. Multi-institutional Validation of a Modified Thoracic Revised Cardiac Risk Index (m-ThRCRI) for Predicting Cardiac Complications Following Lung Resection

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Authors: Daniel C. Thomas, Brian N. Arnold, Joshua E. Rosen, Michelle C. Salazar, ***D***Frank C. Detterbeck, Justin D. Blasberg, Daniel J. Boffa, Anthony W. Kim

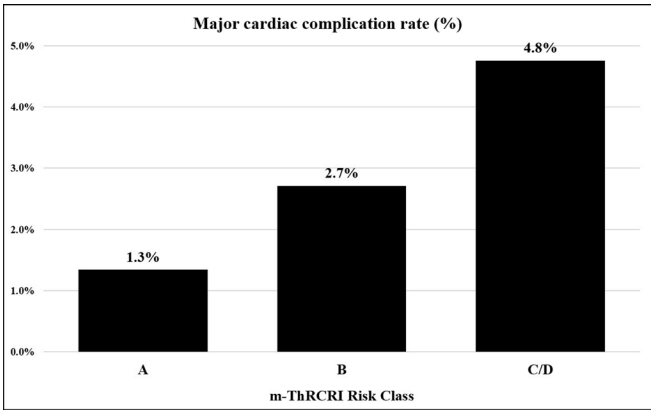
Author Institution(s): *Duke University, Durham, NC*

Objectives: The Thoracic Revised Cardiac Index (ThRCRI) has emerged as a tool that differentiates patients who may proceed to lung resection without further cardiac assessment up (classes A/B) from those who should receive additional cardiac evaluation (classes C/D). This study aims to demonstrate that a modified ThRCRI (m-ThRCRI) can be employed for cardiac risk stratification using a large national multi-institutional dataset.

Methods: Patients undergoing lobectomy or pneumonectomy were identified in the American College of Surgeons National Surgical Quality Improvement Program (ACS-NSQIP) dataset from 2005-2012. Patients were grouped into 4 risk classes based on a summary score of preoperative risk factors: ischemic heart disease (IHD), cerebrovascular disease (CVD), renal comorbidity, pneumonectomy. The primary outcome was the incidence of postoperative major cardiac complication in each of the four risk classes.

Results: Of the 4,625 patients identified, the majority underwent surgery for malignant disease (78%) and had an open procedure (70%). Among the m-ThRCRI risk factors, 9% had IHD, 7% had CVD, 2% had renal comorbidity, and 6% underwent pneumonectomy. The incidence of cardiac complication in all patients was 2%. The incidence of cardiac complication within risk classes A, B, C, D were 1%, 3%, 9%, and 4%, respectively ($p<0.01$). When combined, higher risk patients (classes C and D) were three times as likely to have a cardiac complication compared to class A. Multivariable analysis identified class C as having an increased risk for cardiac complication compared with class A (OR 4.9, 95% CI 1.1-22.1).

Conclusions: Using a large multi-institutional dataset, the m-ThRCRI can differentiate patients at higher risk for cardiac complication following lung resection (classes C and D) and can be a useful and straightforward preoperative instrument. The m-ThRCRI may allow for identification of patients who would benefit from additional cardiac evaluation.



Rate of major cardiac complications, by m-ThRCRI risk classes.

NOTES:

26. Is Repeat Pulmonary Metastasectomy Indicated for Soft Tissue Sarcoma?

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Authors: Neel P. Chudgar, Murray F. Brennan, Kay See Tan, ***D***Rodrigo R. Munhoz, Peter R. Bucciarelli, Sandra P. D'Angelo, Manjit S. Bains, *Matthew Bott, James Huang, *James M. Isbell, ***D****Daniela Molena, ***D***Bernard J. Park, Valerie W. Rusch, Prasad S. Adusumilli, William Tap, *David R. Jones

Author Institution(s): *Memorial Sloan Kettering Cancer Center, New York, NY*

Objectives: Recurrence following pulmonary metastasectomy (PM) for soft tissue sarcoma (STS) is high despite complete (R0) resection. Systemic therapies are limited and repeat PM is often considered. Our objective is to define the subset of patients with pulmonary recurrence selected for repeat PM and identify prognostic factors for survival.

Methods: We reviewed a prospectively maintained database of 539 patients undergoing PM for STS. Clinicopathologic variables of the primary tumor, metastatic disease, treatment and recurrence were examined. Cox proportional hazards models were constructed to identify factors associated with the likelihood of operative selection following lung recurrence, and prognostic factors for survival in the repeat PM group. Survival was modeled using the Kaplan-Meier method.

Results: Following complete initial PM, 63% of patients (N=341) experienced pulmonary recurrence. One hundred forty-one (41%) underwent repeat resection (Table 1). For the entire cohort (N=341), patients with synovial sarcoma primary histology (p=0.001), longer disease-free interval (DFI) between first PM and recurrence (p<0.001), and the lungs as the only site of recurrence (p<0.001) were more likely to undergo subsequent PM. Increased age (p=0.004) and open resection at the first PM (p=0.013) were associated with a decreased odds of undergoing repeat resection. Median overall survival (OS) from first PM was 49 mos in the repeat PM group compared to 20 mos in those not resected (p<0.001, Fig. 1). In repeat PM patients, increasing number of pulmonary metastases (p=0.011), and shorter DFI from initial PM (p=0.005) were associated with increased risk of death.

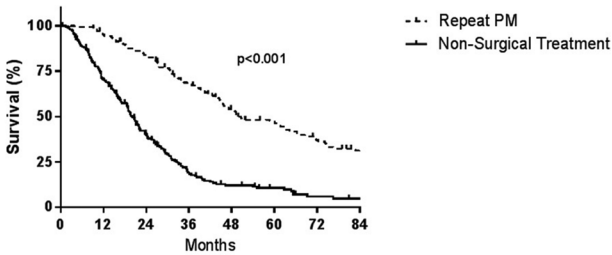
Conclusions: While subject to operative selection, repeat PM for STS is associated with prolonged OS in the management of recurrent pulmonary metastases. Factors associated with survival in patients undergoing repeat resection include number of pulmonary metastases and DFI.

NOTES:

Table 1: Clinicopathologic Characteristics of Patients with Pulmonary Recurrence Following Initial Pulmonary Metastasectomy

VARIABLE	NO REPEAT PM (N=200)	REPEAT PM (N=141)
HISTOLOGY		
PS/MFH	59 (29.5%)	21 (14.9%)
Synovial	21 (10.5%)	32 (22.7%)
Leiomyosarcoma	71 (35.5%)	42 (29.8%)
Liposarcoma	10 (5.0%)	9 (6.4%)
Fibrosarcoma	8 (4.0%)	14 (10.0%)
MPNST	5 (2.5%)	4 (2.8%)
Other	26 (13.0%)	19 (13.4%)
SIZE OF PRIMARY		
≤ 10 cm	97 (48.5%)	75 (53.2%)
> 10 cm	90 (45.0%)	50 (35.5%)
Unknown	13 (6.5%)	16 (11.3%)
GRADE OF PRIMARY		
Low	16 (8.0%)	18 (12.8%)
High	180 (90.0%)	122 (86.5%)
Unknown	4 (2.0%)	1 (0.7%)
TYPE OF SURGERY AT INITIAL PM		
Open	155 (77.5%)	87 (61.7%)
Minimally-Invasive	45 (22.5%)	54 (38.3%)
DISEASE-FREE INTERVAL*		
< 12 mos	175 (87.5%)	98 (69.5%)
≥ 12 mos	25 (12.5%)	43 (30.5%)
SYNCHRONOUS EXTRAPULMONARY DISEASE AT RECURRENCE		
No	74 (37.0%)	110 (78.0%)
Yes	126 (63.0%)	31 (22.0%)

PS/MFH, Pleomorphic sarcoma/malignant fibrous histiocytoma; MPNST Malignant peripheral nerve sheath tumor; PM, Pulmonary metastasectomy; *From first pulmonary metastasectomy to recurrence at any site



	Number at Risk								Median OS (mos)
Repeat PM	141	133	113	90	65	52	40	31	49.3
Non-Surgical Treatment	201	138	73	32	19	13	6	4	20.0

PM, Pulmonary Metastasectomy

Figure 1: Overall Survival in Patients with Recurrent Pulmonary Soft Tissue Sarcoma Based on Treatment

27. Pilot Study Percutaneous Cryotherapy for Stage IA Lung Cancer

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Authors: Frank A. Baciewicz[1], Lance K. Heilbrun[1], Deborah Hackstock[1], Fulvio Lonardo[1], Peter Littrup[2]

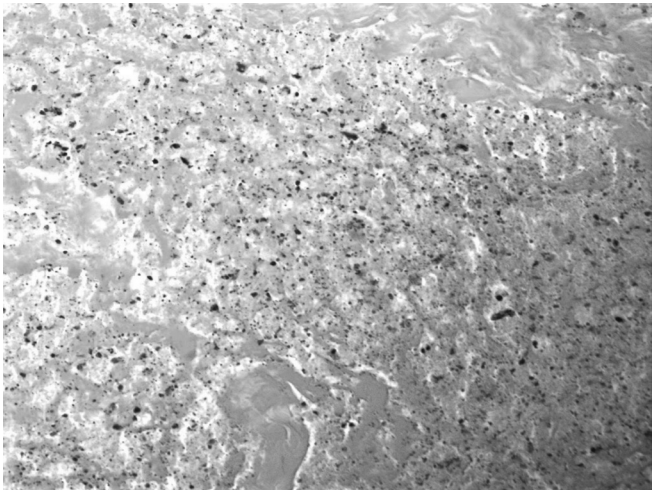
Author Institution(s): *[1]Wayne State University, Detroit, MI; [2]Brown Medical Center, Providence, RI*

Objectives: Lobectomy for Stage IA lung cancer has a 60-85% 5-year survival but has morbidity, mortality risks. Not all patients (pts) with clinical Stage IA cancer are surgical candidates and some pts refuse surgical intervention. Our pilot study's purpose was to determine how much residual tumor would remain in the lung after single visit outpatient percutaneous cryotherapy (PCT) of a stage IA lung cancer

Methods: Pts with a 3.0 cm diameter peripheral (outer 1/3 lung) primary lung cancer would undergo standard clinical staging including body PET scan, MRI brain and/or mediastinal node evaluation. Those in Stage IA would undergo 3 PCT freeze/thaw/freeze cycles to -20C for 15/10/15 minutes. The PCT (Endocare, Irvine, Cal) treatment goal was to create a 4.5 cm iceball (necrosis) engulfing the cancer. CT scans documented the iceball. Thoracotomy/lobectomy was to be performed within 60 days of PCT. The lobectomy specimen and lymph node dissection underwent histologic review.

Results: 9pts (7 male, 2 female), median age 65.9 yrs (range 52-78), mean tumor diameter 1.9 cm received PCT for 4 R upper lobe lesions, 4 L upper lobe lesions and 1 R lower lobe lesion. They had thoracotomy a median of 48 days after PCT. Adverse events after PCT were 4 pneumothoraces, 3 hemoptysis and 3 dyspnea. All patients were discharged after resection. One patient expired 2.5 months later of aspergillus lung infection. 8 pts had no residual tumor in the ablated lung. The one patient with residual disease had pathologic stage, IIIA and died 3.5 months postop from recurrent disease. Image demonstrates lung which has received PCT and then been resected.

Conclusions: 1. Single visit, outpatient PCT treatment for Stage IA lung cancer can be performed with acceptable morbidity. 2. In clinical Stage IA lung cancer pts treated with PCT, no residual tumor was seen in the resected lobe. 3. PCT may offer another treatment option to pts with clinical Stage IA lung cancer.



Representative histologic section of lung which has received PCT and then been resected.

NOTES:

28. Evaluation of Esophageal Anastomotic Integrity With Serial Pleural Amylase Levels

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Authors: ***D****Daniel L. Miller, *Gerald A. Helms, *William R. Mayfield

Author Institution(s): *WellStar Health System, Marietta, GA*

Objectives: An anastomotic leak is the most devastating and potentially fatal complication after esophagectomy. Current detection methods can be inaccurate and place patients at risk of other complications. Analysis of pleural fluid for amylase may be more accurate and less of a risk for evaluating the integrity of an esophageal anastomosis.

Methods: We retrospectively reviewed prospective data of 30 consecutive patients who underwent an Ivor Lewis esophagectomy over a nine month period in 2015 and evaluated their anastomotic integrity with serial pleural amylase levels.

Results: There were 27 men (90%) with a median age of 60 years (range, 35-77). Indication for esophagectomy was cancer in 23 patients (77%); 16 (70%) underwent neoadjuvant chemoradiation. A barium swallow was performed in the first 25 patients at a median of POD 5 (range, 5 - 10); the swallow was negative in 28 patients (93%). Serial pleural amylase levels were performed starting on POD 3 and ending one POD after the swallow test. Amylase levels in the no leak patients were highest on POD 3 (<50 IU/L) and decreased (<20 IU/L) to the lowest levels one POD after the swallow. The two patients with a leak had amylase levels of 630 and 227 IU/L each a day before their scheduled swallow. There was one postoperative death (3%) secondary aspiration pneumonia. Complications occurred in 11 patients (37%); most common was respiratory. The last 5 patients underwent pleural amylase levels only without a swallow or CT scan; no leaks or respiratory issues occurred in these patients.

Conclusions: Serial pleural amylase levels for the detection of esophageal anastomotic leaks proved to be accurate and safe. Elimination of barium swallows and CT scans for evaluation of anastomotic integrity would decrease aspiration risks as well as possible respiratory failure in the postoperative period. Serial pleural amylase levels may be the preferred method of detection for an anastomotic leak after esophagectomy.

NOTES:

29. Management of Anastomotic Leaks After Esophagectomy

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Authors: Joshua L. Manghelli, David Blitzer, Adam Hicks, Karen Rieger, *DuyKhanh Ceppa, Thomas J. Birdas

Author Institution(s): *Indiana University School of Medicine, Indianapolis, IN*

Objectives: Anastomotic leaks are a feared complication after esophagectomy. Their management has evolved over time. We describe our experience with management of esophageal leaks over an 11-year period.

Methods: All patients undergoing esophagectomy with gastric reconstruction at a single institution between 2004-2014 were identified. Perioperative factors were reviewed. Failure of initial leak treatment was defined as need for reintervention for leak management. Length-of-stay (LOS) and mortality were the primary outcomes.

Results: Of 692 eligible patients, 61 (8.8%) were diagnosed with an anastomotic leak, more frequently after a cervical anastomosis (16.9% vs 6%). Thirty-day mortality was 12.7% and median LOS was 19 days (no-leak population: 3.2% and 11 days, respectively). Forty-six patients (75.4%) were initially observed and 11 (23.9%) failed (8 stents – 3 surgery); an occult leak (diagnosed in a routine esophagram) was the only factor predicting success of observation (p=.04). Successful observation patients had shorter LOS (p=.001) – similar to patients without leak. Stents were employed in 19 patients; 42.1% of stents required revision. Stenting did not lower LOS. Lower preoperative serum albumin was the only factor predicting mortality after leak (p=.01). Intrathoracic and cervical leaks had similar outcomes.

Conclusions: Non-occult anastomotic leaks were more likely to fail observation. Occult leaks successfully observed did not worsen postoperative outcomes. Preoperative nutritional status affected mortality, but anastomotic location did not influence outcomes. Stents required frequent revisions and did not shorten LOS. Further study is warranted on interventions in patients likely to fail conservative management.

NOTES:

30. Hospitalization Costs Following Surgery in High-Risk Patients With Early Stage Lung Cancer

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Authors: *Manu S. Sancheti, Ray Chihara, Sebastian Perez, *Felix Fernandez, *Allan Pickens, *Seth Force

Author Institution(s): *Emory University, Atlanta, GA*

Objectives: We previously reported that early stage lung cancer patients who are considered high-risk for surgery can undergo resection with favorable perioperative results and long-term mortality. To further elucidate the role of surgical resection in this patient cohort, this study evaluated the length of stay and total hospitalization cost among patients classified as standard or high risk with early stage lung cancer who underwent pulmonary resection.

Methods: 490 patients from our institutional STS data from 2009-2013 underwent resection for clinical stage I lung cancer. High-risk patients were identified by ACOSOG z4032/z4099 criteria. Demographics, length of stay, and hospitalization cost between high and standard risk patients undergoing lobectomy and sublobar resection were compared. Univariate analysis was performed using the chi-square test/Fisher's exact test. Multivariate analysis was performed using a linear regressions model.

Results: 180 (37%) of patients were classified as high-risk. These patients were older (70y vs. 65y, p<0.0001), had worse FEV1 (57% vs. 85%, p <0.0001), and DLCO (47% vs. 77%, p<0.0001). The baseline cost and length of stay was represented by a thoracoscopic wedge resection in a standard risk patient. A larger extent of resection, thoracotomy, or high-risk classification increased the cost and length of stay, as depicted in Table 1.

Conclusions: Our previous study showed that good clinical outcomes following surgery for early stage lung cancer can be achieved in patients classified as high-risk. In this study, while surgery in high-risk patients led to slightly increased costs, these costs seemed negligible when viewed along with the patients' excellent short and long-term results. This study suggests that surgical resection on high-risk patients with early stage lung is associated with acceptable hospital lengths of stay and overall cost when compared to standard risk patients.

Table 1: Hospitalization Costs and Length of Stay						
Classification	**Mean Cost**	**95% CI**	**p-value**	**Mean Length of stay**	**95% CI**	**p-value**
Standard Risk, Thoracoscopic Wedge Resection	$14,994.00	$11,931,48-$17.956.52		3.63	2.47-4.80	
	Additive Effect			Additive Effect		
+ Segmentectomy	$2,622.00	$2,442.64-$7,686.64	0.31	0.97	0.98-2.93	0.32
+ Lobectomy	$3,633.00	$567.56-$6,698.44	0.02	0.91	0.28-2.09	0.14
+ Thoracotomy	$8,337.00	$5,257.84-$11,416.16	<0.001	3.13	1.94-4.31	<0.001
+ High Risk	$3,377.00	$1,013.24-$5,740.76	0.005	1.58	0.67-2.49	<0.001

NOTES:

31. Need for Pulmonary Arterioplasty at the Time of Bidirectional Cavopulmonary Anastomosis is an Independent Predictor of Poor Surgical Outcome

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Authors: John D. Cleveland[1,2], Susana Tran[1], Cheryl Takao[1], Winfield J. Wells[1], Vaughn A. Starnes[1,2], S R. Kumar[1,2]

Author Institution(s): [1]*Children's Hospital, Los Angeles, Los Angeles, CA;* [2]*University of Southern California, Los Angeles, CA*

Discussant: *Carl L. Backer, *Ann & Robert H Lurie Children's Hospital, Chicago, IL; Northwestern University Feinberg School of Medicine, Chicago, IL*

Objectives: Whereas routine bidirectional cavopulmonary anastomosis (BDCA) can be accomplished with low morbidity and mortality, the impact of concomitant pulmonary arterioplasty (PAplasty) is not known. Currently, PAplasty does not alter the STAT mortality category of BDCA. We hypothesized that the need for and extent of PAplasty adversely affect BDCA outcomes.

Methods: Patients who underwent BDCA at our institution between 2008 and 2015 were included in the analysis. Major morbidity was defined as need for extracorporeal support, BDCA takedown or percutaneous intervention during same admission, hospital length of stay 1 standard deviation or more from mean, or need for supplemental oxygen at discharge. Data were analyzed using SAS 9.2 and are presented as median (interquartile ranges).

Results: 250 patients (136 males, 54%) underwent BDCA for single ventricle physiology at 7 months (5.5-8.8) of age and 6.5 kg (5.7-7.6) weight. 62 (25%) required PAplasty - 29 unilateral and 33 bilateral. Of those that required bilateral PAplasty, 6 underwent ascending aortic extension to augment the aortopulmonary window. There was no difference in the demographic variables, PA pressure or resistance between patients who did and did not require PAplasty. Both major morbidity (35% vs. 15%, p=0.01) and mortality (9.7% vs. 1.6%, p=0.04) were higher in patients who required PAplasty vs. those who did not. Amongst the operative variables evaluated, need for deep hypothermic circulatory arrest (HR = 2.51, p=0.03) and extent of PAplasty (HR = 1.9, p=0.02) independently predicted hospital mortality. Duration of cardiopulmonary bypass (HR = 1.2, p=0.03) and need for any PAplasty (HR = 2.6, p=0.01) were independent predictors of major morbidity.

Conclusions: The need for PAplasty at BDCA is an independent predictor of increased morbidity and mortality. It is important to consider this variable when developing outcome metrics for BDCA.

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32. Major Aortopulmonary Collateral Arteries in Patients With Anatomy Other Than Pulmonary Atresia With Ventricular Septal Defect

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Authors: William L. Patrick, *Richard D. Mainwaring, Olaf Reinhartz, Rajesh Punn, Theresa Tacy, Frank L. Hanley

Author Institution(s): *Stanford University School of Medicine, Stanford, CA*

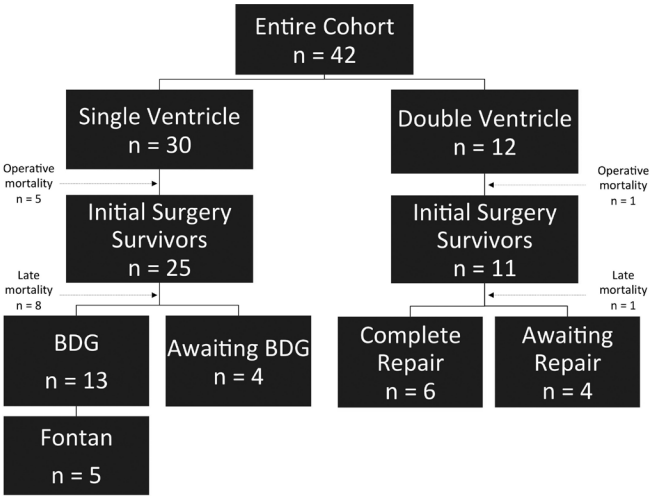
Discussant: *Jeffrey P. Jacobs, *Johns Hopkins All Children's Hospital, St. Petersburg, FL*

Objectives: Major aortopulmonary collateral arteries (MAPCAs) are most frequently found in association with Pulmonary Atresia with Ventricular Septal Defect (PA/VSD). However, between 5 and 10% of patients with MAPCAs do not have PA/VSD but instead have a variety of other "atypical" anatomic diagnoses. This study was performed to evaluate the surgical results in these patients.

Methods: This was a retrospective review of patients with MAPCAs and atypical anatomy who underwent surgical treatment from 1997 to 2015. The 42 patients with MAPCAs could be sub-divided into two groups: 1) Two-ventricle anatomy (n=12) and 2) Single-ventricle anatomy (n=30).

Results: The 12 patients with MAPCAs and two ventricles included 4 with complete atrioventricular canal (CAVC), 3 with double outlet right ventricle, 3 with corrected transposition, 1 with complex D-transposition, and 1 with scimitar syndrome. The initial cardiac operation included single stage complete repair in 4 and unifocalization / shunt in 8. Six patients have currently achieved complete repair status. The 30 patients with MAPCAs and single ventricle included 9 with unbalanced CAVC and total anomalous pulmonary venous connection (TAPVC), 6 with unbalanced CAVC, 5 with pulmonary atresia-intact ventricular septum, 3 with tricuspid atresia, and 7 with other forms of single ventricle. The initial cardiac operation included unifocalization / shunt with TAPVC repair in 9, unifocalization / shunt in 12, creation of an aortopulmonary window in 5, and shunt in 4. To date, 13 patients have had a bi-directional Glenn and 5 have had a Fontan. The flow diagram for these two groups is shown in the Figure.

Conclusions: The data demonstrate the wide diversity of anatomy that can be seen in patients with MAPCAs when evaluating diagnoses other than PA/VSD/MAPCAs. More than two-third of the patients with atypical anatomy had single ventricle, and single ventricle anatomy was associated with a relatively high mortality.



Flow diagram for the 42 MAPCA patients. The combined early and late mortality for the two-ventricle cohort was 17%, and the combined mortality for the single-ventricle group was 43%.

NOTES:

33. Current Results of Multistage Single Ventricle Palliation of Patients With Double Inlet Left Ventricle

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Authors: *Bahaaldin Alsoufi, *Kirk R. Kanter, Subhadra Shashidharan, *Brian Kogon

Author Institution(s): *Emory University School of Medicine, Atlanta, GA*

Discussant: *Ross M. Ungerleider, *Wake Forest University, Winston Salem, NC*

Objectives: Double inlet left ventricle (DILV) is a heterogeneous single ventricle anomaly in which initial presentation and, consequently, timing and mode of palliation vary based on morphology and degree of pulmonary or systemic outflow obstruction. Very few reports, mostly old, focused on palliation outcomes of patients with DILV. We report current era results and examine whether morphologic and, subsequently, surgical factors influence survival.

Methods: From 2002 to 2015, 56 infants with DILV underwent palliation. Initial echocardiographic examination showed pulmonary outflow tract obstruction (n=28, 50%, severe in 15), systemic outflow tract obstruction (n=17, 30%, severe in 14), and arch obstruction (n=16, 19%). Long term outcomes and risk factors associated with hospital / inter-stage death and late survival were examined.

Results: Forty-three patients (77%) required neonatal first-stage palliation: modified Blalock-Taussig shunt (n=15, 27%), Norwood (n=14, 25%), pulmonary artery band (n=14, 25%); whereas 13 patients (23%) received primary Glenn. There was one hospital death (2%) and 2 additional inter-stage mortalities prior to Glenn, in addition to 1 late death that was not cardiac related. Overall 10-year survival was 94% and was comparable for different initial palliation surgeries (93%, 87%, 100% and 100% following shunt, Norwood, band and Glenn, respectively, p=0.28). Two patients underwent heart transplantation for ventricular non-compaction (n=1), pacemaker-induced cardiomyopathy (n=1). On multi-variable analysis, none of the tested demographic, morphologic or surgical variables was associated with the risk of death or transplantation.

Conclusions: Current outcomes of multistage palliation of DILV are relatively good compared to published outcomes of other single ventricle anomalies. Survival is not greatly affected by morphology or type of initial palliation surgery. This information is helpful for decision making and family discussion.

NOTES:

34. Use of Heparin Coated Polytetrafluoroethylene Grafts Reduces Mortality in Neonates Receiving Systemic-to-Pulmonary Shunts

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Authors: Adeel Ashfaq[1], Amit Iyengar[1], Brian Reemtsen[2]

Author Institution(s): *[1]David Geffen School of Medicine at UCLA, Los Angeles, CA; [2]Mattel Children's Hospital, Los Angeles, CA*

Discussant: *Joseph W. Turek, *University of Iowa Carver College of Medicine, Iowa City, IA*

REGULATORY DISCLOSURE: This presentation describes the use of Propaten vascular grafts by W.L. Gore, which is FDA approved.

Objectives: We aimed to evaluate outcomes of systemic-to-pulmonary (SP) shunt procedures utilizing heparin-coated (HC) polytetrafluoroethylene vascular grafts compared to uncoated (non-HC) grafts, in order to observe any benefits in neonates.

Methods: Our institution switched from using non-HC grafts to HC grafts in March 2011. We conducted a retrospective review of consecutive neonates receiving SP shunts from May 2008 to December 2015. Perioperative variables including baseline characteristics, morbidity, mortality, and blood-product utilization were evaluated between the HC and non-HC groups.

Results: A total of 142 neonates received SP shunts during the study period: 69 patients received HC shunts and 73 patients received non-HC shunts. There were no significant differences between groups in age, weight, gender and perioperative variables including bypass necessity, bypass time, and cross clamp time. Perioperative transfusion and blood product utilization was significantly lower in the HC group (p=0.025). There was no significant difference in the incidence of unplanned reoperation for desaturation or arrest (p=0.746) [HC group 6/69 (8.2%); non-HC group 7/73 (5.8%); p=0.746]. Of the 6 patients requiring unplanned reoperation in the HC group, 5 shunts remained patent and did not require revision. There was a significantly lower incidence of shunt revision in the HC group (1.4%) compared to the non-HC group (8%), p=0.007). Thirty day mortality was significantly lower in the HC group (4%) versus the non-HC group (15%), p=0.047.

Conclusions: In this study, neonates receiving HC polytetrafluoroethylene grafts in SP shunts demonstrated significantly lower mortality, shunt revisions, and transfusions of blood and blood products. Though no significant difference was noted for unplanned reoperations, the majority of HC grafts remained patent. These findings suggest that HC grafts used in SP shunt procedures may benefit neonates in terms of efficacy and outcomes.

NOTES:

35. Surgical Strategy Toward Bi-ventricular Repair for Severe Ebstein's Anomaly in Neonates and Early Infancy

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Authors: Shu-Chien Huang, Yihsharng Chen

Author Institution(s): *National Taiwan University Hospital , Taipei, Taiwan*

Discussant: *Christopher J. Knott-Craig, *Lebonheur Children's hospital, Memphis, TN*

Objectives: The neonates with severe form of Ebstein's anomaly is a surgical challenge, and the Starnes's operation as single ventricle palliation is highly advocated. The cone reconstruction of tricuspid valve plasty (TVP) had become a widely accepted technique, but the experience of TVP in neonates is few. Here we describe the surgical strategy of neonatal Ebstein's anomaly, aiming for bi-ventricular repair.

Methods: Since 2007, seven neonate/early infancy with severe Ebstein's anomalies received TVP in our institute. The principle of cone reconstruction was applied with mobilization of all three leaflets and reattach to normal tricuspid annulus. The atrialized right ventricle (RV) was not plicated. In patients with anatomical pulmonary stenosis (PS), the inter-atrial communication was not totally closed and a systemic-to-pulmonary shunt was added if needed.

Results: All of them presented as intractable heart failure and/or severe cyanosis with mechanical ventilation. One patient with hydrops required ECMO before operation for 6 days. All of them had marked adherence of the anterior leaflet to the RV free wall. Intracardiac anomalies including VSD (n=2) and tetralogy of Fallot(n=1), were repaired simultaneously. One patient died after operation. The other six patients (86%) survived. There were no late mortality or re-do TVP for a median follow-up of 3.7 years (range:0.2-9.3). In the two patients with VSD and no PS, complete bi-ventricular circulation was achieved. For the other four patients with PS, fenestration on ASD (n=4) and shunt (n=2) were performed, and shunt closure was done in one.

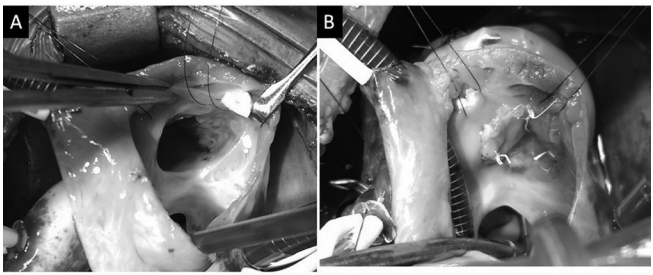
Conclusions: Reconstruction of tricuspid valve is an acceptable surgical strategy in severe neonatal Ebstein's anomaly. Fenestrated ASD and systemic-pulmonary shunt could help to overcome the anatomical PS and high pulmonary resistance in the neonatal period. This surgical strategy had good survival outcome and preserve the possibility for complete biventricular repair.

Patient characteristics, associated lesions and outcome

case	Age (days)	Body weight (kg)	Associated lesions	Operation	Outcomes	Follow-up duration (years)
1	23	3.1	VSD	TVP, VSD repair, ASD closure	survive	9.3
2	102	3.4	VSD, prematurity	TVP, VSD repair ASD closure	survive	5.9
3	18	2.7	valvular PS	TVP, fenestrated ASD	survive	4.2
4	36	3.4	functional pulmonary atresia	TVP, fenestrated ASD, shunt	survive shunt closed	3.7
5	6	2.0	hydrops, on ECMO, severe PS	TVP, RVOT patch fenestrated ASD, shunt	survive shunt partially occluded	1.9
6	11	2.1	critical PS	TVP, RVOT patch fenestrated ASD, shunt	mortality (TVP stitches tear)	X
7	27	3.7	Tetralogy of Fallot mild RV hypoplasia	TVP, Fallot repair ASD fenestration	survive	0.2

VSD: ventricular septal defect, PS: pulmonary stenosis, CPR: cardiopulmonary resuscitation, ECMO: extracorporeal membrane oxygenation, RVOT: right ventricular outflow tract, TVP: tricuspid valve plasty, ASD: atrial septal defect

Case 7, A neonate with Ebstein's anomaly with Fallot's tetralogy, the tricuspid valve before (A) and after (B) anatomical repair



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36. Arch Augmentation via Median Sternotomy for Repair of Coarctation of Aorta With Associated Arch Hypoplasia is a Safe and Durable Procedure

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Authors: W H. Gray[1,2], Winfield J. Wells[1,2], Vaughn A. Starnes[1,2], S R. Kumar[1,2]

Author Institution(s): [1]*University of Southern California, Los Angeles, CA;* [2]*Children's Hospital, Los Angeles, Los Angeles, CA*

Discussant: *Robert J. Dabal, *University of Alabama Birmingham, Birmingham, AL*

Objectives: It has been proposed that coarctation of aorta with proximal arch hypoplasia can be approached via thoracotomy/extended end-to-end anastomosis with the expectation that the proximal arch grows. We hypothesized that complete arch augmentation via midline sternotomy is a safe and more effective repair.

Methods: We reviewed records of patients with biventricular anatomy and coarctation of aorta/proximal arch hypoplasia, without any other cardiac lesion mandating midline sternotomy. Data are presented as median (interquartile range).

Results: 64 patients underwent repair between 2005-15 at 11 (5-21) days of life. 15 (23%) of them presented in shock. The proximal transverse arch was 41% (34-47) the size of the ascending aorta. Following median sternotomy and placement on cardiopulmonary bypass (41, 37-47min), the arch was reconstructed with or without coarctectomy either primarily (6%) or via homograft patch plasty (94%). In 62 patients, repair was undertaken with circulatory arrest (27, 22-31min). Patients were discharged home in 12 (8-19) days. There was no mortality and 9 morbidity events (recurrent nerve injury-4, chylothorax-2, phrenic nerve injury, seizure and superficial wound infection-1 each). All patients are alive at 30-(11-59) month follow-up. 7 (11%) have required re-intervention (5 catheter-based and 2 surgical) for recurrent coarctation. Re-intervention free survival at 1, 3 and 5 years is 86%. Only one child is on anti-hypertensive therapy. At last echocardiogram, the transverse arch is 95% (86-102) of ascending aortic diameter, ejection fraction 67% (59-78) and one patient has left ventricular hypertrophy.

Conclusions: Arch augmentation via median sternotomy is a safe and effective procedure associated with low morbidity and mortality. The reconstructed arch retains excellent profile at intermediate follow-up. Our results should serve as contemporary benchmark when evaluating other modes of intervention in this patient population.

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37. Similar Outcomes in Diabetic Patients After CABG With Single ITA Plus Radial Artery Grafting & Bilateral ITA Grafting

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Authors: Sajjad Raza, ***D***Eugene Blackstone, Marijan Koprivanac, Penny Houghtaling, Lars G. Svensson, ***D***Joseph F. Sabik

Author Institution(s): *Cleveland Clinic, Cleveland, OH*

Discussant: *Walter H. Merrill, *Vanderbilt University, Nashville, TN*

Objectives: To determine in diabetic patients whether single internal thoracic artery (SITA) plus radial artery (RA) grafting yields similar outcomes to those of bilateral internal thoracic artery grafting (BITA).

Methods: From January 1994 to January 2011, 1,325 diabetic patients underwent primary isolated coronary artery bypass grafting (CABG) with either (i) SITA+RA±saphenous vein grafts (SVG; n=965) or (ii) BITA±SVG (n=360); internal thoracic artery was used in all patients to graft the left anterior descending coronary artery. Endpoints were in-hospital outcomes and long-term mortality. Median follow-up was 7.4 years, with a total follow-up of 9,162 patient-years. Propensity-score matching was performed to identify 282 well-matched pairs for adjusted comparison of outcomes.

Results: Unadjusted hospital mortality (0.52% vs. 0.28%; P=.6) and occurrence of deep sternal wound infections (DSWI; 3.2% vs. 1.7%; P=.13) were similar between the SITA+RA±SVG and BITA±SVG groups. Unadjusted survival was better in the BITA±SVG group: at 1, 5, 10, and 14 years, 97%, 88%, 68%, and 51% for the SITA+RA±SVG group vs. 97%, 95%, 80%, and 66% for the BITA±SVG group, respectively (early P=.4, late P=.002). However, in propensity-matched patients, hospital mortality (0.35% vs. 0.35%) and occurrence of DSWI (1.4% vs. 1.4%) were similar (P>.9) between the two groups, as was survival at 1, 5, 10, and 14 years: 97%, 90%, 70%, and 58% for the SITA+RA±SVG group and 97%, 93%, 79%, and 64% for the BITA±SVG group, respectively (early P=.8, late P=.2).

Conclusions: In patients with diabetes, SITA+RA grafting and BITA grafting yield similar in-hospital outcomes and long-term survival after CABG. Therefore, both SITA+RA grafting and BITA grafting should be considered in diabetic patients undergoing CABG.

NOTES:

38. Diagnosis and Surgical Management of Pericardial Constriction After Cardiac Surgery

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Authors: Justin Van Meeteren, *Hartzell Schaff, *Joseph Dearani, Kevin Greason, ***D***Richard Daly

Author Institution(s): *Mayo Clinic, Rochester, MN*

Discussant: ***D***Douglas R. Johnston, *The Cleveland Clinic Foundation, Cleveland, OH*

Objectives: The incidence of pericardial constriction after cardiac surgery is unknown, and the diagnosis may be difficult to establish because of underlying cardiac disease. To better understand modes of presentation and results of operation, we reviewed our experience with pericardiectomy for constrictive pericarditis in patients who have undergone previous cardiac surgery.

Methods: Two hundred fifty-three patients underwent pericardiectomy for postoperative constriction from January 1, 1994 through October 1, 2013. The median interval between prior operation and pericardiectomy was 2.2 (9.7) years and 72 (28.5%) patients presented within two years of initial operation. Baseline characteristics include mean age 61.6 (13.7), male sex 211 (83.4%), NYHA, III/IV 217 (85.7%) and mean ejection fraction 57.4% (9). Previous operations included CABG 103 (40.7%), valve surgery 69 (27.3%), combined CABG and valve surgery 25 (9.9%), and other procedures in 56 (22.1%). Cardiac catheterization was performed in 193 (76%) patients; mean right ventricular systolic and diastolic pressures were 44.8 (14.5) mmHg and 24.4 (5.8) mmHg.

Results: Cardiopulmonary bypass was used to support the heart during dissection in 183 (72%) patients for an average of 50.2 (37.7) minutes. Mean length of stay was 8 (range 0-102) days and there were 14 (5.5%) early deaths. Median follow-up time was 6.2 years, and survival at 5 and 10 years postoperatively was 56% and 37%. On multivariate analysis, older age (P <.0001), NYHA, III/IV (P=.0089), right heart failure symptoms (P=.0255), time from previous surgery <2 years (P=.0303) and non-elective operation (P=.0305) were associated with decreased long-term survival.

Conclusions: Increased awareness for symptoms of right heart failure in post cardiac surgery patients should alert physicians to the possibility of pericardial constriction, and early diagnosis may improve early and late outcomes of pericardiectomy in this challenging group of patients.

NOTES:

39. Incidence, Risk Factors, and Outcomes of Conversion from Off-pump Coronary Artery Bypass Grafting to On-pump Coronary Artery Bypass Grafting: A Report from the STS Adult Cardiac National Database

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Authors: *William B. Keeling[1], ***D***Vinod H. Thourani[1], ***D***Gorav Aliawadi[2], Sunghee Kim[3], Derek Cyr[3], *Vinay Badhwar[4], *Jeffrey P. Jacobs[5], J M. Brennan[3], James Meza[3], Roland Matsouaka[3], *Micahel E. Halkos[1]

Author Institution(s): *[1]Emory University, Atlanta, GA; [2]University of Virginia, Charlottesville, VA; [3]Duke Clinical Research Institute, Durham, NC; [4]University of Pittsburgh, Pittsburgh, PA; [5]Johns Hopkins All Children's Hospital, St. Petersburg, FL*

Discussant: ***D****Faisal Bakaeen, *Cleveland Clinic, Cleveland, OH*

Objectives: Off pump coronary artery bypass grafting (OPCAB) has been shown to be an effective strategy to achieve coronary revascularization. The purpose of this study was to define the incidence of intraoperative conversion from OPCAB to ONCAB and to report outcomes based on the reason for conversion.

Methods: Starting in 7/2007, the STS database captured patients that were planned OPCAB but then were converted to OPCAB. 196,576 patients undergoing planned OPCAB within the STS National Database from 7/07 to 6/14 were evaluated. Patients were grouped according to their intraoperative conversion to cardiopulmonary bypass (CPB): 1) planned conversion (PLAN), 2) unplanned conversion for visualization (VIS), 3) unplanned conversion for hemodynamic instability (HEMO), and 4) no conversion (OPCAB). Logistic regression analysis was used to determine risk factors for conversion.

Results: The overall rate of conversion from OPCAB to ONCAB was 5.5%, with 49.6% of the conversions being planned. When compared to those not undergoing conversion (OPCAB, 30-day mortality O:E 0.8), those undergoing conversion to ONCAB experienced greater 30-day mortality regardless of etiology of conversion (PLAN O/E 1.4, VIS 1.6, and HEMO 2.7) (Table 1). Similar O:E ratios were observed for renal failure and prolonged ventilation following conversion. Logistic regression analysis showed advanced age, ejection fraction less than 35%, preoperative intra-aortic balloon pump placement, increasing number of diseased coronary arteries, preoperative heart failure within two weeks, and urgent procedural status were all independent predictors for conversion to ONCAB ($p \leq 0.01$).

Conclusions: Intraoperative conversion from OPCAB to ONCAB remains a morbid event with a risk of mortality much higher than expected. Surgeons should consider elective ONCAB in those with a high risk for conversion during OPCAB.

Table 1 – Postoperative Outcomes

	PLAN N=5,385	VIS N=1,429	HEMO N=4,034	OPCAB N=185,728	Overall
Deep Sternal Wound Infection	15 (0.3%)	8 (0.6%)	24 (0.6%)	468 (0.3%)	515 (0.3%)
Permanent Stroke	76 (1.4%)	29 (2.0%)	116 (2.9%)	1,535 (0.8%)	1,756 (0.9%)
Prolonged Ventilation	671 (12.5%)	209 (14.6%)	933 (23.1%)	13,137 (7.1%)	14,950 (7.6%)
Renal Failure	222 (4.1%)	61 (4.3%)	272 (6.7%)	4,683 (2.5%)	5,238 (2.7%)
30 Day Mortality	163 (3.0%)	48 (3.4%)	294 (7.3%)	2,786 (1.5%)	3,291 (1.7%)

NOTES:

40. Surgical Ablation of Atrial Fibrillation in the United States

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Authors: *Vinay Badhwar[1], ***D****Niv Ad[2], ***D****J. S. Rankin[1], Maria Grau-Sepulveda[3], ***D****Ralph J. Damiano[4], ***D****Patrick M. McCarthy[5], ***D****A. M. Gillinov[6], D *Vinod H. Thourani[7], *Rakesh M. Suri[6], *Jeffrey P. Jacobs[8], ***D****James L. Cox[4]

Author Institution(s): *[1]West Virginia University, Morgantown, WV; [2]Inova Heart and Vascular Institute, Fairfax, VA; [3]Duke Clinical Research Institute, Durham, NC; [4]Washington University, St. Louis, MO; [5]Northwestern University, Chicago, IL; [6]Cleveland Clinic, Cleveland, OH; [7]Emory University, Atlanta, GA; [8]Johns Hopkins University, Baltimore, MD*

Discussant: ***D***Gorav Aliwadi, *University of Virginia, Charlottesville, VA*

Objectives: Surgical ablation (SA) for atrial fibrillation (AF) is effective at restoring sinus rhythm. Incompletely defined operative risk has previously limited the concomitant performance of SA during cardiac operations. The goal of this study was to define performance trends and risk-adjusted outcomes of contemporary surgical ablation.

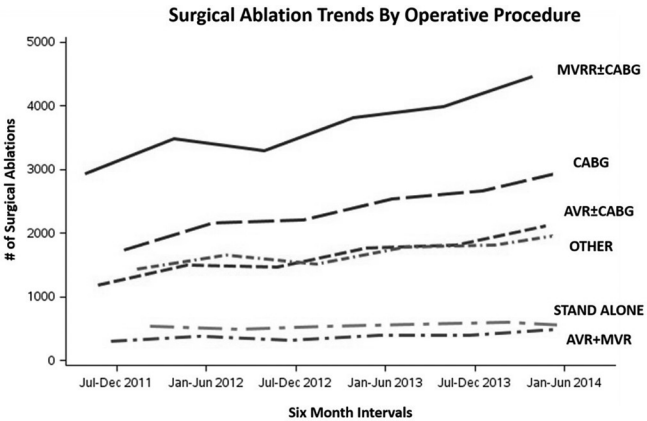
Methods: From January 1 2011 to June 30 2014, 86,941 patients with AF and without endocarditis underwent primary non-emergent cardiac operations in the Society of Thoracic Surgeons Adult Cardiac Surgery Database (STS ACSD). Performance trends of SA were examined for 6 operative categories: MVRR±CABG, AVR±CABG, CABG, AVR+MVR, Stand-alone SA, other concomitant operations. The risk of performing concomitant SA was analyzed by propensity matching 28,739 patients with and without SA by the primary operation type, AF type, and STS ACSD co-morbid risk variables using Greedy 1:1 matching algorithms.

Results: Among all patients with AF in the unmatched cohort, 48.3% (42,066/86,941) underwent SA. Mitral operations had the highest rate of SA [MVRR±CABG 68.4% (14,693/21,496), AVR+MVR 59.1% (1,626/2,750)]. AVR±CABG and isolated CABG rates were 39.3% (6,816/17,349) and 32.8% (9,156/27,924), respectively. Nearly half of other concomitant operations underwent SA, 47.6% (6,939/14,586). Performance frequency increased throughout the study period (Figure). Relative risks (RR) in the matched cohort revealed SA was associated with 30-day reduction in mortality [RR 0.92 (95% CI 0.85-1.00)] and stroke [RR 0.84 (0.74-0.94)] but increase in renal failure [RR 1.12 (1.03-1.22)] and pacemaker implantation [RR 1.33 (1.24-1.43)] (Table).

Conclusions: There is increasing contemporary utilization of SA for all operative categories with evidence of reduction of 30-day mortality and stroke but increase in renal failure and pacemaker implantation.

Relative Risks of Performing Surgical Ablation in Propensity Matched Patients with Atrial Fibrillation During Adult Cardiac Operations 2011-2014

Outcome	Overall (N=57,478)	No Ablation (N=28,739)	Ablation Performed (N=28,739)	Relative Risk (95% CI)	p-value
Mortality	4.31% (2,480)	4.50% (1,292)	4.13 (1,118)	0.92 (0.85-1.00)	0.0422
Reoperation for Bleeding	3.61% (2,075)	3.73% (1,073)	3.49% (1,002)	0.93 (0.86-1.02)	0.1195
Permanent Stroke	1.96% (1,124)	2.13% (612)	1.78% (512)	0.84 (0.74-0.94)	0.0028
Transient Ischemic Attack	0.38% (218)	0.42% (121)	0.34% (97)	0.80 (0.61-1.05)	0.1064
Renal Failure	4.62% (2,585)	4.35% (1,219)	4.88% (1,366)	1.12 (1.03-1.22)	0.0107
Prolonged Ventilation (>24hrs)	16.31% (9,373)	16.75% (4,813)	15.87% (4,560)	0.95 (0.90-0.99)	0.0224
Pacemaker	6.87% (3,946)	5.89% (1,693)	7.84% (2,253)	1.33 (1.24-1.43)	< .0001
Phrenic Nerve Injury	0.06% (33)	0.06% (16)	0.06% (17)	1.06 (0.53-2.14)	0.8655
Readmission 30-days	13.36% (7,347)	12.79% (3,511)	13.92% (3,836)	1.09 (1.03-1.15)	0.0011



MVRR – Mitral Valve Replacement or Repair; CABG – Coronary Artery Bypass Grafting; AVR – Aortic Valve Replacement; OTHER – other combination of concomitant operations; Stand Alone – only surgical ablation performed; MVR – Mitral Valve Replacement

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41. Transcervical Extended Mediastinal Lymphadenectomy (TEMLA) – Experience from a North American Cancer Center

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Authors: *Saikrishna Yendamuri[1], Athar Battoo[1], Mark Hennon[1], Chukwumere Nwogu[1], ***D***Elisabeth Dexter[1], Miriam Huang[1], *Anthony Picone[1], *Todd L. Demmy[2]

Author Institution(s): *[1]Roswell Park Cancer Institute, Buffalo, NY; [2]Cancer Institute of New Jersey, New Brunswick, NJ*

Objectives: Accurate staging of the mediastinum is a critical element of therapeutic decision making in NSCLC. We sought to determine the efficacy of transcervical extended mediastinal lymphadenectomy (TEMLA) for NSCLC tumors that were large, central, or required induction therapy.

Methods: A retrospective chart review of all patients having TEMLA at our institution from the inception of the TEMLA program (2009) to Dec 2015 was performed. Stage was assessed by PET/CT, TEMLA, and final pathologic review. Lymph node yields, tumor characteristics, and TEMLA-related perioperative morbidities were tabulated as well. The accuracy of TEMLA mediastinal restaging the after neoadjuvant therapy was compared to PET/CT.

Results: 164 patients underwent TEMLA. Of these 159 (97%) were completed successfully. Table 1 summarizes the clinical characteristics of this population. Combined surgical resection along with TEMLA was performed in 142 of these patients with the vast majority undergoing a VATS resection (136/142; 95.7%). The recurrent laryngeal nerve injury rate was 6.7%. 118 of 164 patients underwent TEMLA for restaging after neoadjuvant therapy; 108 of these patients were also restaged by PET/CT. In this patient subgroup, TEMLA was more accurate than PET/CT in staging the mediastinum (90% vs 73%, P<0.005). However, the pneumonia rate in this subgroup of patients was 13%.

Conclusions: Transcervical mediastinal lymphadenectomy (TEMLA) is a safe and superior to PET/CT for restaging of the mediastinum after neoadjuvant therapy for NSCLC. This increased accuracy comes at a cost of a higher than normal post-operative pneumonia rate.

Table 1. Patient characteristics

Patient characteristic	Measure
Age (mean)	64.4yrs
Gender (% female)	51.2%
Histology (%) Adenocarcinoma Squamous cell carcinoma Other histology	 90 (54.9%) 59 (36.0%) 15 (9.1%)
FEV1 (Mean %pred) DLCO (mean %pred)	75.4% 74.6%
Clinical stage (%) I II III IV	 18 (11%) 39 (24%) 96 (59%) 11 (7%)
Pathologic stage (%) 0 I II III IV	 7 (4.3%) 39 (23.8%) 52 (31.7%) 56 (34.1%) 10 (6.1%)
Neoadjuvant therapy (%) None Chemotherapy Chemoradiation Radiation	 46 (28%) 100 (61%) 17 (10.4%) 1 (0.6%)
Extent of resection (%) None Wedge resection Lobectomy Pneumonectomy	 26 (15.8%) 6 (3.6%) 115 (70.1%) 17 (10.4%)
Modality of resection (%) No resection VATS Open	 26 (15.8%) 130 (79.2%) 8 (4.9%)

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42. Transversus Abdominis Plane (TAP) Block Improves Perioperative Outcomes After Esophagectomy Compared to Thoracic Epidural (TE)

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Authors: Gal Levy[1], Mark Cordes[2], Ralph W. Aye[1], Alexander S. Farivar[1], ***D***Brian E. Louie[1]

Author Institution(s): *[1]Swedish Medical Center and Cancer Institute, Seattle, WA; [2]Swedish Hospital, Seattle, WA*

Objectives: Pain control is challenging during esophagectomy. A thoracic epidural (TE) is commonly used but is a compromised when covering chest and abdominal incisions. Additionally, the sympathetic blockade can have unintended consequences such as hypotension or delayed return of bowel function. A transversus abdominis plane block (TAP) has the potential to control upper abdominal pain without these negative consequences. We aimed to compare a TE (T5-9) with bilateral TAP blocks with PCA for immediate management after esophagectomy.

Methods: Retrospective review of patients undergoing esophagectomy between 2012 and 2015. Primary outcomes were initial volume resuscitation at 72 hours, hypotension (SBP <90 mmHg), length of stay (LOS), return of bowel function and complications. Pain scores (0-10) at 24, 48 and 72 hours were assessed for adequacy of pain control.

Results: Forty patients underwent esophagectomy: bilateral TAP block with PCA (N=20) versus TE (N=20). Both groups were comparable in age, gender, stage and histology. During the initial 72 hours after surgery, hypotension was less prevalent in the TAP group (14% vs 78%, p<0.05) and consequently, the TAP group required significantly less volume resuscitation (10 L vs 17 L, p=0.018). Pain scores were not statistically different between TAP blocks and TE at 24 h (5.9 vs 4.6, p=0.07), 48 h (5.5 vs 4.9, p=0.21), and 72 h (4.8 vs 4.5, p=0.37). There was one death and one pneumonia in the TAP block group but lower overall morbidity (25% vs 60%, p<0.05), lower occurrences of atrial fibrillation (5% vs 25%, p=0.67) and lower anastomotic leak rates (0 vs 10%, p=0.15). The length of stay and return of bowel function was significantly shorter in the TAP group (10 days vs 12, p=0.02) and (5 days vs 7, p<0.05) respectively.

Conclusions: TAP blocks with a PCA during esophagectomy achieve equivocal pain control compared to TE result in less hypotension and fluid resuscitation with fewer complications.

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43. Office-Based Spirometry: A New Model of Care in Preoperative Assessment for Low-Risk Pulmonary Resections

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Authors: Jessica L. Hudson, Jennifer Bell, *A. Sasha Krupnick, *Daniel Kreisel, ***D***Traves D. Crabtree, *G. Alexander Patterson, *Bryan F. Meyers, *Varun Puri

Author Institution(s): *Washington University School of Medicine, St. Louis, MO*

Objectives: Formal pulmonary function testing with laboratory spirometry (LS) is currently standard of care for risk stratification prior to lung resection. We have previously shown that LS and handheld office spirometry (OS) are clinically comparable for forced expiratory volume in 1 second (FEV1) and forced vital capacity. We investigated the safety of preoperative risk stratification for lung resection based solely on OS.

Methods: Patients deemed low-risk for lung resection by predetermined criteria were enrolled in a single-center prospective study and underwent preoperative OS. When FEV1% was >60% by OS, formal LS was not performed. Patients in the OS group were compared to those who underwent LS and lung resection in a propensity score matched model. Standardized mean differences determined covariate balance in the model. McNemar's test and log-rank test were performed respectively for categorical and continuous paired outcome data.

Results: 65 prospectively enrolled patients met inclusion criteria, received OS, and underwent pulmonary resection. 1,444 patients in the institutional database (50% of resections from 2008-15) also met inclusion criteria and underwent LS. The c-statistic of the propensity score model was 0.966, resulting in 44 matched pairs (68%). There were no mortalities and only one 30-day readmission per group. The risk of major morbidity was similar at 6 patients per group (13.6%). All analyses of morbidity in discordant pairs had p >0.56. Likewise, there was no association between length of stay and exposure to OS vs LS (p=0.31). The estimated annual cost savings to the institution from performing OS only and avoiding LS was $65,000.

Conclusions: Low-risk patients undergoing lung resection can be adequately and safely assessed using handheld OS without the need for formal LS, with significant cost savings. With upcoming bundled care reimbursement paradigms, such safe and effective strategies are likely to be more widely employed.

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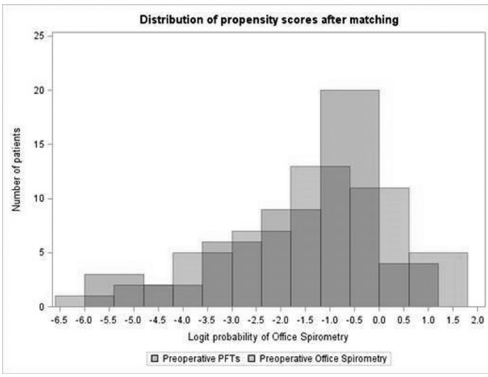
Characteristics of 1509 patients being evaluated for lung resection screened with office spirometry vs formal laboratory spirometry techniques

		Unmatched groups			Propensity score matched groups		
		No. of patients (%)			No. of patients (%)		
Characteristics		Office spirometry (N=65)	Laboratory spirometry (N=1444)	p value	Office spirometry (N=44)	Laboratory spirometry (N=44)	p value
Age, mean (SD), in years		58.02 (12.31)	62.58 (12.21)	*0.003	59.16 (12.50)	56.89 (14.89)	0.440
Male sex		30 (46.15)	682 (43.77)	0.705	19 (43.18)	19 (43.18)	1.000
Race	White	51 (84.48)	1254 (86.84)	0.053	36 (81.82)	35 (79.55)	0.787
	Black	13 (20.00)	163 (11.29)	*0.032	7 (15.91)	8 (18.18)	0.777
	Other	1 (1.54)	27 (1.87)	0.847	1 (2.27)	1 (2.27)	1.000
Body mass index, mean (SD)		28.66 (6.35)	28.15 (6.61)	0.539	27.34 (7.02)	29.18 (6.22)	0.852
Smoking	Never smoker	27 (41.54)	381 (26.39)	*0.003	18 (40.91)	17 (38.64)	0.896
	Former smoker (quit >1 month prior)	26 (40.00)	686 (47.51)	0.387	20 (45.45)	18 (40.91)	0.735
	Current smoker	9 (13.85)	376 (26.04)	*0.027	6 (13.64)	8 (18.18)	0.560
Packs per year, mean (SD), in pack-years		36.68 (20.83)	43.97 (30.79)	0.056	35.50 (22.38)	29.52 (22.53)	0.337
FEV1% predicted, mean (SD), in %		89.42 (15.99)	87.26 (16.23)	0.293	87.60 (14.84)	90.64 (18.78)	0.403
FVC% predicted, mean (SD), in %		88.73 (22.24)	95.17 (16.53)	*0.024	88.75 (20.84)	92.18 (18.31)	0.414
Number of preoperative comorbidities, mean (range)		0.79 (0-3)	1.03 (0-5)	0.654	0.68 (0-2)	0.74 (0-5)	0.750
Disease category	Benign	12 (18.46)	211 (14.61)	0.402	6 (13.64)	5 (11.36)	0.747
	Malignant	53 (81.54)	1226 (84.90)	0.402	38 (86.36)	39 (88.64)	0.747
Surgery type	Wedge resection	39 (60.00)	519 (35.94)	*<0.0001	24 (54.55)	25 (56.82)	0.830
	Segmentectomy	NA	59 (4.09)	*<0.0001	NA	NA	NA
	Lobectomy	24 (36.92)	815 (56.44)	*0.002	19 (43.18)	18 (40.91)	0.830
	Bilobectomy	2 (3.08)	39 (2.70)	0.855	1 (2.27)	1 (2.27)	1.000
	Bullectomy	NA	12 (0.83)	*<0.0001	NA	NA	NA
Incision type	Thoracoscopy	48 (73.85)	496 (34.35)	*<0.0001	30 (68.18)	32 (72.73)	0.640
	Thoracotomy	14 (21.54)	936 (64.82)	*<0.0001	14 (31.82)	11 (25.00)	0.478
	Thorascopy converted to thoracotomy	2 (3.08)	8 (0.55)	*0.014	NA	1 (2.27)	0.315
	Sternotomy	1 (1.54)	3 (0.21)	*0.041	NA	NA	NA
	Other	NA	1 (0.07)	*<0.0001	NA	NA	NA

Abbreviations: SD, standard deviation. NA, not applicable.



Propensity score distribution after matching for office spirometry versus formal laboratory spirometry

44. Video-Thoracoscopic Management of Post-Pneumonectomy Empyema

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Authors: Domenico Galetta, Alessandro Borri, Roberto Gasparri, Francesco Petrella, Lorenzo Spaggiari

Author Institution(s): *European Institute of Oncology, Milan, Italy*

Objectives: Postpneumonectomy empyema (PPE) is a serious complication even when it is not associated with bronchopleural fistula (BPF). Besides irrigation, an aggressive treatment is usually applied for removing infected material. However, a minimally invasive approach might achieve satisfactory results in selected patients.

Methods: We retrospectively identified 18 patients presenting with PPE receiving video-thoracoscopic approach. There were 14 males and 4 females, (mean age, 62 years; range, 44-73). Empyema was confirmed by thoracentesis and bacteriological examination. All patients had immediate chest tube drainage and underwent thoracoscopic debridement of the empyema. No irrigation was used postoperatively. Fifteen patients had no proven BPF; 2 had suspicious of a BPF, and one had a minor (<3 mm) BPF.

Results: Median time from pneumonectomy to empyema diagnosis was 129 days (range, 7-10590). Median time from drain position to VATS procedure was 10 days (range, 2-78). A bacterium was isolates in 13 cases (72.2%). There was no mortality and no morbidity related to the procedure. The average duration of thoracoscopic debridement was 56 minutes (range, 40-90). Median postoperative stay was 7 days (range, 1-18). Only in one patient an open-window thoracostomy was performed. Median follow-up of the 18 patients receiving thoracoscopy was 41.5 months (range, 1-78 months). None had recurrent empyema. The patient with a minor BPF remained asymptomatic and is doing well at 48 month follow-up.

Conclusions: Thoracoscopy might be a valuable approach for patients presenting with PPE with or without minimal BPF. Video-thoracoscopic debridement of postpneumonectomy space is an efficient method to treat PPE.

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45. Medium-Term Outcomes After Implantation of Expanded-Polytetrafluoroethylene Valved Conduit (ePTFE VC) for Right Ventricular Outflow Tract

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Authors: *Yoshio Ootaki (Otaki), Allison Welch, Michael J. Walsh, Michael Quartermain, *Ross M. Ungerleider

Author Institution(s): *Wake Forest Baptist Health, Winston Salem, NC*

Discussant: ***D****James A. Quintessenza, *All Children's Hospital, St. Petersberg, FL*

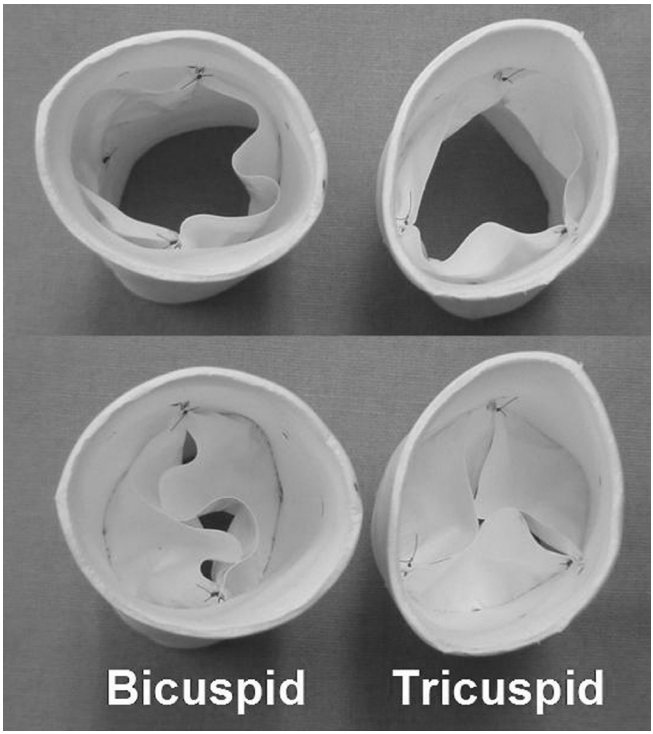
REGULATORY DISCLOSURE: This presentation describes the off-label use of an Expanded-Polytetrafluoroethylene Valved Conduit, which has an FDA status of investigational.

Objectives: Pulmonary valve replacement (PVR) is becoming the most frequent congenital heart operation performed on adolescents and young adults. Multiple surgical options are available including autologous pericardium, mechanical valves, allografts, and bioprosthetic valves. Each option has limitations with durability, endocarditis or freedom from reintervention for stenosis or insufficiency, particularly in the pediatric population. We report our experience a uniquely designed, trileaflet expanded-polytetrafluoroethylene valved conduit (ePTFE VC) for right ventricular outflow tract reconstruction.

Methods: Beginning in 2012, ePTFE VC were implanted in 24 patients with a median age of 10.2 years (1 year to 15 years). Bileaflet valved conduits were used initially in 3 patients, and our novel trileaflet valved conduit was used in 21 patients (Figure 1). Our unique trileaflet ePTFE VC is easy to construct and due to design characteristics, is 1-2 cm shorter than similar bileaflet models. Our ePTFE VC is fashioned from commercially available ePTFE tube graft (16 mm in 1 patient, 20 mm in 6 patients, 24 mm in 17 patients) and 0.1 mm thick ePTFE membrane for the leaflet material on a sterile back table while the sternum is being opened by a colleague. Valve function was assessed by echocardiography after the implantation.

Results: There were no hospital deaths. Mean follow up was 2.2 years (4 month to 4.2 years) and during this time there was no reoperation for the ePTFE VC. There was one intervention for stenosis at the distal anastomosis. Pulmonary insufficiency was mild or less in 22 patients (92%). The mean peak pressure gradient between the right ventricle and the pulmonary artery measured by echocardiography was 19.2 ± 7.6 mmHg. There have been no cases of endocarditis.

Conclusions: Compared to historical data for other PVR options, our ePTFE VC shows superior medium-term performance, with less reinterventions, endocarditis or significant valve dysfunction.



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46. Efficacy of an Extracellular Matrix in Systemic Loading Conditions in Congenital Heart Disease Surgical Repair

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Authors: Adeel Ashfaq[1], Amit Iyengar[1], Oh Jin Kwon[1], Saad Soroya[1], Son Nguyen[1], Ryan Ou[1], Brian Reemtsen[2]

Author Institution(s): *[1]David Geffen School of Medicine at UCLA, Los Angeles, CA; [2]Mattel Children's Hospital, Los Angeles, CA*

Discussant: *Lauren Kane, *Texas Children's Hospital / Baylor College of Medicine, Houston, TX*

REGULATORY DISCLOSURE: This presentation describes the use of the CorMatrix Patch by CorMatrix Cardiovascular Inc., which is FDA approved.

Objectives: Extracellular matrices (ECM) are commonly used to repair congenital heart defects; however there is a lack of literature pertaining to outcomes with ECM use in high pressure conditions. We aimed to evaluate the efficacy of an ECM used in systemic, high pressure loading conditions in congenital heart defect repair.

Methods: Between January 2011 and August 2014, a total of 202 patients underwent congenital heart disease repair using the ECM placed in a systemic pressure condition, and were included in the study. The operative sites with the appropriate loading conditions included: defects in the ventricular septum, mitral valve, aortic valve, ascending aorta, and aortic arch. Patients were followed and evaluated for mortality and reoperations due to loss of ECM integrity. Echocardiograms were evaluated for graft malfunction such as aneurysmal dilation, VSD formation, valve malfunction, or outflow tract obstruction.

Results: Patients were followed for an average of 527 days (Median=374). Out of the 202 patients, 7 (3.5%) died due to complications unrelated to ECM, and 9 (4%) underwent reoperations due to complications of ECM integrity. Reoperations were as follows: 3 of 6 patients receiving aortic leaflet replacement required reoperation for leaflet failure; 3 of 12 patients receiving mitral valve leaflet repairs required reoperation for leaflet failure (All 3 were less than 1 year-old); 2 of 142 patients with VSD repair required reoperation for residual shunting; and 1 patient required a balloon angioplasty after coarctation patch repair. The average time to reoperation was 198 days (Median=67).

Conclusions: This modern case series suggests that the ECM is efficacious and sustainable under systemic conditions in congenital heart defect repair. However, concerns remain about the use of ECM in aortic valve repair and infant mitral valve repair. Further studies are needed to evaluate long-term ECM integrity.

Extracellular Matrix Placement Sites and Reoperations

ECM Placement Site (n)		Reoperations
Ventricular Septum	142	2 (Residual Shunting)
Aorta	44	None
Mitral Valve Leaflet	12	3 (Leaflet Repair)
Aortic Valve Leaflet	6	3 (Leaflet Repair)
Ventricular Assist Device Suture Site	3	None
Left Ventricle	1	None

*Several patients has multiple patches placed, thus percentages are not reported.

NOTES:

47. Brom (Multisinus) Aortoplasty for Supravalvar Aortic Stenosis

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Authors: Michael C. Monge[1,2], *Carl L. Backer[1,2], Osama Eltayeb[1,2], Joyce T. Johnson[1,2], Andrada R. Popescu[1,2], Cynthia K. Rigsby[1,2], John M. Costello[1,2]

Author Institution(s): [1]*Ann & Robert H Lurie Children's Hospital, Chicago, IL;* [2]*Northwestern University Feinberg School of Medicine, Chicago, IL*

Discussant: *James D. St. Louis, *Children's Mercy Hospital and Clinics, Kansas City, MO*

Objectives: Controversy remains regarding the optimal surgical approach for children with supravalvar aortic stenosis (SAS). There are proponents of one-patch, two-patch, three-patch, and autologous slide aortoplasty.

Methods: The three-patch technique was first described by Gerard Brom from Brussels, Belgium in 1988. Since 1997 we have used the Brom three-patch aortoplasty to treat 20 patients with SAS. In recent years we have used computed tomographic (CT) imaging for preoperative evaluation rather than cardiac catheterization as it does not require general anesthesia.

Results: In 20 consecutive patients with SAS, the mean age was 3.7 ± 5.9 years, median age was 1.5 years. Twelve patients had Williams syndrome. Ten patients had advanced preoperative medical imaging (7 CT, 3 MRI). Mean cardiopulmonary bypass time was 172 ± 29 minutes. Mean cross-clamp time was 110 ± 21 minutes. Nine patients had simultaneous pulmonary artery stenosis patching. Median length of stay was 7 days. There was no operative or late mortality. Mean follow-up time is now 6 ± 5 years. There were no reoperations on the aortic root. Eight patients have no or trivial aortic insufficiency (AI), 3 patients have mild AI, and 1 patient has moderate AI. One patient who had infant balloon dilation of the aortic valve and later subacute bacterial endocarditis has moderate to severe aortic valve insufficiency (AI) and stenosis (AS). One patient has moderate residual supravalvar AS; all the others have essentially no AS. None had signs of late coronary insufficiency.

Conclusions: CT imaging is our diagnostic modality of choice for SAS. Multisinus patch aortoplasty restores the normal aortic root geometry and relieves coronary orifice stenosis in children with supravalvar aortic stenosis. Long-term outcomes are excellent with essentially no recurrent SAS and preservation of aortic valve function.

NOTES:

48. A New Kaolin Impregnated Hemostatic Sponge (QuikClot®) Is Effective for Intraoperative Hemostasis in Norwood Operation

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Authors: Takeshi Shinkawa, Carl Chipman, Jessica Holloway, Xinyu Tang, Jeffrey M. Gossett, Michiaki Imamura

Author Institution(s): *University of Arkansas for Medical Sciences, Little Rock, AR*

Discussant: *Charles B. Huddleston, *Cardinal Glennon Children's Hospital, St. Louis University School of Medicine, St. Louis, MO*

Objectives: A newly developed kaolin impregnated hemostatic sponge (QuikClot®) is reported to reduce intraoperative blood loss in trauma or non-cardiac surgery. The objective of this study was to assess the effectiveness of this device in pediatric cardiac surgery.

Methods: This is a retrospective review of all patients who underwent Norwood operation in infancy between 2011 and 2015 at a single institution. The patients who had postoperative extracorporeal membrane oxygenation support were excluded. The patients were divided into 2 groups based on the kaolin impregnated hemostatic sponge usage, and the operative outcomes were compared between groups.

Results: Twenty-nine Norwood operations during the study period were included. All patients had cardiopulmonary bypass primed with packed red blood cell and fresh frozen plasma, and deep hypothermia to 18 degrees Celsius with antegrade regional cerebral perfusion. The packed red blood cell, platelet concentrate, cryoprecipitate, and the factor VII were given as necessary after cessation of cardiopulmonary bypass. A kaolin impregnated hemostatic sponge was used intraoperatively in 13 patients (Group Q) and not used in 16 patients (control). There was no significant difference in preoperative profiles and cardiopulmonary bypass time between the groups. The intraoperative platelet, cryoprecipitate, and factor VII dosage were significantly less in group Q compared to control (55 ml, 10 ml, 0mcg/kg vs. 72 ml, 15 ml, 45 mcg/kg; p=0.028, 0.011, 0.036). The bleeding complication (2nd cardiopulmonary bypass run for hemostasis or mediastinal exploration in the ICU) was significantly lower in group Q compared to control (0 vs. 31 %, p=0.048).

Conclusions: A new kaolin impregnated hemostatic sponge was effective to reduce blood product use and postoperative bleeding complications in Norwood operation at a single institution.

Results

Variables	Control (No Quikclot use; n=16)	Group Q (QuikClot use; n=13)	*p*-value
packed Red Blood Cell after bypass (ml)	268 (238, 295)	252 (0, 270)	0.10
Platelet dose (ml)	72 (60, 86)	55 (45, 70)	0.028
Cryoprecipitate dose (ml)	15 (10, 20)	10 (10, 10)	0.011
Factor VII (mcg/kg)	45 (0, 180)	0 (0, NA)	0.036
Bleeding complication	5 (31%)	0 (0%)	0.048

Variables were summarized as median (25th percentile, 75th percentile) or number (percentage). p-values are based on Mann-Whitney U tests and Fisher's exact test.

NOTES:

49. Midterm Results of Hybrid Arch Repair With Zone 0 Stent Graft Deployment

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Authors: Seyed Hossein Aalaei Andabili[3], *Charles T. Klodell[1], Teng Lee[1], Philip Hess[2], ***D***Tomas Martin[3], ***D***Adam Beck[4], ***D***Robert Feezor[1], Salvatore T. Scali[1], *Thomas M. Beaver[1]

Author Institution(s): *[1]University of Florida, Gainesville, FL; [2]Indiana University, Indianapolis, IN; [3] Florida Hospital Orlando, Orlando, FL*

Objectives: Hybrid technique can facilitate treatment of distal aortic arch pathology. We reviewed outcomes of single-stage hybrid arch (HybridArch) procedures at our center.

Methods: Single university center retrospective review (Jun-2010 to Aug-2015) of 48 patients undergoing replacement of the ascending aorta, arch debranching, with Zone 0 antegrade stent graft placement.

Results: There were 25 (52%) elective and 23 (48%) emergent patients with a mean age±SD 64±11yrs. Twenty seven (56%) patients had aortic aneurysm and 21 (44%) acute/chronic dissection. Overall in-hospital mortality was 17% (8/48): 17% (4/23) in emergent and 16% (4/25) in elective patients (P=1). In-hospital mortality was associated with age>65 [OR=9.5 (1.2-36)], preoperative INR>1.3 [OR=14.2 (2.1-95.8)], and postoperative acute kidney injury (AKI) [OR=5.6 (1.1-29)]. Post-operative stroke and paraplegia occurred in 3(6%) and 2(4%) patients, respectively. Six (13%) patients were re-intubated. Based on AKIN criteria, 12 (25%) patients developed AKI. Emergent patients had longer ICU admission than elective, 7.7 days (range: 3.1-48.2) vs 4.2 (rage: 3.3-40.8) days (p=0.034). Median length of ventilation and hospital stay were not different between two groups. At one year follow up, 2 (2/40, 5%) patients were noted to have a type, II endoleak, and 2 other patients had chronic dissection of the distal aorta: one underwent graft expansion, while another had distal aortic reconstruction. Median follow up time was 17 months (range: 1-63); following discharge overall survival rate was 92% at 6 months and 89% at 1-3 years (Fig-1).

Conclusions: HybridArch techniques facilitate repair of complex arch aortic pathology and obviate the need for second stage surgery. Mortality was higher in patients with preoperative INR>1.3, age >65yrs, and postoperative AKI; and following discharge midterm survival was 89% at 3 years.

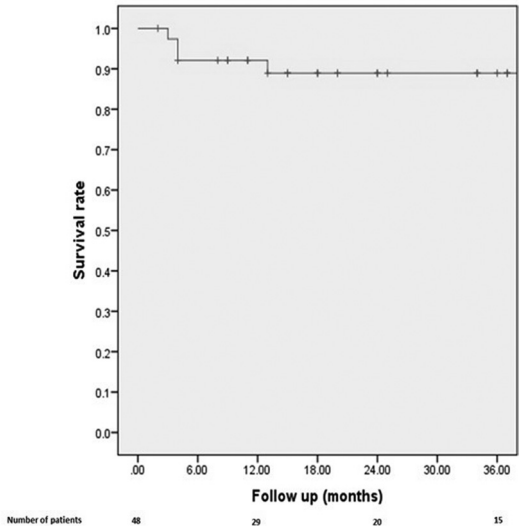

Figure-1. Survival rate of patients who underwent single-stage HybridArch repair

NOTES:

50. Transmyocardial Laser Revascularization (TMR) For Class IV Angina: 30-Day Outcomes from a Contemporary, Multi-Center Patient Registry

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Authors: ***D****V. Seenu Reddy[6], Keith B. Allen[1], Eric Peck[5], Thomas R. Pollard[3], Robert J. Still[4], Joseph Wilson[2]

Author Institution(s): *[1]St. Luke's Mid America Heart Institute, Kansas City, MO; [2]Eisenhower Medical Center, Rancho Mirage California, CA; [3]Parkwest Medical Center, Knoxville, TN; [4]Baptist Medical Center, Jacksonville, FL; [5]Bakersfield Memorial Hospital, Bakersfield, CA, CA; [6]Centennial Hospital, Nashville, TN*

Objectives: Transmyocardial revascularization (TMR) is an effective treatment for symptomatic relief of angina. The objectives of this patient registry were to define further the disease characteristics of the population being treated, evaluate rates of 30-day postoperative mortality and major adverse cardiac events (MACE), and assess preoperative and operative risk factors.

Methods: Between May 2013 - March 2015, 203 patients (189 (93.1%) TMR+CABG, 13 (6.4%) sole therapy) with Canadian Cardiovascular Society (CCS) class IV angina and regions of myocardium not amenable to direct coronary revascularization, were enrolled from 25 centers. Patient demographics, TMR procedure, 30-day follow-up, and CCS angina score information were prospectively collected. Multivariate analyses evaluated the relationship between 30-day mortality and 30-day MACE (cardiac-related death, myocardial infarction, congestive heart failure, cerebrovascular accident, and serious arrhythmia), with preoperative and operative variables. Mean age was 64.3 ± 10.2 and 74.4% were male. Mean pre-operative ejection fraction (EF) was 52.2 ± 9.8%.

Results: Sole therapy patients were younger and had more pre-operative comorbidities vs. TMR+CABG patients. Thirty-day follow-up was 98.5% complete (n=200/203). Rates of 30-day mortality and MACE were 0.5% (1/200) and 9.5% (19/200), respectively. Diabetes was the only statistically significant predictor of MACE. Diabetics had a 3.3 times greater risk of MACE vs. non-diabetics (p=0.043). Rehospitalization occurred in 8.0% (16/200) of patients and 98.9% (183/185) reported a ≥2 class reduction in angina.

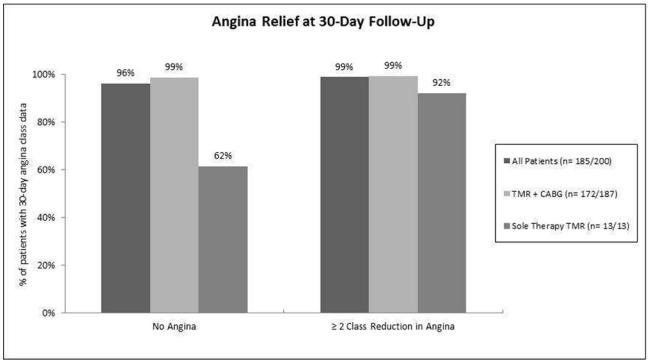
Conclusions: The data demonstrate low operative mortality and incidence of MACE at 30-day follow-up in patients with Class IV angina undergoing either sole therapy or adjunctive TMR, with excellent reduction in angina.

Summary of 30-Day Outcomes, n (%)*

Event	All Patients (n= 200)	Adjunctive TMR+CABG (n= 187)	Sole Therapy TMR (n= 13)
Mortality	1 (0.5%)	1 (0.5%)	0 (0%)
MACE	19 (9.5%)	18 (9.6%)	1 (7.7%)
A-fib	13 (6.5%)	12 (6.4%)	1 (7.7%)
Rehospitalization	16 (8.0%)	14 (7.5%)	2 (15.4%)
≥ 2 Class Reduction in Angina	183/185 (98.9%)	171/172 (99.4%)	12/13 (92.3%)

*30-day follow-up available for 200/203 of all patients, 187/189 of TMR+CABG, and 13/13 of sole therapy.

*STSA Member ***D*** Relationship Disclosure


Angina Relief at 30-Day Follow-Up
% of patients with 30-day angina class data
100%
80%
60%
40%
20%
0%
96%
99%
62%
99%
99%
92%
No Angina
≥ 2 Class Reduction in Angina
All Patients (n= 185/200)
TMR + CABG (n= 172/187)
Sole Therapy TMR (n= 13/13)

NOTES:

51. Intermediate Outcomes After Conservative Repair of Type A Aortic Dissection

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Authors: Fernando Fleischman, James M. Tatum, Daniel Logsdon, W H. Gray, Robbin G. Cohen, Amy Hackmann, Mark J. Cunningham, Vaughn A. Starnes, ***D***Michael E. Bowdish

Author Institution(s): *University of Southern California, Los Angeles, CA*

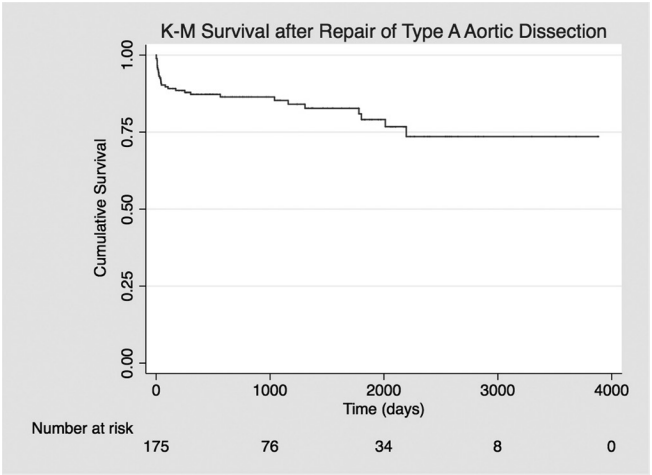
Objectives: Controversy exists regarding the extent of repair required in type A aortic dissection. We resect all proximal and arch intimal tears and repair the corresponding sections of the aorta, but only address disease essential for survival.

Methods: Between 2005 and 2015, 179 patients had repair of type A aortic dissections (age 61+/-13.4 years, range 29-88 years; 70% male). Arterial cannulation was isolated axillary in 107 (60%), isolated central in 6 (3%), isolated femoral in 14 (8%) and through a combination of cannulation sites in 52 (29%). Repair was categorized by site of proximal and distal anastomosis. The proximal anastomosis was at the sinotubular junction in 136 (76.4%), the aortic root in 39 (21.9%), and valve sparing root replacement in 3 (1.7%). Distal anastomosis was distal ascending aorta in 35 (20.0%), arch undersurface in 105 (59.0%) and total arch replacement in 38 (21.4%). Innominate or axillary artery dissections had been identified on imaging in 58 (32.6%). Mortality was confirmed utilizing Social Security Death Index or by patient contact. Mean follow-up is 3.0+/-2.7 (Range 0-10.7) years. Kaplan-Meier and cox-proportional hazard analysis was used to assess survival and model contributing factors.

Results: Survival was 92.2%, 85.7%, 83.8% and 77.7% at 30-days, 1, 3 and 5 years. Complications were cerebrovascular accidents in 13 (7.4%), acute renal failure in 32 (18.2%), liver failure in 21 (12.1%), and limb ischemia in 5 (2.8%). Intraoperative death occurred in 3 (1.6%), <30-day mortality in 14 (7.8%). Axillary cannulation did not affect incidence of post-operative complications regardless of innominate or axillary artery dissection. Level of anastomosis did not affect survival (Proximal: hazard ratio [HR]: 1.085, 95% confidence interval [CI]: 0.47, 2.47, p = 0.84, Distal: HR: 1.083, CI: 0.65, 1.88, p = 0.78).

Conclusions: A conservative approach to the repair of acute type A dissection results in excellent survival to 5 years.

*STSA Member ***D*** Relationship Disclosure


K-M Survival after Repair of Type A Aortic Dissection
Cumulative Survival
0.00
0.25
0.50
0.75
1.00
0
1000
2000
3000
4000
Time (days)
Number at risk
175
76
34
8
0

NOTES:

52. Timing of Operation for Tricuspid Regurgitation After Heart Transplant

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Authors: *A. Michael Borkon, Kaitlyn Carl, Sanjeev aggarwal, *Keith B. Allen, Alex Pak, John R. Davis, Eric Thompson, Jingyan Wang, Andrew Kao

Author Institution(s): *Mid America Heart Institute of Saint Luke's Hospital, Kansas City, MO*

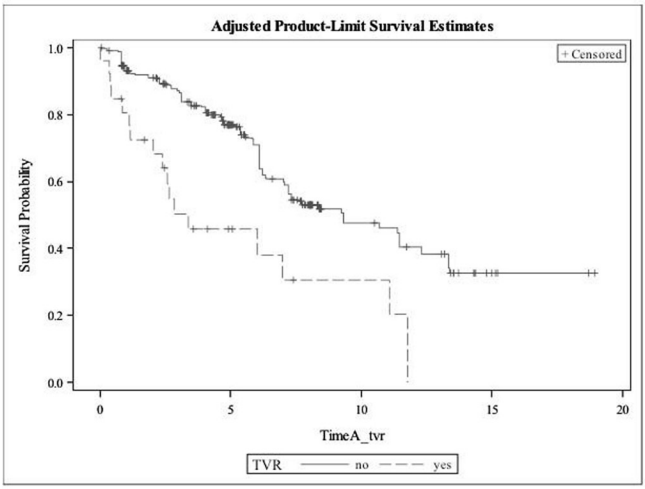
Discussant: *Anthony L. Estrera, *University of Texas Houston Medical School, Houston, TX*

Objectives: Significant tricuspid regurgitation (TR) developing after heart transplantation (HT) may reduce quality of life and increase late mortality. This study examines outcomes for patients with at least moderate TR after HT and the importance of timing for tricuspid valve operation in this group of patients.

Methods: Between January 1, 2000 and July 1, 2015, 460 HT performed in 456 patients at our institution were retrospectively studied. Patients dying within 30-days were excluded. Echocardiograms at post-transplant time points were obtained for 451 HT. Severity of TR was graded on a scale of none to severe. Moderate/severe TR was found in 75 HT patients. Results from this group were compared to patients with mild or no TR. During this period, 31 HT (TVR) underwent tricuspid repair (3) or replacement (28). 26 TVR patients could be matched with 128 HT without TVR by recipient gender, age at HT, ischemic time, and era of transplant. Data was analyzed with uni-variable, Kaplan Meier analyses and Cox proportional hazard modeling.

Results: Moderate/severe TR was more frequent in HT with a higher number of post-transplant biopsies (19.9±7.9 vs. 14.1±5.2, $p<0.001$) and treatable rejection episodes (1.2±1.6 vs. 0.5±1.1, $p<0.001$), and lack of annuloplasty at time of HT (80.0% vs. 93.6%, $p<0.001$). HT with moderate/severe TR had significantly higher incidence of composite death, re-transplant, or need for TV surgery compared to HT with none/mild TR ($p=0.0023$). Of 31 patients undergoing TVR, there was only one hospital death; however, the hazard ratio for death, re-transplant, or need for TV surgery in HT undergoing TVR compared to HT not undergoing TVR was 4.258 ($p<0.0001$).

Conclusions: Development of moderate/severe TR after HT is associated with poor composite outcomes. While TVR can be carried out with low mortality, this group of HT patients continues to do poorly, suggesting a need for earlier operation and a less invasive means of rejection diagnosis.



When adjusted by gender, age at transplant, ischemic time and transplant date, time-dependent variable TVR was associated with increased mortality, and graft failure, p = 0.0001, Hazard ratio = 4.258(95% CI: 2.419, 7.497) at 5% significant level.

NOTES:

53. Atrial Resection Without Cardiopulmonary Bypass for Lung Cancer: Experience from a Single Institution

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Authors: Domenico Galetta1, Alessandro Borri, Roberto Gasparri, Francesco Petrella, Lorenzo Spaggiari

Author Institution(s): *European Institute of Oncology, Milan, Italy*

Objectives: Results of resection of lung cancer invading the left atrium (T4atrium) without cardiopulmonary bypass (CPB) remain controversial. \We reviewed our experience analyzing surgical results and postoperative outcomes.

Methods: Patients who underwent extended lung resection for T4atrium without CPB between September 1998 and March 2016 were retrospectively reviewed using a prospective database.

Results: Forty-four patients were collected (34 men, median age of 63 years). Twenty-five patients underwent preoperative mediastinal staging and 27 received induction treatment (IT). Lung resection included 40 (90.9%) pneumonectomies, 3 (6.8%) lobectomies and one bilobectomy (2.3%). Pathological nodal status was N0 in 10 patients (22.7%), N1 in 18 (40.9%), and N2 in 16 (36.4%). Four patients receiving IT had complete pathological response (9.1%). Ten patients (22.7%) had microscopic tumor evidence on atrial resected margins. Mortality was nil. Major complication rate was 11.4%: one BPF, one cardiac herniation, and three cases of hemothorax all requiring re-intervention. Minor complication rate was 25%: 8 atrial arrhythmias, and 3 atelectases. After a median survival of 37 months (range, 1-144 months), 20 patients (45.4%) were alive. Five-year survival and disease-free interval were 39% and 45.8%, respectively. Patients with N0 disease and R0 had a best prognosis (log-rank test: p=.03, and p=.01, respectively). IT neither influenced survival nor postoperative complications. At multivariate analysis, pN0 [p=.04 (95% CI: 0,65-9,66)] and negative atrial margins [p=.02 (95% CI: 0,96-8,35) were positive independent prognostic factors.

Conclusions: Resection of T4atrium is technically feasible without mortality and with acceptable morbidity. Patients with N2 cancers should not be operated on. Our results suggest that lung cancer invading the left atrium should not be systematically considered as a definitive contraindication to surgery.

NOTES:

54. Comparing Outcomes After Pulmonary Resection for Lung Cancer Between Veterans Administration Medical Center and an Academic Medical Center

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Authors: Travis Geraci[1], Vanessa Baratta [1], John Young[1], Ann-Marie Dunican[2], Richard Jones[1], Thomas Ng[1]

Author Institution(s): *[1]Warren Alpert Medical School of Brown University, Providence, RI; [2]Providence VAMC, Providence, RI*

Objectives: Hospital and surgeon volume each have an association with postoperative outcomes. The volume of lung cancer surgery at our Veterans Administration Medical Center (VAMC) is lower than at our Academic Medical Center (AMC). We compared the outcomes after lobectomy for lung cancer at VAMC and AMC, in order to identify specific areas of clinical care requiring quality improvement.

Methods: Data was derived from a prospective database from a single surgeon in order to keep surgeon experience constant. Included were all male patients undergoing lobectomy for non-small cell lung cancer. Postoperative morbidity, mortality and overall survival were compared after propensity score matching.

Results: From 2004-2013, 419 patients were evaluated (338 AMC, 81 VAMC). Unadjusted comparison of demographics, found VAMC patients to be younger (p=0.027), more often active smokers (p<0.001), lower %DLCO (p=0.028), and higher Charlson Co-morbidity Index (p=0.002); while body-mass index, %FEV1 and ASA were not different. Outcomes comparison after propensity score matching of 81 AMC with 81 VMAC patients, found higher rate of major complication (27.2% vs 12.3%, p =0.018) and longer hospital stay (median 7.5 vs 6.0 days, p<0.001) for VAMC, but no difference in 90 day mortality (VAMC 6.2% vs AMC 4.9%, p=1.000). Pneumonia was the specific complication found to be higher at VAMC as compared with AMC (11.1% vs 1.2%, p=0.009). There was no difference in 5 year overall survival for stage I disease (VAMC 68.2% vs AMC 69.0%, p=0.950).

Conclusions: With the surgeon variable kept constant, and after adjusting for patient factors, the rate of major complication after lobectomy for lung cancer is higher at VAMC as compared with AMC. The difference is largely attributable to a higher rate of postoperative pneumonia at VAMC. Complications after pulmonary resection at VAMC could be reduced by implementing quality improvement initiatives aimed at reducing the rate of postoperative pneumonia.

NOTES:

55. Perioperative Outcomes of Patients Undergoing Pulmonary Lobectomy on Clopidogrel

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Authors: Scott Atay, Arlene Correa, *Wayne L. Hofstetter, *Reza J. Mehran, *David C. Rice, Jack A. Roth, *Boris Sepesi, *J1Stephen G. Swisher, *Ara Vaporciyan, *Garrett Walsh, *Mara Antonoff

Author Institution(s): *University of Texas MD Anderson Cancer Center, Houston, TX*

Objectives: Perioperative management of anti-platelet therapy for patients undergoing pulmonary resection must balance the risk of cardiovascular events with that of hemorrhage. An optimal approach has not been defined in this population. We sought to characterize outcomes of patients undergoing pulmonary lobectomy on anti-platelet therapy with clopidogrel.

Methods: A retrospective review of a prospective institutional database was performed, identifying all patients undergoing pulmonary lobectomy from 2005-2015 who received perioperative clopidogrel. Patients were divided into groups based on the timing of clopidogrel discontinuation prior to operation: (I) ≤5 days, (II) 6-14 days, and (, III) >14 days. Analyses were performed to assess the impact of timing of discontinuation on both cardiovascular and hemorrhagic events.

Results: Sixty-two patients with complete datasets were identified and included in the analysis. The indication for clopidogrel was coronary artery disease in 44 (71%) patients, 35 (56%) of whom had prior stent placement. Overall incidence of transfusion and major cardiovascular events were 16% (10/62) and 6.5% (4/62), respectively. There were 4 post-operative non-ST elevation myocardial infarctions. Three were in patients with stents, all placed >1 year prior to surgery. None were secondary to acute in-stent thrombosis. Transfusion rates were lower in group, III as compared to, II (0% vs. 24%, p=0.045). No significant differences were identified between groups in terms of mortality, estimated blood loss, or operative duration (Table).

Conclusions: No significant outcome differences were identified among groups in terms of perioperative cardiovascular or hemorrhagic events. While these findings suggest that clopidogrel may be discontinued shortly before surgery with limited risk of bleeding, we also found that holding therapy for >14 days pre-operatively did not appear to increase the risk of major cardiovascular events.

Post-operative events

Event	≤5 days n=8	6-14 days n=38	>14 days n=16	p
Mortality (30-day)	0	1 (2.6%)	0	1.0
Myocardial infarction	0	4 (10.5%)	0	0.446
Estimated blood loss (ml)	75	200	138	0.056
Operative duration	182	182	175	0.695
Transfusion	1 (12.5%)	9 (24%)	0	0.075*/0.045**
Post-op length of stay (days)	4	6.5	6	0.046
Atrial Arrythmia	0	10 (26%)	5 (28%)	0.239
Sepsis	0	2 (5.2%)	0	1.0
Re-operation	1 (12.5%)	1 (2.6%)	0	0.307
Renal failure	0	1 (2.6%)	0	1.0
Discharge with chest tube	0	4 (10.5%)	2 (11%)	0.846
Pneumonia	0	5 (13%)	1 (6%)	0.570
CVA/TIA	0	0	0	1.0

* = p-value across all 3 groups ** = p-value comparing groups, II and, III

NOTES:

56. Is There Consensus on Postoperative Surveillance Following Esophageal Cancer Resection? A Survey of Current Surgeon Practices

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Authors: Siyuan Cao[1], Gail Darling[2], *Stephen C. Yang[1]

Author Institution(s): *[1]The Johns Hopkins Medical Institution, Baltimore, MD; [2]General Thoracic Surgery Club Clinical Trials Group/University of Toronto, Toronto, Ontario, Canada*

Objectives: There remain limited consensus and guidelines on the long-term postoperative surveillance and care of the patient following esophagectomy for cancer. In this study, we report survey results on the postoperative surveillance practices of thoracic surgeons in their follow up of esophageal cancer patients.

Methods: An on-line IRB-approved survey was sent to the General Thoracic Surgical Club (n=265) to assess postoperative surveillance plans and views on long-term care needs in patients with esophageal cancer. General descriptive analyses using frequencies and proportions on the quantitative data was performed.

Results: Respondents (n=63) comprised of 97% general thoracic and 3% cardiothoracic surgeons. Most (32%) performed 10-19 esophagectomies/year, and followed their own patients long-term (92%). Surveillance goals were aligned, with 60%, 33%, and 5% of respondents ranking overall survival/cancer recurrence, quality of life/symptoms, and access to care as top priorities, respectively. However, there was variance in timing and frequency of follow up visits. Chemotherapy and radiation were used by 84% of surgeons, but utilization was guided by different criteria. Nutritional consult, pain management, and complementary medicine were used 76%, 56%, and 10% of the time, respectively, guided by patient symptoms. Surveillance studies were utilized by 80%, but study type, frequency, and indications varied widely (Figure 1). Dedicated survivorship clinics or activities existed in 43% of the responses.

Conclusions: In following postoperative esophageal cancer patients, surgeons have similar goals and use a combination of clinic visits, adjuvant therapy, and lab tests/imaging studies. However, surveillance plans differ in frequency and type of follow up, and often guided by different criteria. A consensus is needed for more concrete guidelines and survivorship care plans for these patients. This ultimately will improve the patient experience after surgery.

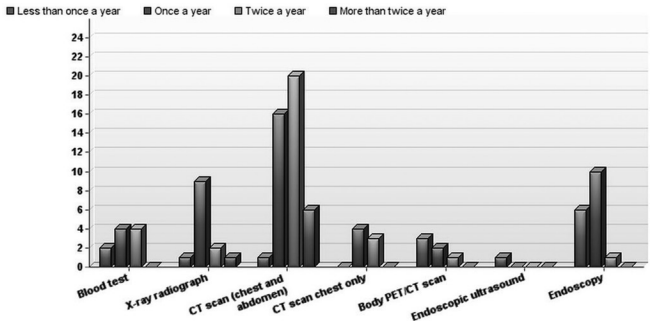

Figure 1: Frequency and type of tests ordered for surveillance following esophagectomy for cancer

NOTES:

57. AvalonElite DLC Provides Reliable Total Cavopulmonary Assist in Failing Fontan Sheep Model Using Valved Extracardiac Conduit

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Authors: Cheng Zhou[1], ***D***Dongfang Wang[1], ***D***Cherry Ballard-Croft[1], Guangfeng Zhao[2], Stephen Topaz[2], ***D****Joseph Zwischenberger[1]

Author Institution(s): *[1]University of Kentucky, Lexington, KY; [2]W-Z Biotech, LLC, Lexington, KY*

Discussant: Umar Boston, *Lebonheur Children`s Hospital, Memphis, TN*

REGULATORY DISCLOSURE: Th¬is presentation describes the off-label use of AvalonElite DLC by Maquet, which has an FDA status of investigational.

Objectives: The AvalonElite Double-lumen Cannula (DLC) provides total cavopulmonary assist (CPA), but is not reliable. A modification with paired umbrellas improves performance, but is in early development stage. We propose off label application of AvalonElite DLC to support failing Fontan circulation with 2 valves added in SVC and IVC to guarantee reliable CPA performance. This concept was tested in a 6 hr failing Fontan sheep model.

Methods: A valved extracardiac conduit (ECC) was used to create failing Fontan adult sheep model (n=6). Through a thoracotomy, SVC and IVC were cut off from RA and connected to the valved ECC (Fig). The ECC was connected to right PA by side to side anastomosis to create total cavopulmonary connection. One ECC valve was located above and the other one below cavopulmonary anastomosis. A 27 Fr AvalonElite DLC was inserted from RJV-SVC into ECC. The infusion lumen opening was positioned between the two ECC valves. Coupled with a pump, this DLC drainage lumen withdrew blood from SVC/IVC, and infusion lumen sent blood to ECC. Two ECC valves bracket infusion blood to pulmonary artery for efficient CPA. Blood was sampled for blood count and metabolism.

Results: A successful failing Fontan model with valved ECC was successfully created in all 6 sheep. CVP was elevated from 9±1 to 17±1 mmHg, systolic arterial pressure decreased from 103±9 to 51±13 mmHg, and cardiac output decreased from 3.6±0.3 to 1.4±0.2 l/min. The serum lactate level was increased from 1.6 to 3.6 mmol/L, indicating poor perfusion. At 4 L/min CPA, failing Fontan circulation was completely converted to normal baseline level. At end of 6 hr CPA, serum lactate returned to 1.7 mmol/l, indicating adequate perfusion. Necropsy revealed intact valved ECC with well positioned DLC. No major thrombosis was found.

Conclusions: Adding two valves in SVC and IVC, guaranteed reliable CPA performance of AvalonElite DLC in failing Fontan circulation sheep model.
IMAGE #57_2524399_A.jpg

NOTES:

58. Influence of Weight at Time of First Palliation on Survival in Patients With Single Ventricle

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Authors: TK Susheel Kumar[1], Sushitha Surendran[1], Jeffrey A. Towbin[1], Jerry Allen[1], James B. Tansey[1], Umar Boston[1], David Zurakowski[2], *Christopher J. Knott-Craig[1]

Author Institution(s): *[1]Lebonheur Children's Hospital, Memphis, TN; [2]Boston Children's Hospital , Boston, MA*

Discussant: *James Gangemi, *University of Virginia Health System, Charlottesville, SC*

Objectives: We sought to determine the influence of various factors on survival following staged palliation in patients with single ventricles at our institution.

Methods: A retrospective study of all single ventricle patients who underwent staged palliation at our institution over an eight year period was conducted. The data was collected from the Society of Thoracic Surgeons Congenital Heart Surgery database and patient charts. Information on age and weight at stage of first palliation, prematurity, chromosomal, non-cardiac anomalies and type of palliation was collected. Hospital mortality and unplanned reintervention following each stage of palliation was also collected.

Results: 72 patients underwent staged palliation over an eight year period. There were 13 interstage deaths. There was no hospital mortality following Glenn or Fontan operations. On univariate analysis low weight at the time of first palliation, prematurity and presence of non-cardiac anomalies were predictors of interstage mortality. However, multivariable cox regression analysis revealed weight at stage 1 palliation as a strong predictor of interstage mortality. Type of stage 1 palliation did not have any influence on outcome. No difference in survival was noted following Glenn operation.

Conclusions: Weight at stage 1 palliation influences interstage mortality. The type of stage 1 palliation has no bearing on outcome.

TABLE 1: Univariate Analysis of Survivors and Non-Survivors

Variable	Survivors (n = 59)	Non-Survivors (n = 13)	p-Value
Age, days	5 (3-8)	4 (2-7)	0.20
Weight, Kg	3.2 (2.8-3.8)	2.4 (2.1-2.9)	<0.001*
Weight < 2.6 kg	11 (19%)	9 (69%)	<0.001*
Gender, M/F	34/25	10/3	0.23
Prematurity	6 (10%)	5 (39%)	0.02*
Chromosomal anomaly	3 (5%)	2 (15%)	0.22
Non-cardiac anomalies	16 (27%)	7 (54%)	0.10 (trend)
Type of palliation	-	-	0.67
MBT	30 (51%)	5 (38%)	
PAB	9 (15%)	3 (23%)	
Norwood	20 (34%)	5 (38%)	

*STSA Member ***D*** Relationship Disclosure

NOTES:

59. Repair of Transposition of the Great Arteries With Intact Ventricular Septum—Results With a Standardized Method of Coronary Transfer

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Authors: *Kirk R. Kanter

Author Institution(s): *Emory University School of Medicine, Atlanta, GA*

Discussant: *Constantine Mavroudis, *Florida Hospital for Children, Orlando, FL*

Objectives: We hypothesized that a standardized method for coronary artery transfer for the arterial switch operation for transposition of the great arteries with intact ventricular septum (TGA/IVS) could improve outcomes.

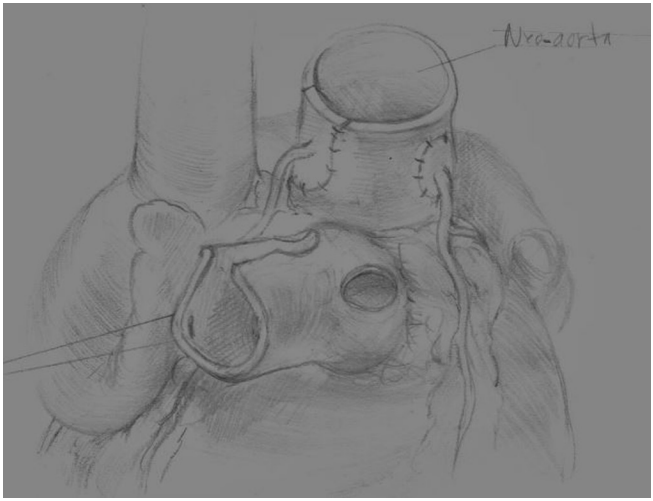
Methods: Since 2002, 107 consecutive neonates with TGA/IVS aged 5.8±11.4 days (median 4d) weighing 3.4±0.6 kg (median 3.4kg; range 1.9-6.0kg) had a standardized method of coronary transfer (Figure). Six (5.6%) had emergency operations for low saturations despite balloon septostomy. Five (4.7%) had simultaneous repair of an associated coarctation or hypoplastic aortic arch. 37 (34.6%) had coronary artery branching anomalies including 3 with intramural single coronary arteries (Table).

Results: Mean crossclamp and cardiopulmonary bypass times were 61±22 min (median 57) and 144±43 min (median 137). Extracorporeal membrane oxygenation was used in 2 pts, one for cardiac dysfunction 2 days postoperatively and 1 for pulmonary hypertension—both were weaned. Delayed sternal closure was used in 14 (13.1%). Median ICU stay was 4 days and median hospital stay 8 days. There was 1 early death of sepsis at 48 days in a child with a single intramural coronary artery with preserved postoperative ventricular function. On follow-up from one month to 14 years, there was one late death of unknown causes. 9 patients (8.4%) had late reinterventions without mortality: 8 for supravalvular aortic or pulmonary stenosis and 1 coronary revision. No patient has ventricular dysfunction on latest echocardiogram.

Conclusions: Using a simple standardized and reproducible approach to coronary transfer, repair of TGA/IVS can be performed safely with good long-term results in a variety of coronary anatomies and preoperative states.

Patient Characteristics

Characteristic	N (%)
Preoperative balloon septostomy	60 (56.1%)
Emergent operation for hypoxemia	6 (5.6%)
Preoperative sepsis	4 (3.7%)
Small muscular VSD	6 (5.6%)
Associated coarctation/hypoplastic arch repair	5 (4.7%)
Circumflex from right coronary artery	20 (18.7%)
Single coronary artery	11 (10.3%)
Other coronary anomaly	6 (5.6%)



Standardized Coronary Transfer for Two-Coronary System

NOTES:

60. Neonatal Transfer Does Not Impact Mortality Within a Regionalized Pediatric Cardiac Surgery Network

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Authors: Michael F. Swartz, George M. Alfieris

Author Institution(s): *University of Rochester, Rochester, NY*

Discussant: *Dilip Nath, *Children's National Medical Center, Washington, DC*

Objectives: Following the regionalization of pediatric cardiac surgical care, neonates are commonly transferred from their birth hospital to a different hospital for surgery. The impact of transferring a neonate for surgery, particularly over a considerable distance (>10 miles), has been left un-explored. We sought to identify the impact of transferring a neonate for cardiac surgery.

Methods: Between 2005-2014, we queried the New York State Cardiac Surgery database from a single institution to identify neonates that were either transferred for surgery, or were born within the cardiac surgery center. Outcomes were compared between groups, with subgroup analysis between single ventricle and bi-ventricular repairs.

Results: A total of 116 neonates were born at the cardiac surgery center, and 240 were transferred 80.2 ± 17.2 miles. Age at operation, and need for pre-operative ventilation were significantly lower from neonates who were born at the cardiac surgery center (Table 1). In addition, there was a greater percentage of neonates with single ventricle anatomy born at the cardiac surgery center (44.8 vs 30 %; p=0.03). Despite these differences, there were no significant differences in post-operative morbidity (Table 1). Birth at a cardiac surgery center did not impact 30 day survival (Birth: 88.6 vs. Transfer:91.5%; p=0.7) (Figure 1). The thirty day survival of single ventricle palliations (76 vs 80 %; p=0.7) or Bi-ventricular repairs (95.3 vs 96.4 %; p=0.7) was not significant between groups.

Conclusions: This data suggests that the transfer of neonates from outlying hospitals may not significantly impact 30-day survival or post-operative outcomes in our current model of regionalization.

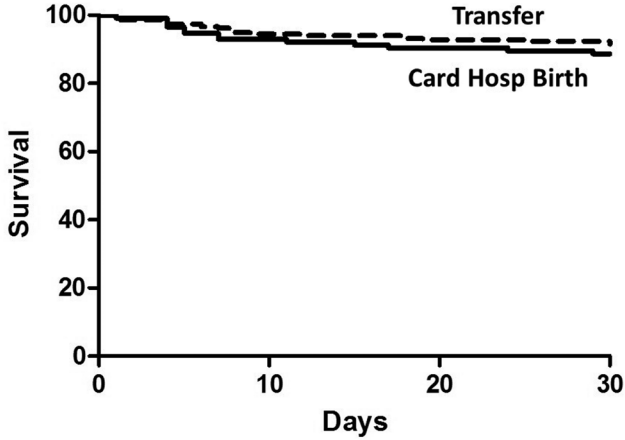
Peri-Operative Demographics

	Card Hosp Birth (n=116)	Transfer (n=240)	p value
Age at Operation (days)	6.7 ± 5.2	10.1 ± 6.7	<0.001
Male Gender	55% (64)	58% (139)	0.6
Weight (kg)	3.2 ± 0.9	3.1 ± 0.6	0.5
Bi-Ventricular Repair	55.2% (64)	70% (60)	<0.001
Single Ventricle Palliation	44.8% (52)	30% (72)	<0.001
Pre-Operative Risks			
No Risks	6% (7)	6% (15)	1.0
Ventilation	45% (52)	65% (156)	<0.001
Inotropes	9% (10)	16% (38)	0.06
Post-Operative Morbidity			
No Events	74% (86)	79% (190)	0.3
Ventilation > 10 days	8% (9)	5% (11)	0.2
Sepsis	13% (15)	8% (19)	0.2
Un-planned re-intervention	2% (2)	1% (2)	0.6
Operative Length of Stay (days)	26.7 ± 24.1	22.5 ± 27.3	0.2

Abbreviations: Card Hosp Birth-Cardiac Hospital Birth

*STSA Member ***D*** Relationship Disclosure

Figure 1.



Thirty day survival for neonates who required transfer, or were born at the cardiac surgery hospital (Card Hosp Birth)

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61. Lung Transplant Outcomes in Patients With Re-Vascularized Coronary Artery Disease

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Authors: Jin Sui, *Scott B. Johnson, *Daniel T. DeArmond1, Nitin A. Das, *Ian A. Makey

Author Institution(s): *UTHSCSA, San Antonio, TX*

Objectives: In lung transplant candidates, the degree of coronary artery disease deemed acceptable varies among transplant centers. The impact of prior percutaneous intervention (PCI) and coronary artery bypass grafting (CABG) surgery on lung transplant (LT) outcomes needs further scrutiny.

Methods: We performed a retrospective review of 306 consecutive LTs performed at the University of Texas Health Science Center from March 2004 to January 2015 and analyzed demographics and postoperative outcomes. We considered two groups: patients with CAD who had undergone a prior CABG or PCI (n=45, 15%) and the control, which consisted of patients with and without CAD who did not undergo prior re-vascularization (n=261, 85%). Redo LTs were excluded. A paired t test was used for group comparisons. Kaplan-Meier and Cox proportional hazards analyses were used to test group differences in time-to-event outcomes.

Results: Demographic data were comparable among groups, except age and presence of CAD were higher in the CABG/PCI group. Single lung transplant was higher in the CABG/PCI group (22 [49%] vs 75 [29%], p=0.01). The CABG/PCI group was more likely to have renal failure requiring dialysis (3 [6.7%] vs 1 [0.38%], p=0.01) and additional catheterization post-transplant (8 [17.8%] vs 14 [5.36%], p=0.01). There was no difference in operative mortality. The overall survival difference represented as a hazard ratio of CABG/PCI vs control was 1.46 [0.91, 2.34] p=0.12. When adjusted for the higher rate of single lung transplant in the CABG/PCI group the hazard ratio was 1.26 [0.77, 2.06] p=0.36.

Conclusions: LT patients with CAD that required re-vascularization likely have worse overall survival compared to the control. The hazard ratio is mitigated when adjusted for the higher rate of single lung transplant in the CABG/PCI group. Prior CABG/PCI patients should be counseled about their higher risk and/or more effort made to perform bilateral transplants in these patients.

Demographics

Patient Demographic	CABG/STENT (n=45)	Control (n=261)	P-Value
Age (years)	61.88	56.74	0.02
Smoking History	29 (64.4%)	102 (60.92%)	0.78
Hyperlipidemia	26 (58%)	86 (33%)	0.002
Hypertension	23 (51%)	103 (39%)	0.19
Diabetes Mellitus	9 (20%)	56 (21%)	0.98
Diagnosed CAD	45 (100%)	92 (35%)	0.001
Prior Open Lung Biopsy	6 (13%)	35 (13%)	1
Prior CABG	14 (31%)	0 (0%)	0.001
Prior Valve Replacement	0 (0%)	2 (0.77%)	1
Prior Thoracotomy	0 (0%)	8 (3%)	0.61
Post-Operative Outcomes			
Single Lung Transplant	22 (49%)	75 (29%)	0.01
Bilateral Lung Transplant	23 (51%)	186 (71%)	0.01
Operative Mortality	1 (2.2%)	7 (2.6%)	0.9
Takeback for bleeding/hemothorax	6 (13%)	46 (18%)	0.62
Infection requiring prolonged hospitalization	3 (6.7%)	8 (3.1%)	0.21
Atrial fibrillation requiring cardioversion	2 (4.4%)	16 (6.1%)	1
Acute renal failure requiring dialysis	3 (6.7%)	1 (0.38%)	0.01
Reperfusion injury requiring prolonged intubation	0 (0%)	5 (1.9%)	1
Pneumothorax requiring replacement of a chest tube	4 (8.9%)	22 (8.4%)	1
Cardiac arrest requiring CPR	1 (2.2%)	1 (0.38%)	0.27
Cerebrovascular Accident	2 (4.4%)	4 (1.5%)	0.22
Tracheostomy placement	6 (13.3%)	19 (7.3%)	0.28
Coronary Catheterization	8 (17.8%)	14 (5.4%)	0.01
Other	2 (4.4%)	15 (5.8%)	1

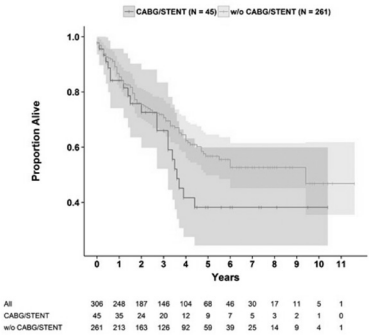

Figure 3: Proportion alive with and without CABG/STENT (log-rank p=0.12)

Survival Curve with 95% Confidence Intervals

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62. Donation After Cardiac Death Donors: A Single Center Experience

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Authors: Joseph Costa, Sowmya Sreekandh, Lori Shah, Hilary Robbins, Kashif Raza, Selim Arcasoy, ***D**** Joshua R. Sonett, Frank D'Ovidio

Author Institution(s): *Columbia University Medical Center, New York, NY*

Objectives: Donation after cardiac death (DCD) donors remain an underutilized source of lungs. Well-established donor assessment protocols and implementation of a consistent surgical team have been advocated when considering using lung allografts from DCD donors. We present our center's experience using lungs from DCD donors.

Methods: Starting 2007 to February 2016, 67 Maastricht Class, III DCD donor lung allografts were assessed. A comparative cohort was used of 254 brain dead donors (BDD) assessed during 2012 – 2015 by the same team also using a consistent assessment protocol. Post-transplant primary graft dysfunction (PGD) and survival were monitored in both cohorts, as well as recipient and donor characteristics collected.

Results: Lungs were procured from 42/67 DCD donors (37% dry run rate) resulting in 43 transplants (21 double, 6 Right and 16 Left). Table 1 shows relevant timings at DCD procurement and the reasons for declining lungs. In the comparative cohort lungs were procured in 147/254 BDD (42% dry run rate), resulting in 153 transplants (76 double, 26 Right, 51 Left). PGD 2 and 3 at 72 hours in DCD donor recipients was 3/43 (7%) and 2/43 (5%) respectively. Comparatively in BDD recipient cohort at 72 hours, PGD 2 and 3 was 21/153 (14%) and 17/153 (11%). 90-day and 1-year recipient survival was 100% and 90% respectively for recipients of DCD lungs and 96% (146/153) and 92% 140/153 using allografts from BDD.

Conclusions: Our center experience reaffirms the use of lung allografts from DCD donors, as a viable source with favorable outcomes. In particular, recipients from DCD donors showed equivalent or possibly better PGD rate at 72hrs and survival compared to recipients from BDD.

Table 1. Relevant DCD Timing and Reasons for Declination

DCD donor accepted (42)[1]	
Time (min):	
Withdrawal to Declaration of Death	28 (20 – 33)
Withdrawal to Systolic < 50 mm Hg	16.5 (10 – 24)
Systolic < 50 mm Hg to Cold Perfusion	12 (11 – 17)
Withdrawal to Cold Perfusion	32 (22 – 37)
Withdrawal to Sat < 70%	6 (3 – 9)
Sat < 70% to re-Ventilation	23.5 (19 – 30)
DCD Donor declined (25)	
Bilateral Purulent Secretions	10 (40%)
Bullous disease	2 (8%)
Lesions	2 (8%)
Effluent Clot	1 (4%)
Did not expire	6 (24 %)
Hyperemic Edematous Airways	2 (8%)
EVLP Right Declined (purulence) – Single Left Lung	1 (4%)
Single Right Declined – No back up for Single Left	1 (4%)

[1] One donor provided twin single lungs and no DCD hemodynamic data on 1 donor

NOTES:

63. Minimally Invasive Left Ventricular Assist Device (LVAD) Implantation Reduces Blood Product Utilization After Heart Transplant

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Authors: *Denis Gilmore[1], Shi Huang[1], Yulia Khalina[1], Monica Djunaidi[1], Mary Keebler[1], Mark Wigger[1], ***D***Simon Maltais[2], Ashish Shah[1], Matthew Danter[1]

Author Institution(s): *[1]Vanderbilt Medical Center, Nashville, TN; [2]Mayo Clinic, Rochester, MN*

Objectives: Intrapericardial VADs allow for minimally invasive implantation, potentially reducing operative time and blood product use. This study examines the influence of minimally invasive LVAD implantation on blood product utilization and operative time in a large contemporary cohort.

Methods: A single institution, retrospective review of prospectively collected data from 2011-2015 on all patients undergoing heart transplant (HTx) was conducted. Patients were analyzed as follows: those without previous VAD (NoVAD), VAD implant via sternotomy (sVAD) and VAD implant via a mini-thoracotomy (VADmini). Pre-operative demographics, intraoperative blood utilization and operative times were collected. The primary endpoint of total utilization of blood products including red blood cells, platelets, cryopreciptate and fresh frozen plasma intraoperatively was compared using Kruskal-Wallis test and multiple regression analysis was conducted.

Results: 164 heart transplants were performed over 5 years. 75 involved LVAD explantation (62 sVAD, 15 VADmini). The median age for all groups was 53 years. The mean time to transplant from VAD implant was 284 days in the VADmini and 372 days in the sVAD group. Ischemic time was not significant between the sVAD and VADmini groups with times of 173 min and 201 min. There was no difference in operative times between the sVAD (450 min) and VADmini group (458 min). The median total blood product use for sVAD, VADmini, and noVAD was 18, 12, and 7 units respectively. After adjusting for co-variates, sVAD approach had a significant higher blood product usage than VADmini. ($p=0.04$) There was no significant difference in total blood product usage between the VADmini and noVAD ($p=0.4$) groups.

Conclusions: This study represents the largest cohort comparing heart transplant following sternal sparing approaches to VAD implant. Minimally invasive approaches to LVAD implantation is associated with less blood utilization during HTx.

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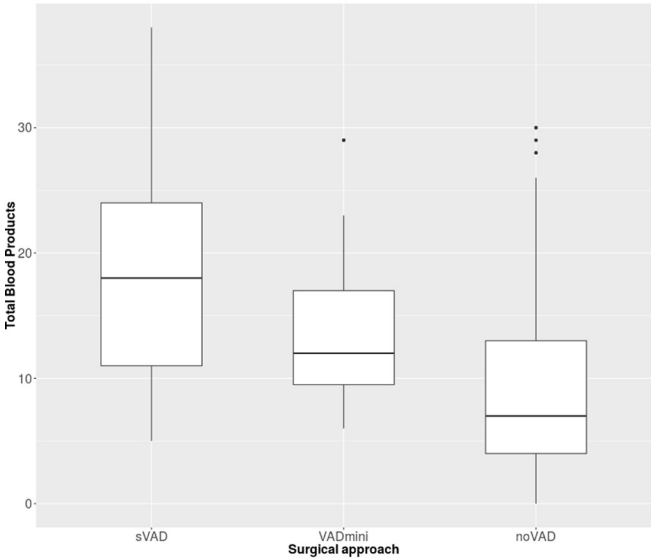

Minimally invasive left ventricular assist device implantation significantly reduces blood product utilization at time of cardiac transplantation compared to conventional sternotomy. Furthermore, there is no significant difference in total blood product utilization between minimally invasive LVAD and no prior VAD.

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64. Is There A Difference In Bleeding After Left Ventricular Assist Device Implant: Centrifugal Versus Axial?

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Authors: Ann C. Gaffey, Carol W. Chen, Jennifer J. Chung, Jason Han, Joyce Wald, Michael A. Acker, Pavan Atluri

Author Institution(s): *University of Pennsylvania , Philadelphia, PA*

Objectives: Continuous-flow left ventricular assist devices (CF-LVAD) have become the standard of care for patients with end stage heart failure. Device reliability has increased, bringing the potential for VAD as compared to transplant into debate. However, complications continue to limit VADs as first line therapy for transplant eligible patients. Bleeding, particularly, is a major source of morbidity. A debate exists as to the difference in bleeding profile between the major centrifugal and axial flow devices. We hypothesized that there would be similar adverse bleeding event profiles between the 2 major CF-LVADs.

Methods: We retrospectively investigated isolated CF LVADs performed at our institution between July 2010 and July 2015 (n=139): 76% (n=105) HMII and 24% (n=34) HVAD. We reviewed demographic, perioperative and short- and long-term outcomes.

Results: There was no significant difference in demographics or comorbidities. There was a low incidence of history of GI bleed 3.9% in HMII and 2.9% in HVAD (p=0.78), pre-implant. Preoperatively, the cohorts did not differ in coagulation measures (p=0.95) or hemoglobin value (p=0.23). Within the post-operative period (30 days), there was no difference in product transfusion: red blood cells (8.2 + 1.0 vs 4.9 + 1.6 U, p=0.10), fresh frozen plasma (3.3 + 0.5 vs 2.0 + 0.6 U, p=0.19), and platelets (1.1 + 0.2 vs. 1.2 + 0.5 U, p=0.89). Post-operatively, a higher but not significantly different number of HMII patients returned to the operating room for bleeding (n=27, 25.7%) compared to HVAD (n=6, 18.2%, p=0.35). There was no difference in complication rates of stroke (p=0.65), re-intubation (p=0.60), drive-line infection (p=0.05), and GI bleeding (p=0.31). The patients had equivalent ICU LOS (p=0.86) and index hospitalization LOS (p=0.59).

Conclusions: We found no difference in the rate of bleeding complications between the current commercially available axial and centrifugal flow devices.

Variables	HMII (n=105)	HVAD (n=34)	p-value
Age	56.5 + 13.9	57.2 + 14.6	0.82
Partial thromboplastin time (PTT)	52.6 + 2.5	52.3 + 3.9	0.95
INTERMACS Class I	12 (14.3)	5 (14.7)	0.19
INTERMACS Class II	39 (37.1)	14 (41.2)	0.19
INTERMACS Class III	36 (34.3)	15 (44.1)	0.19
Ischemic etiology of heart failure	47 (45.2)	12 (55.2)	0.59
Post-operative bleeding requiring operative exploration, n (%)	27 (25.7)	6 (18.2)	0.35
Incidence of GI bleeding (post-operative), n (%)	12 (11.5)	2 (5.9)	0.28
Incidence of GI bleeding (3 months), n (%)	20 (17.7)	17 (19.5)	0.35

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65. A Surprising Alliance: Two Giants of the 20th Century

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Authors: *Robert M. Sade

Author Institution(s): *Medical University of South Carolina, Charleston, SC*

This presentation will provide a view into the remarkable life and times of two of the most famous historical figures of the 20th century, who joined forces to pursue cardiopulmonary bypass in the early 1930s: the surgeon Alexis Carrel and the aviator-engineer Charles Lindbergh. Carrel won the Nobel Prize in Physiology or Medicine in 1912 for his work that began in 1896 when he was a surgical resident. Before 1910, he replaced carotid artery with jugular vein, transplanted kidneys, hearts, ovaries, spleens, intestines, thyroid and adrenal glands, operated on the mitral valve, and did the first coronary artery bypass graft, among other innovative procedures. Lindbergh was an engineer who became one of the most famous men in the world when he flew solo for over 33 hours from New York to Paris in the Spirit of St. Louis. When his sister-in-law was dying of mitral stenosis, Lindbergh questioned why doctors could not operate inside the heart. In 1930 he was introduced to Carrel and spent several years working with him with the objective of developing a heart-lung bypass machine for operating inside the heart. Carrels scientific expertise and Lindbergh's engineering brilliance led for the first time to a successful perfusion apparatus. Their pump oxygenators were able to maintain functional vital organs, including beating hearts, for days to weeks. John Gibbon's first paper on heart-lung bypass in 1937 cited Lindbergh's 1935 paper on the apparatus, which journalists named the "artificial heart." Before a fully functional heart-lung bypass machine could be created, however, the work of Carrel and Lindbergh work was interrupted by the start of WW, II. Both men became political pariahs because of their association with the German government before and during the war. The internationally renowned scientist Carrel was vilified as a Nazi collaborator and died in disgrace in 1944. The world-famous Lindbergh's leadership of the US isolationist movement led to recrimination and hostility and his popularity plummeted. His request for reinstatement of his military rank (US Army Air Force Colonel) was denied by two US presidents. After the war ended, his many contributions to the aeronautic industry and environmental preservation led to his public rehabilitation. President Eisenhower restored his US Air Force commission, and he died a Brigadier General in 1974.

NOTES:

66. Individual Assessment of Frailty Parameters in High- and Extreme-Risk Patients Who Underwent Transcatheter Aortic Valve Replacement

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Authors: Jessica Forcillo, Jose F Condado Contreras, Yi-An Ko, Michael Yuan, Vasilis Babaliaros, ***D****Brad Leshnower, ***D***Chandan Devireddy, *Eric L. Sarin, James P Stewart, Hanna A Jensen, Peter C Block, *Robert Guyton, ***D****Vinod H. Thourani

Author Institution(s): *Emory University, Atlanta, GA*

Objectives: Frailty has been proposed as a risk factor for patient's undergoing transcatheter aortic valve replacement (TAVR). The full effect of frailty on post-TAVR outcomes remains incompletely understood. The objective of this study was to evaluate the weight of four commonly used frailty parameters as predictors of 30-day outcomes and 1-year mortality in patients undergoing TAVR.

Methods: A retrospective review of prospectively collected data from 2011-2015 on 361 patients undergoing TAVR at a university hospital. Patients had a 4-parameter frailty assessment done before TAVR that include: serum albumin (g/dl), 5-meter walk (sec), grip strength (kg) and KATZ questionnaire of activities of daily livings. Logistic regression was used to examine the association between the selected frailty markers and 30-day composite endpoint and we delineated a cutoff point for each frailty markers.

Results: Median age was 82 years [IQ: 76-86] and 46.3% (167/361) were female. The rate of 30-day mortality, stroke and re-admission was 5.8%, 1.4% and 3.9%, respectively. The composite of outcomes occurred in 28% of patients. Of these 4 frailty parameters, the only significant predictor for the 30-day composite outcome was a low serum albumin 0.38 (p=0.02). Furthermore, none of the frailty markers were associated with increased mortality at 1 year.

Conclusions: In high-risk patients undergoing TAVR, a low serum albumin was the only frailty marker associated with increased risk for the 30-day composite outcomes. None of the 4 frailty parameters studied predicted mortality at 1 year. In this high- and extreme-risk TAVR population, a re-evaluation of the current frailty parameters and the cut-off values are necessary to enhance their predictive nature.

Cutoff points for each frailty variable and the corresponding area under the ROC curve (AUC)

Frailty Markers	Cut-off points	Area Under the Curve
Pre-procedure albumin levels (g/dL)	3.4	0.761
Grip strength (kg) in males	43-44	0.782
Grip strength (kg) in females	35-39	0.605
ADLs	4	0.676

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67. Surgeon Leadership in the Operating Room: What Behaviors Best Support Surgical Teamwork?

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Authors: Juliana Stone[3], Francesca Gino[2], Emma L. Aveling[3], Morgan Shields[3], Cameron Wright[1], *Thor Sundt[1], Sara Singer[3,1]

Author Institution(s): *[1]Massachusetts General Hospital, Boston, MA; [2]Harvard Business School, Boston, MA; [3]Harvard TH Chan School of Public Health, Boston, MA*

Objectives: The importance of effective team leadership for achieving surgical excellence is widely accepted. There is less agreement on the actual behaviors that accomplish this goal, and little primary data to inform this discussion. We studied intraoperative interactions in cardiac surgical teams and team member perceptions to identify leadership behaviors that best support surgical teamwork.

Methods: We observed and surveyed cardiac surgical teams (7 surgeons and 113 team members) from September 2013 to April 2015. We documented 2201 surgeon-team member interactions during 22 days of surgery, coded them by type and valence (i.e., positive/negative/neutral), and characterized them as leadership functions: conductor, elucidator, delegator, engagement facilitator, tone setter, human being, and safe space maker. We surveyed non-surgeon team members about surgeons' performance as team leaders. We created individual surgeon profiles by calculating percentage of interaction types, leader functions, and valence. We correlated these with non-surgeon perceptions of leadership.

Results: 81 non-surgeons rated surgeons' leadership at 5.4 out of 7 (range 4.2 to 6.2; see table). We observed 33 types of interactions (23/4/6 positive/neutral/negative respectively) of which 24% were elucidating and 20% tone setting. Overall, 66% (range 43% to 84%) were positive and 11% (range 1% to 45%) negative. Percent positive/negative interactions correlated strongly ($r=0.85$, $r=-0.75$, $p<0.05$) with non-surgeon evaluations of leadership. Facilitating engagement related most positively ($r=0.80$, $p=0.03$), and negative forms of elucidating, i.e., criticism, related most negatively ($r=-0.81$, $p=0.03$).

Conclusions: We identified 7 surgeon-leadership functions and related behaviors that impact perceptions of leadership, offering specific targets for coaching surgeons to improve team performance and patient safety. This framework may be applied to future research studies in other settings as well.

Perception of surgeons as team leaders and surgeon interactions by leader function and valence

	S1	S2	S3	S4	S5	S6	S7	Surgeon Average
Perception of surgeon as team leader-- Avg (SD)	6.22 (0.93)	4.22 (2.07)	5.17 (1.14)	6.02 (1.01)	5.81 (1.04)	4.75 (1.49)	5.91 (1.08)	5.40 (0.85)
Number of Interactions	218	317	201	417	218	129	426	275
Percent of interactions by leader function								
Elucidator	24%	38%	17%	25%	14%	29%	20%	24%
Tone setter	17%	34%	15%	25%	14%	23%	13%	20%
Engagement facilitator	26%	6%	18%	15%	14%	9%	16%	15%
Delegator	10%	9%	14%	12%	22%	12%	25%	15%
Safe space maker	18%	9%	18%	14%	21%	13%	12%	15%
Conductor	4%	2%	11%	7%	15%	14%	10%	9%
Human being	0%	1%	6%	3%	0%	0%	4%	2%
Percent of interactions by valence								
Positive	84%	49%	71%	72%	64%	43%	69%	66%
Neutral	15%	27%	22%	18%	28%	12%	26%	23%
Negative	1%	24%	7%	9%	8%	45%	2%	11%

NOTES:

68. Laparoscopic Synthetic Patch and Hepatic Buttress Repair of an Intrapericardial Diaphragmatic Hernia After Convergent "Hybrid" Maze Procedure

*Unless otherwise noted in this program book or verbally by the speakers, speakers have no relevant financial relationship to disclose and will only be presenting information on devices, products, or drugs that are FDA approved for the purposes they are discussing. Authors listed with a **D** next to their name have indicated that they have a financial or other relationship with a healthcare-related business or other entity to disclose.*

Authors: Andrew J. Kaufman[1], Eugene Kahn[2], Jon Villena[2], Justin Steele[2], Raja Flores[1]

Author Institution(s): *[1]Icahn School of Medicine at Mount Sinai, New York, NY; [2]Mount Sinai Beth Israel, New York, NY*

Objectives: Intrapericardial diaphragmatic hernias (IDH) are the rarest form of diaphragmatic hernia. We report a case of IDH after a convergent maze procedure (CMP). The goal of this video is to describe a rare but potentially life threatening complication of CMP and to illustrate a novel minimally invasive surgical repair using both a synthetic patch and natural tissue.

Methods: An 86 year-old woman presented with acute onset epigastric pain, nausea, and hypotension 16 months after undergoing CMP. A CT scan of the chest revealed an IDH with small bowel in the pericardial space and pericardial effusion. The CT findings were seen 10 months prior but she was diagnosed with a Morgagni hernia despite a normal scan without hernia from 8 years prior.

Results: A laparoscopic repair was performed with complete exclusion of the defect. Upon entering the abdomen, the small bowel had reduced itself into the peritoneum and the epicardium was clearly visible through a 20 mm defect in the central tendon of the diaphragm. This was closed with a 2 mm thick PTFE patch fitted with fenestrations to prevent pericardial tamponade. The mesh was secured with non-absorbable sutures and a 5 mm tacks to eliminate potential for herniation. The triangular ligament and left hepatic lobe were attached as a buttress. The patient went home on post-operative day 2 without complication.

Conclusion: The convergent maze procedure is increasingly utilized for the treatment of atrial fibrillation. This is the second reported case of an intrapericardial diaphragmatic hernia with bowel incarceration after CMP. Early diagnosis and treatment is essential to prevent catastrophic complications. Laparoscopic repair of IDH with PTFE and hepatic buttress is safe and feasible. We suggest routine closure of the diaphragm after CMP. This case report will increase awareness of this complication and reduce the likelihood of misdiagnosis and delays in treatment.

NOTES:

FOURTH SCIENTIFIC SESSION B

69. Left Ventricular Outflow Tract Obstruction After Transcatheter Mitral Valve-in-Ring Implantation: A Word of Caution

*Unless otherwise noted in this program book or verbally by the speakers, speakers have no relevant financial relationship to disclose and will only be presenting information on devices, products, or drugs that are FDA approved for the purposes they are discussing. Authors listed with a **D** next to their name have indicated that they have a financial or other relationship with a healthcare-related business or other entity to disclose.*

Authors: *Sameh Said, Sorin Pislaru, Kunal Kotkar, ***D***Charanjit Rihal, William Mauermann, *Hartzell Schaff, *Joseph Dearani

Author Institution(s): *Mayo Clinic, Rochester, MN*

Objectives: Left ventricular outflow tract obstruction is a well-known albeit a rare complication that can occur after mitral valve replacement. With the current increase in transcatheter valve interventions, new and unique complications may be expected to occur.

Methods: We present a surgical video of severe left ventricular outflow tract obstruction that developed after transcatheter mitral valve implantation. Due to severe symptoms we reoperated the patient.

Results: On cardiopulmonary bypass, we performed transaortic resection of anterior mitral leaflet to relieve the left ventricular outflow tract obstruction.

Conclusion: The key to success of transcatheter MV interventions is careful evaluation of the interventricular septum, aorto-mitral angle, size of the left ventricle and the subvalvular apparatus to avoid such complications.

NOTES:

PAST MEETINGS AND AWARDS

PAST MEETINGS

	PRESIDENT	SECRETARY
1954–Hollywood Beach, FL	James D. Murphy*	Hawley H. Seiler*
1955–White Sulphur Springs, WV	Paul W. Sanger*	Hawley H. Seiler*
1956–Miami Beach, FL	Donald L. Paulson*	Hawley H. Seiler*
1957–New Orleans, LA	Duane Carr*	Hawley H. Seiler*
1958–Miami Beach, FL	John S. Harter*	Hawley H. Seiler*
1959–Edgewater Park, MS	Edward F. Parker*	Hawley H. Seiler*
1960–Nassau Bahamas, B.W.I.	Edgar W. Davis*	Hawley H. Seiler*
1961–Memphis, TN	DeWitt C. Daughtry*	Hawley H. Seiler*
1962–Ocho Rios, Jamaica	James E. Dailey*	Hawley H. Seiler*
1963–San Antonio, TX	Lewis H. Bosher	Hawley H. Seiler*
1964–Atlanta, GA	Robert G. Ellison*	Hawley H. Seiler*
1965–Freeport, Grand Bahama	Francis H. Cole*	Hawley H. Seiler*
1966–Asheville, NC	Will C. Sealy*	Hawley H. Seiler*
1967–Dallas, TX	Edward R. Munnell*	Hawley H. Seiler*
1968–San Juan, Puerto Rico	Milton V. Davis*	Hawley H. Seiler*
1969–Washington, DC	Osler A. Abbott*	James W. Brooks*
1970–Bermuda	Watts R. Webb	James W. Brooks*
1971–Tampa, FL	Hawley H. Seiler*	James W. Brooks*
1972–Port of Spain Trinidad and Tobago	A. Robert Cordell*	James W. Brooks*
1973–Louisville, KY	James W. Pate	James W. Brooks*
1974–Williamsburg, VA	Bertram A. Glass*	James W. Brooks*
1975–New Orleans, LA	Frederick H. Taylor*	J. Kent Trinkle*
1976–Acapulco, Mexico	James W. Brooks*	J. Kent Trinkle*
1977–Marco Island, FL	Joseph W. Peabody, Jr.*	J. Kent Trinkle*
1978–Marco Island, FL	Robert Carr*	J. Kent Trinkle*
1979–San Antonio, TX	Harold C. Urschel, Jr.*	Richard B. McElvein
1980–White Sulphur Springs, WV	W. Glenn Young, Jr.*	Richard B. McElvein
1981–Palm Beach, FL	Dennis Rosenberg*	Richard B. McElvein
1982–Hilton Head Island, SC	J. Kent Trinkle*	Richard B. McElvein
1983–Marco Island, FL	Francis Robicsek	Harvey W. Bender, Jr.
1984–Hilton Head, SC	Charles R. Hatcher, Jr.	Harvey W. Bender, Jr.
1985–Boca Raton, FL	George C. Kaiser	Harvey W. Bender, Jr.
1986–White Sulphur Springs, WV	Richard B. McElvein	Harvey W. Bender, Jr.
1987–Boca Raton, FL	J. Alex Haller, Jr.	Gordon F. Murray
1988–Marco Island, FL	O. Brewster Harrington*	Gordon F. Murray
1989–Scottsdale, AZ	Richard E. Clark	Gordon F. Murray
1990–Dorado, Puerto Rico	Harvey W. Bender, Jr.	Gordon F. Murray
1991–Orlando, FL	Robert M. Sade	Hendrick B. Barner
1992–Wesley Chapel, FL	William A. Cook	Hendrick B. Barner
1993–Panama City Beach, FL	Gordon F. Murray	Hendrick B. Barner
1994–Marco Island, FL.	Ronald C. Elkins	Hendrick B. Barner
1995–San Antonio, TX	Frederick L. Grover	D. Glenn Pennington
1996–Cancun, Mexico	William C. Alford	D. Glenn Pennington
1997–Naples, FL	Kit. V. Arom*	D. Glenn Pennington
1998–Orlando, FL	Hendrick B. Barner	D. Glenn Pennington
1999–San Juan, PR	William A. Baumgartner	Carolyn E. Reed*
2000–Marco Island, FL	Donald C. Watson	Carolyn E. Reed*
2001–San Antonio, TX	William F. Sasser	Carolyn E. Reed*
2002–Miami, FL	Constantine Mavroudis	Carolyn E. Reed*
2003–Bonita Springs, FL	Joseph I. Miller, Jr.	John H. Calhoon
2004–Cancun, Mexico	D. Glenn Pennington	John H. Calhoon
2005–Orlando, FL	Irving L. Kron	John H. Calhoon
2006 –Tucson, AZ	Ross Ungerleider	John H. Calhoon
2007–Bonita Springs FL	Carolyn E. Reed*	Robert J. Cerfolio
2008–Austin, TX J	John W. Hammon	Robert J. Cerfolio
2009–Marco Island, FL	Michael J. Mack	Robert J. Cerfolio
2010–Orlando, FL	Keith S. Naunheim	Robert J. Cerfolio
2011–San Antonio, TX	Joseph S. Coselli	David R. Jones
2012–Naples, FL	Walter H. Merrill	David R. Jones
2013–Scottsdale, AZ	Robert J. Cerfolio	David R. Jones
2014–Tucson, AZ	Richard L. Prager	David R. Jones
2015–Orlando, FL	John H. Calhoon	Daniel L. Miller

*** Deceased**

AWARDS

CLIFFORD VAN METER PRESIDENT'S AWARD

Formerly known as the President's Award, the Clifford Van Meter President's Award was established in 2008 to recognize the best scientific paper delivered at the STSA Annual Meeting. In 2013, this Award was augmented to specifically recognize the best adult cardiac surgery paper delivered at the Annual Meeting. The award is given on the basis of originality, content, and presentation. Previous award recipients have uniformly displayed excellence in all areas. The selected author receives a certificate identifying the award and a suitable monetary reward. The recipient is chosen by the President with assistance from the Council.

1964–Bertram A. Glass	New Orleans, Louisiana
1965–Harold C. Urschel, Jr.	Dallas, Texas
1966–Thomas J. Yeh	Savannah, Georgia
1967–Yale H. Zimberg	Richmond, Virginia
1968–J. Alex Haller, Jr.	Baltimore, Maryland
1969–William H. Sewell	Sayre, Pennsylvania
1970–George R. Daicoff	St. Petersburg, Florida
1971–Charles E. Eastridge	Memphis, Tennessee
1972–J. Kent Trinkle	San Antonio, Texas
1973–Donald L. Bricker	Lubbock, Texas
1974–Harvey W. Bender, Jr.	Nashville, Tennessee
1975–Charles E. Martin	Nashville, Tennessee
1976–Gordon F. Murray	Chapel Hill, North Carolina
1977–Denis H. Tyras	St. Louis, Missouri
1978–Joseph I. Miller, Jr.	Atlanta, Georgia
1979–M. Wayne Flye	Galveston, Texas
1980–Francis Robicsek	Charlotte, North Carolina
1981–Ellis L. Jones	Atlanta, Georgia
1982–William G. Malette	Omaha, Nebraska
1983–Robert H. Breyer	Springfield, Massachusetts
1984–Blair A. Keagy	Chapel Hill, North Carolina
1985–John W. Hammon, Jr.	Nashville, Tennessee
1986–William H. Frist	Nashville, Tennessee
1987–Jean-Nicolas Vauthey	New Orleans, Louisiana
1988–Robert A. Gustafson	Morgantown, West Virginia
1989–Harvey I. Pass	Bethesda, Maryland
1990–Vincent L. Gott	Baltimore, Maryland
1991–Ross M. Ungerleider	Durham, North Carolina
1992–William H. Frist	Nashville Tennessee
1993–Kirk R. Kanter	Atlanta, Georgia
1994–Thomas L. Spray	St. Louis, Missouri
1995–Constantine Mavroudis	Chicago, Illinois
1996–David A. Fullerton	Denver, Colorado
1997–Christopher J. Knott-Craig	Oklahoma City, Oklahoma
1998–James L. Zellner	Charleston, South Carolina
1999–Thomas D'Amico	Durham, North Carolina
2000–Joseph C. Cleveland, Jr.	Denver, Colorado
2001–Neal D. Kon	Winston-Salem, South Carolina
2002–Joseph S. Coselli	Houston, Texas
2003–Robert J. Cerfolio	Birmingham, Alabama
2004–Malcolm DeCamp	Boston, Massachusetts
2005–Seenu V. Reddy	San Antonio, Texas
2006–Andrew W. ElBardissi	Rochester, Minnesota
2007–John Stulak	Rochester, Minnesota
2008–G. Chad Hughes	Durham, North Carolina
2009–Scott H. Johnson	Lansing, Michigan
2010–Kenneth A. Kesler	Indianapolis, Indiana
2011–Robert Stewart	Cleveland, Ohio
2012–Haritha Reddy	Ann Arbor, Michigan
2013–Bartosz Rylski	Freiburg, Germany
2014–Stephano Mastrobuoni	Brussels, Belgium
2015–Anthony L. Estrera	Houston, Texas

CAROLYN REED PRESIDENT'S AWARD

The Carolyn Reed President's Award was established in 2013 to recognize the best general thoracic surgery scientific paper delivered at the STSA Annual Meeting. Named in memory of STSA Past President, Carolyn E. Reed, MD, (STSA President, 2006-07), this award will be given on the basis of originality, content, and presentation. The selected author receives a certificate identifying the award and a suitable monetary reward. The recipient is chosen by the President with assistance from the Council.

2013–R. Douglas Adams	Merrillville, Indiana
2014–Pamela Samson	Webster Groves, Missouri
2015–Jonathan Spicer	Montreal, Quebec

GEORGE R. DAICOFF PRESIDENT'S AWARD

The George R. Daicoff President's Award was established in 2013 to recognize the best congenital heart surgery scientific paper delivered at the STSA Annual Meeting. Named for longtime active member, George R. Daicoff, MD, this award will be given on the basis of originality, content, and presentation. The selected author receives a certificate identifying the award and a suitable monetary reward. The recipient is chosen by the President with assistance from the Council.

2013–Vincent K.H. Tam	Fort Worth, Texas
2014–Jennifer Solms Nelson	Chapel Hill, North Carolina
2015–James D. St. Louis	Wayzata, Minnesota

TIKI AWARD

The quality of slides can greatly enhance or detract from a scientific presentation. In order to emphasize the importance of well-planned and prepared slides, the Southern Thoracic Surgical Association has created the Tiki Award.

This award is given to the person who presents a slide at the annual meeting which is judged by a committee appointed by the President to be the most memorable and noteworthy. This slide can be selected because it is unintelligible, confusing, cluttered, irrelevant, or conversely because it is superbly clear, concise, colorful, pertinent, and/or utilizes state of the art graphics.

1964–Watts R. Webb	New Orleans, Louisiana
1965–J. Alex Haller, Jr.	Baltimore, Maryland
1966–Richard M. Peters	San Diego, California
1967–Myron W. Wheat	St. Petersburg, Florida
1968–Carl H. Almond	Columbia, South Carolina
1969–Francis Robicsek	Charlotte, North Carolina
1970–William A. Neely	Jackson, Mississippi
1971–Paul C. Adkins	Washington, DC
1972–Panagiotis Symbas	Atlanta, Georgia
1973–James L. Alexander	Savannah, Georgia
1974–Lloyd H. Hudson	Flint, Michigan
1975–Richard E. Clark	St. Louis, Missouri
1976–William S. Lyons	Alexandria, Virginia
1977–Maruf A. Razzuk	Dallas, Texas
1978–Harold C. Urschel, Jr.	Dallas, Texas
1979–Maruf A. Razzuk	Dallas, Texas
1980–Francis Robicsek	Charlotte, North Carolina
1981–Robert Sade	Charleston, South Carolina
1982–Kit V. Arom	Minneapolis, Minnesota
1983–Herbert E. Warden	Morgantown, West Virginia
1984–Noel L. Mills	New Orleans, Louisiana
1985–George C. Kaiser	St. Louis, Missouri

AWARDS

1986–J. G. Selle	Charlotte, North Carolina
1987–Steven Gundry	Baltimore, Maryland
1988–Harvey I. Pass	Bethesda, Maryland
1989–Duke E. Cameron	Baltimore, Maryland
1990–Richard E. Clark	Pittsburgh, Pennsylvania
1991–William H. Coltharp	Nashville, Tennessee
1992–Joseph S. Coselli	Houston, Texas
1993–Benson R. Wilcox	Chapel Hill, North Carolina
1994–P. Michael McFadden	New Orleans, Louisiana
1995–Carolyn E. Reed	Charleston, South Carolina
1996–John L. Ochsner	New Orleans, Louisiana
1997–Clifford H. Van Meter, Jr.	New Orleans, Louisiana
1998–John D. Oswalt	Austin, Texas
1999–W. Randolph Chitwood	Greenville, North Carolina
2000–Ross M. Ungerleider	Portland, Oregon
2001–Neal D. Kon	Winston-Salem, South Carolina
2002–W. Steves Ring	Dallas, Texas
2003–Betsey Urschel	Dallas, Texas
2004–John Puskas	Atlanta, Georgia
2005–Meredith Scott	Shell, Wyoming
2006–Constantine Mavroudis	Chicago, Illinois
2007–Robert J. Cerfolio	Birmingham, Alabama
2008–Curt Tribble	Gainesville, Florida
2009–Jeffrey P. Jacobs	St. Petersburg, Florida
2010–Peter K. Smith	Durham North Carolina
2011–John H. Calhoon	San Antonio, Texas
2012–Vinay Badhwar	Pittsburgh, Pennsylvania
2013–Lorraine Cerfolio	Birmingham, Alabama
2014–Kristine J. Guleserian	Dallas, Texas
2015–Daniel L. Miller	Marietta, Georgia

OSLER ABBOTT AWARD

The Osler Abbott Award was first given in 1960 and has been awarded annually to that member of the Association who excels in the art of discussionmanship. It was named for Osler Abbott, MD of Atlanta, Georgia, who, in 1950, somehow managed to discuss 26 papers, no mean feat since only 25 were presented and one was his own!

In the early years, sheer volume of discussion was sufficient to earn at least an honorable mention, but volume alone never won the award. More important were factors such as pomposity, arrogance, irrelevancy, and the use of outdated slides which had been shown on two or more occasions. In recent years, the tactics have ranged from extreme subtlety to blatant exhibitionism and from apparent indifference to obvious covetousness.

To place this traditional award on a somewhat higher plane of competition, the Council, in its wisdom, decided to base the decision on Oslerian principles, and selection would come from evaluation of the more memorable of discussions during the scientific sessions.

Thus, the reincarnated purposes of the Osler Abbott Award of the Southern Thoracic Surgical Association are:

1. To focus on the importance of open, frank, and candid discussion in the spirit and substance of the Southern Thoracic Surgical Association and, in this way, to encourage more objective and active participation by all members attending the Annual Meeting.
2. To stimulate a healthy give-and-take among the members and, thereby, enhance the camaraderie and esprit-de-corps which have traditionally characterized the Southern Thoracic Surgical Association.

1960–Joseph W. Peabody, Jr.	Washington, DC
1961–Milton V. Davis	Dallas, Texas
1962–E. Converse Peirce,, II	New York, New York
1963–Lewis H. Bosher, Jr.	Richmond, Virginia
1964–Sam E. Stephenson, Jr.	Jacksonville, Florida
1965–Bertram A. Glass	New Orleans, Louisiana
1966–Robert E. Carr	Fort Worth, Texas
1967–Osler A. Abbott	Atlanta, Georgia
1968–Watts R. Webb	New Orleans, Louisiana
1969–William A. Cook	Andover, Massachusetts
1970–Edward F. Parker	Charleston, South Carolina
1971–Minas Joannides , Jr.	St. Petersburg, Florida
1972–J. Alex Haller , Jr.	Baltimore, Maryland
1973–Harold C. Urschel, Jr.	Dallas, Texas
1974–Bertram A. Glass	New Orleans, Louisiana
1975–Gilbert S. Campbell	Little Rock, Arkansas
1976–James W. Brooks	Richmond, Virginia
1977–J. Kent Trinkle	San Antonio, Texas
1978–Raymond C. Read	Little Rock, Arkansas
1979–Richard E. Clark	St. Louis, Missouri
1980–Joseph Peabody, Jr.	Washington, DC
1981–Robert M. Sade	Charleston, South Carolina
1982–James S. Donahoo	Philadelphia, Pennsylvania
1983–Francis Robicsek	Charlotte, North Carolina
1984–Milton V. Davis	Kaufman, Texas
1985–George C. Kaiser	St. Louis, Missouri
1986–Milton V. Davis	Kaufman, Texas
1987–J. Alex Haller, Jr.	Baltimore, Maryland
1988–Ronald C. Elkins	Oklahoma City, Oklahoma
1989–Bradley M. Rodgers	Charlottesville, Virginia
1990–Harvey W. Bender, Jr.	Nashville, Tennessee
1991–Kamal A. Mansour	Atlanta, Georgia
1992–Arthur E. Baue.	St. Louis, Missouri
1993–Kit V. Arom	Minneapolis, Minnesota
1994–Frederick L. Grover	Denver, Colorado
1995–Constantine Mavroudis	Chicago, Illinois
1996–George Daicoff	St. Petersburg, Florida
1997–Ross M. Ungerleider	Durham, North Carolina
1998–Lynn Harrison	New Orleans, Louisiana
1999–William A. Baumgartner	Baltimore, Maryland
2000–Robert J. Cerfolio	Birmingham, Alabama
2001–Carolyn E. Reed	Charleston, South Carolina
2002–John H. Calhoon	San Antonio, Texas
2003–Constantine Mavroudis	Chicago, Illinois
2004–Keith S. Naunheim	St. Louis, Missouri
2005–Irving L. Kron	Charlottesville, Virginia
2006–Thoralf M. Sundt	Rochester, Minnesota
2007–W. Steves Ring	Dallas, Texas
2008–John W. Hammon	Winston-Salem, North Carolina
2009–Kevin D. Accola	Orlando, Florida
2010–Vinod Thourani	Atlanta, Georgia
2011–Jeffrey P. Jacobs	Saint Petersburg, Florida
2012–Duke E. Cameron	Baltimore, Maryland
2013–Daniel L. Miller	Marietta, Georgia
2014–Stephen C. Yang	Baltimore, Maryland
2015–Joseph A. Dearani	Rochester, Minnesota

AWARDS

KENT TRINKLE EDUCATION LECTURESHIP

The Kent Trinkle Educational Lectureship is dedicated to J. Kent Trinkle, (STSA President, 1981-82) for his contri¬butions to cardiothoracic surgery and STSA. Each year, in honor of Dr. Trinkle's remarkable dedication to student education, an STSA member is selected to present on his/her training program. Presenters are selected by the STSA President.

1993–Benson R. Wilcox	Chapel Hill, North Carolina
1994–George C. Kaiser	St. Louis, Missouri
1995–J. Kent Trinkle	San Antonio, Texas
1996–Irving L. Kron	Charlottesville, Virginia
1997–William A. Baumgartner	Baltimore, Maryland
1998–Donald C. Watson, Jr.	Memphis, Tennessee
1999–Fred A. Crawford, Jr.	Charleston, South Carolina
2000–Robert A. Guyton	Atlanta, Georgia
2001–Joel D. CooperSt.	Louis, Missouri
2002–W. Steves Ring	Dallas, Texas
2003–Walter G. Wolfe	Durham, North Carolina
2004–Joseph Coselli	Houston, Texas
2005–Neal Kon	Winston-Salem, North Carolina
2006–Joe B. Putnam, Jr.	Nashville, Tennessee
2007–Walter H. Merrill	Cincinnati, Ohio
2008–Curt Tribble	Gainesville, Florida
2009–Irving L. Kron	Charlottesville, Virginia
2010–Michael R. Mill	Chapel Hill, North Carolina
2011–John H. Calhoon	San Antonio, Texas
2012–Bartley P. Griffith	Baltimore, Maryland
2013–Michael Argenziano	New York, New York
2014–Mark S. Slaughter	Louisville, Kentucky
2015–John S. Ikonomidis	Charleston, South Carolina

HAROLD URSCHEL HISTORY LECTURESHIP

The Harold Urschel History Lectureship is dedicated to long-time STSA member and contributor, Harold C. Urschel, Jr., MD, (STSA Historian, 2001-12). This lectureship was established in memory of Dr. Urschel in 2013. The lecturer will be selected annually by the Program Committee as the abstract author who submitted the most exemplary history abstract.

2013–Joseph S. Coselli	Houston, Texas
2014–Daniel L. Miller	Marietta, Georgia
2015–Erle H. Austin	Louisville, Kentucky

HAWLEY H. SEILER RESIDENTS COMPETITION AWARD

The Hawley H. Seiler Residents Competition Award is presented for an outstanding paper by a cardiothoracic or general surgery resident. It is bestowed upon the resident excelling in the following categories regarding their abstract submission: quality of abstract as well as manuscript and oral presentation. The award is named after STSA Past President and founding member, Hawley H. Seiler.

Dr. Seiler's many contributions to STSA included serving as Secretary for 15 years and presenting on numerous topics at Annual Meetings.

1997–Elaine E. Tseng	Baltimore, Maryland
1998–Stephen Langley	Durham, North Carolina
1999–Aron Goldberg	Charleston, South Carolina
2000–Cullen D. Morris	Atlanta, Georgia
2001–Sitaram M. Emani	Durham, North Carolina
2002–Thomas H. Maxey	Charlottesville, Virginia
2003–Brian T. Bethea	Baltimore, Maryland

2004–Tara Karamlou	Portland, Oregon
2005–Edward John	Hickey London, England
2006–Thomas K. Varghese	Seattle, Washington
2007–Tara Karamlou	Portland, Oregon
2008–David T. Cooke	Sacramento, California
2009–Jeremiah Geoff Allen	Baltimore, Maryland
2010–Castigliano M. Bhamidipati	Charlottesville, Virginia
2011–Sameh Said	Rochester, Minnesota
2012–Timothy George	Baltimore, Maryland
2013–Rachel L. Medbery	Atlanta, Georgia
2014–Damian J. LaPar	Charlottesville, Virginia
2015–Emily A. Downs	Charlottesville, Virginia

AWARDS

MAVROUDIS-URSCHEL AWARD

The Mavroudis-Urschel Award was established in 2006 to recognize and honor an STSA member who has not only made important contributions to the STSA scientific program, but who has also uniquely personified the social spirit, camaraderie, and fun for which STSA is famous. The award is named for STSA Past Presidents Constantine Mavroudis and Harold Urschel, who both contributed significantly not only to the scientific value of the STSA Annual Meeting but also, and just as importantly, to the organization's high spirits (and high-jinx).

There is more to an organization than its bylaws, and there is more to its Annual Meeting than the slides and presentations. To many, STSA meetings are as much about social interactions as they are about new research findings in cardiothoracic surgery. Meeting highlights also happen at social events, such as the president's mixer, receptions, sports events, and during the exhibit hall breaks. The Award goes to a member who has enhanced both aspects of the organization, scientific and social, and done so with a distinctive, even flamboyant, personal style–in the manner of its namesakes.

The Mavroudis-Urschel Award is made at the discretion of the President with input and recommendation from the double-secret Tiki and Osler-Abbot committee chairs. When given, the award is announced at the annual dinner/dance.

2007–Kit V. Arom	Bangkok, Thailand
2009–John H. Calhoon	San Antonio, Texas
2010–Keith S. Naunheim	St. Louis, Missouri
2011–Francis Robicsek	Charlotte, North Carolina
2012–Harold C. Urschel, Jr.	Dallas, Texas
2013–Kevin D. Accola	Orlando, Florida
2014–Andrea J. Carpenter	San Antonio, Texas
2015–Kamal A. Mansour*	Atlanta, Georgia

STSA INSPIRATION AWARD

The STSA Inspiration Award was established in 2007 to recognize the important contribution of mentorship to the specialty and the organization, and to encourage upcoming generations of CT surgeons by helping to cultivate mentors worthy of emulation.

The future of cardiothoracic surgery is in the hands and hearts of its medical students and residents. Inspiring a resident or medical student to become a CT surgeon–to become a great CT surgeon–is among the most far-reaching and important contributions one can make to the specialty and ultimately to the Southern Thoracic Surgical Association.

The residency program directors and faculty at teaching programs affiliated with the STSA are developing and inspiring future cardiothoracic surgeons every day -- teaching them to become leaders in their future institutions, practices, and communities. And mentorship is not limited to program directors and faculty. Surgeons in private practice hire young graduates and become influential mentors providing career guidance and support often for years to come.

To acknowledge the crucial importance of mentorship in developing CT surgeons and to recognize and positively reinforce STSA members who have excelled in their mentorship roles, STSA established its Inspiration Award in 2007. The Inspiration Award is given to the STSA member who has demonstrated exceptional efforts in motivating, inspiring, and cultivating the clinical and research talents of medical students, residents and/or early career CT surgeons.

Nominations must be submitted in writing by September 1 to the sitting STSA President to be considered for possible presentation at the subsequent STSA Annual Meeting. Recommendation letters should outline the specific merits

of the nominee and his or her positive influences for the 'mentee(s).' Recipient must be a member of STSA in good standing. The award is given at the discretion of the President in consultation with the Council.

2007–Robert J. Cerfolio	Birmingham, Alabama
Hooshang Bolooki	Miami, Florida
2009–Irving L. Kron	Charlottesville, Virginia
2010–Kamal A. Mansour	Atlanta, Georgia
Francis Robicsek	Charlotte, North Carolina
2012–Harvey W. Bender, Jr.	Nashville, Tennessee
Frederick L. Grover	Aurora, Colorado
Ara A. Vaporciyan	Houston, Texas
2013–James Robert Headrick	Chattanooga, Tennessee
2014–Curtis G. Tribble	Charlottesville, Virginia
2015–L. Henry Edmunds	Bryn Mawr, Pennsylvania

JAMES W. BROOKS MEDICAL STUDENT SCHOLARSHIP

The STSA James W. Brooks Medical Student Scholarship was established in 2010 to pay tribute to Dr. Jim Brooks, past president of STSA and a great mentor to countless residents and students. The Brooks Scholarship seeks to identify 2nd, 3rd, and 4th year medical students in the STSA region who are interested in cardiothoracic surgery. The recipient(s), selected annually by a committee of STSA leaders, receives funding to attend the STSA Annual Meeting and the unique opportunity to benefit from the guidance of STSA members, thus extending Dr. Brooks' legacy as a great mentor. It has become increasingly important to begin mentoring future CT surgeons at the medical student level. In establishing the Brooks Scholarship and providing first-rate mentorship, STSA hopes to annually inspire promising medical students to become great CT surgeons, thus making a far-reaching and important contribution to the future of the specialty and ultimately to the STSA.

2010–Elizabeth A. Spradlin	Richmond, Virginia
2011–Carlo Bartoli	Louisville, Kentucky
2012–Vernissia Tam	Baltimore, Maryland
2013–Sahar Saddoughi	Charleston, South Carolina
2014–Mickey Ising	Louisville, Kentucky
Xiaoying Lou	Chicago, Illinois
2015–Bogdan Kindzielski	Potomac, Maryland
Graham Ungerleider	Winston-Salem, North Carolina
2016–Caitlin Brown	Portland, Oregon
Andrew Percy	Richmond, Virginia

STSA RESIDENT SCHOLARHIP

The STSA Resident Scholarship was established in 2014 and seeks to identify a general surgery or thoracic surgery resident who is committed to CT surgery. Each year a scholarship recipient will be invited to attend the STSA Annual Meeting where they will be mentored by an STSA surgeon leader.

2014–Zachary Kon	Baltimore, Maryland
2015–Erin Schumer	Louisville, Kentucky
Mansi Shah	Chapel Hill, North Carolina
2016–Sameer Hirji	Alston, Massachusetts
David Ranney	Durham, North Carolina

EXHIBITORS*

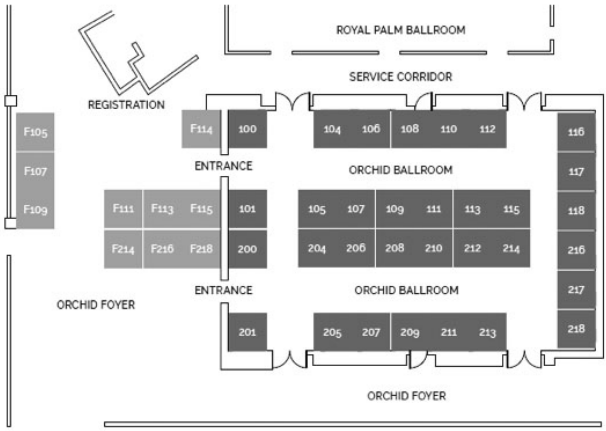
*CONFIRMED AS OF SEPTEMBER 22, 2016

EXHIBIT HOURS AND FLOOR PLAN

THURSDAY, NOVEMBER 10
EXHIBITS OPEN 10:00 am – 3:30 pm

FRIDAY, NOVEMBER 11
EXHIBITS OPEN 7:45 am – 12:00 pm
12:45 pm – 4:00 pm

- Exhibit Hall is located in Orchid Foyer and Ballroom
- All coffee breaks scheduled during show hours are in the exhibit area
- Complimentary coffee and pastries will be served



EXHIBITORS

Abbott Vascular **Booth: F115**
Santa Clara, CA 95054

At Abbott, we're committed to helping you live your best possible life through the power of health. For more than 125 years, we've brought new products and technologies to the world—in nutrition, diagnostics, medical devices and branded generic pharmaceuticals—that create more possibilities for more people at all stages of life. Today, 74,000 of us are working to help people live not just longer, but better, in the more than 150 countries we serve.

AtriCure, Inc. **Booth:F216**
West Chester, OH 45069

AtriCure is intent on reducing the Afib epidemic. We're a leading Afib solutions partner with the only FDA-approved surgical treatment for Afib and significant investment in science, education and innovation.

Bard Davol **Booth: F218**
Roswell, GA 30076

Bard is the market leader in comprehensive soft tissue reconstruction. In addition to this extensive suite of products, our BioSurgery franchise is delivering a growing line of sealants and hemostatic products to complement surgical techniques across thoracic, cardiovascular, and other surgical specialties.

CryoLife **Booth: F11**
Kennesaw, GA 30144

CryoLife® is one of the world's leading contemporary medical device companies; providing preserved human cardiac and vascular tissues, surgical adhesives and sealants, prosthetic heart valves, cardiac lasers, and other medical devices.

Edwards Lifesciences **Booth: F214**
Irvine, CA 92614

Edwards Lifesciences, based in Irvine, Calif., is the global leader in patient-focused medical innovations for structural heart disease, as well as critical care and surgical monitoring.

ETHICON **Booth: 205**
Cincinnati, OH 45242

Ethicon US LLC , brings to market a broad range of innovative surgical products, solutions and technologies used to treat some of today's most prevalent medical issues, such as: colorectal and thoracic conditions, spine and cardiovascular conditions, cancer, obesity and other conditions requiring general surgery. Learn more at www.ethicon.com.

Fehling Surgical **Booth: 104**
Acworth, GA 30101

FEHLING SURGICAL INSTRUMENTS is the leader in fine crafted surgical instrumentation that has focused on Cardiovascular surgery for over 30 years. Our Products also includes a full MICS offering.

Genesee BioMedical **Booth: 211**
Denver, CO 80223

Design Beyond Standard. Genesee BioMedical, Inc. provides high quality, unique and innovative instruments focused particularly on neonate, pediatric and adult cardiothoracic surgery. www.geneseebiomedical.com

Getinge Group **Booth: 107**
Wayne, NJ 07470

Getinge Group is a leading global provider of products and systems that contribute to quality enhancement and cost efficiency within healthcare and life sciences. We operate under the three brands of ArjoHuntleigh, Getinge and Maquet. We build quality and safety into every system, and enhance efficiency throughout the clinical pathway.

Karl Storz **Booth: 207**
El Segundo, CA 90245

KARL STORZ offers technology solutions for thoracic surgery and bronchoscopy, including our IMAGE1 S™ camera architecture system for rigid and flexible endoscopy. This modular system provides brilliant, natural color rendition, and offers innovative visualization technologies.

KLS-Martin **Booth: 209**
Jacksonville, FL 32245

KLS Martin is a company dedicated to providing innovative medical devices and power systems for craniomaxillofacial surgery. The company's rich history began with surgical instrument production in Tuttlingen, Germany in 1896 and continued with miniplate production in 1975. KLS Martin has advanced the capabilities of distraction osteogenesis, and revolutionized resorbable fixation with the SonicWeld Rx system.

LifeNet Health **Booth: 109**
Virginia Beach, VA 23453

LifeNet Health helps save lives, restore health, and give hope to thousands of patients each year. We are the world's most trusted provider of transplant solutions, from organ procurement to new innovations in bio-implant technologies and cellular therapies—a leader in the field of regenerative medicine, while always honoring the donors and healthcare professionals that allow the healing process.

LivaNova **Booth: F113**
Arvoda, CO 80004

LivaNova's comprehensive offering includes innovative sutureless, stentless and stented heart valves, mitral repair solutions, MICS cannulae and surgical instruments. When combined with LivaNova's Goal-Directed Perfusion systems, the cardiopulmonary by-pass can also be optimized to minimize postoperative complications without compromising the quality of the surgical procedure.

LSI Solutions **Booth: 109**
Victor, NY 14564

Celebrating our 10th year of clinical use and over 2.8 million fasteners sold worldwide, COR-KNOT® is suture fastening technology you can trust. COR-KNOT® reduces cardiopulmonary bypass and cross clamp time, saving total operative time and improving patient outcomes. Visit us at www.lsisolutions.com

Medtronic, Inc. **Booth: F105-107**
Minneapolis, MN 55432

Through innovation and collaboration, Medtronic improves the lives and health of millions of people each year. Learn more about our technology, services and solutions at Medtronic.com.

EXHIBITORS

Medtronic HeartWare **Booth: F109**

HeartWare is focused on enhancing outcomes in treating end stage heart failure. The HVAD® System — VAD of choice — demonstrates high survival rates, low complication rates and improved quality of life.

Memorial Healthcare System **Booth: 200**
Hollywood, FL 33312

Memorial Healthcare System is one of the largest public healthcare systems in the United States and a national leader in quality care and patient satisfaction.

Myriad Genetics **Booth: 206**
Salt Lake City, UT 84108

Myriad myPlanTM Lung Cancer is a 46 gene expression assay that's been clinically validated to predict 5-year lung cancer-specific mortality in over 2200 resected patients with Stage I or II NSCLC.

Quest Medical **Booth: 204**
Allen, TX 75002

Quest Medical, Inc. is a medical device manufacturer and worldwide distributor that focuses on providing better patient outcomes. We specialize in Myocardial Protection with the Quest MPS 2® and Microplegia.

Scanlan International, Inc. **Booth: 200**
St. Paul, MN 55107

Highest quality surgical products designed and manufactured by the Scanlan family since 1921. 3,000 stainless steel & titanium precision instruments, VATS Dennis Rib Cutter & Rocco Nodule Clamps, Single-Use Products.

St. Jude Medical **Booth: 208**
Austin, TX 78746

St. Jude Medical is a leading global medical device manufacturer and is dedicated to transforming the treatment of some of the world's most expensive epidemic diseases. Visit sjm.com.

Terumo Cardiovascular **Booth: 106**
Ann Arbor, MI 48103

At Terumo Cardiovascular Group, we develop, manufacture, and distribute medical devices for cardiac and vascular surgery with an emphasis on cardiopulmonary bypass, intra-operative monitoring and vascular grafting.

Transonic **Booth: 110**
Ithaca, NY 14850

Transonic, the pioneer in CABG flow assessment, offers state-of-the-art technology for on-the-spot quantitative confirmation of bypass flow to guarantee early graft patency.

Veran Medical **Booth: 209**
St. Louis, MO 63114

Veran is a privately held medical device company headquartered in St. Louis, MO. The company's main focus is assisting physicians in the early diagnosis and treatment of lung cancer. In the United States, lung cancer kills more people each year than breast, prostate, and colon cancers combined.

Vitalcor, Inc./Applied Fiberoptics **Booth: 105**
Westmont, IL 60559

Coronary Artery Perfusion Cannula Balloon. LED light source (20,000+ hours) & Gemini Plus headlight with camera. Axiom Wound Drains with specialized Clot Stop. Titanium and stainless steel specialty instruments & retractors.

Wexler Surgical **Booth: 101**
Houston, TX 77035

Wexler Surgical designs and manufactures titanium and stainless steel specialty surgical instruments and products for Cardiovascular, Thoracic, and Micro Surgery. Visit us at www.wexlersurgical.com.

CONSTITUTION AND BYLAWS

CONSTITUTION AND BYLAWS

SOUTHERN THORACIC SURGICAL ASSOCIATION
CONSTITUTION AND BYLAWS
(as amended November 7, 2014)

ARTICLE I: NAME

The name of the Corporation shall be the SOUTHERN THORACIC SURGICAL ASSOCIATION, INC. (hereinafter designated as "the Association").

ARTICLE, II: OBJECTIVES

The Association is a not-for-profit corporation whose principle objectives are to disseminate knowledge and information and to stimulate progress in the field of thoracic and cardiovascular surgery in the designated geographic area. The mission of the organization is to: support southern and southern trained members of the cardiothoracic surgery community and their families in the pursuit of the highest quality patient care, education, scientific achievement, collegiality, and life balance.

The Association will:

1. Disseminate knowledge, encourage research and report at the annual meeting, scientific session and postgraduate course on the advancements within the field of thoracic and cardiovascular surgery.
2. Promote fellowship among thoracic and cardiovascular surgeons throughout the designated geographic area.
3. Assure that the activities of the Association are undertaken without any discrimination with regard to race, color, religious creed, national origin, ancestry, physical handicap, medical condition, marital status or sex.

ARTICLE, III: OFFICES

The Association shall have and continuously maintain a registered office and a registered agent in the State of Illinois, and may have such other offices in or outside the State of Illinois at the Council's discretion.

ARTICLE IV: MEMBERS

SECTION 1. Membership. There shall be six (6) categories of members: Active, Senior, Resident, Student, Associate, and Honorary Member. Members shall be individuals who support the purpose of the Association and who agree to comply with the Association's rules and regulations. Active and Senior members shall be entitled to hold office and shall have voting privileges. Active and Senior Members must be board certified by the American Board of Thoracic Surgery or its foreign equivalent. If an Active Member moves from the designated membership geographical area outlined in SECTION 2, he or she may retain membership as long as all other requirements for membership are satisfied. Members whose practices have been limited because of disability, or who have reached the age of 65 years, may apply for Senior Membership. The Association shall not be required to subscribe to *The Annals of Thoracic Surgery* for Senior members. Associate Members include support staff for practicing cardiothoracic surgeons including, but not limited to, nurses, nurse practitioners, perfusionists, physician assistants, and research staff. Honorary membership can be bestowed upon a worthy recipient upon recommendation of the Council and ratification by a two-thirds majority of the votes at the annual meeting. Honorary Members are broadly defined as physicians who have made significant contributions to the field of cardiothoracic surgery Nomination for Honorary Membership can be made to the Council in writing for review prior to the spring Council Meeting. Honorary Members are welcomed at all scientific and business meetings of the Association,

but have no obligations or responsibilities in the organization. Honorary, Associate, Resident, and Student Members do not have voting privileges, nor may they hold office. Resident Members must be matched or enrolled in a thoracic surgery educational program accredited by the Residency Review Committee for Thoracic Surgery under the authority of the Accreditation Council for Graduate Medical Education that is within the STSA region provided for in SECTION 2 to be classified as a Resident Member. Resident Members may retain membership up to three years following the completion of their thoracic surgery training. Resident members who have been certified in thoracic surgery by the American Board of Thoracic Surgery (ABTS) may, upon written request to the Association and with approval of the Membership Committee and the Council, transition directly, with no initiation fee applied, to Active Membership. If no such official request is forthcoming, Resident Membership will be terminated and reinstatement will be dependent upon a formal application for Active Membership, with its associated requirements, including initiation fee and approval by the full membership. Student Members may apply for membership by expressing a desire to enter the field of cardiothoracic surgery. Student members may transfer to Resident Member status once they have matched or enrolled in a thoracic surgery educational program accredited by the Residency Review Committee for Thoracic Surgery under the authority of the Accreditation Council for Graduate Medical Education that is within the STSA region.

SECTION 2. Applicants. An applicant for Active Membership must at the time of acceptance reside, or have previously practiced cardiothoracic surgery for at least one year, or have completed a thoracic or general surgery residency program, or have completed a thoracic or cardiovascular research or clinical fellowship for at least twelve consecutive months in one of the following states or regions: Alabama; Arkansas; Florida; Georgia; Kentucky; Louisiana; Maryland; Mississippi; Missouri; North Carolina; Oklahoma; South Carolina; Tennessee; Texas; Virginia; West Virginia; District of Columbia; the U.S. territories and commonwealths in the Caribbean. An applicant for active membership must be certified by the ABTS. Applicants who meet the practice requirement above but whose training has been in countries other than the United States of America, and who are certified as proficient in thoracic and cardiovascular surgery by appropriate authorities in their home country, may apply. At least seventy-five percent of the practice of the applicant must be devoted to the field of thoracic and cardiovascular surgery, which may include research and peripheral vascular surgery. If an applicant is unsuccessful in obtaining membership in two successive years, an interval of two years must elapse before he/she may reapply. The Membership Committee and the Council may recommend acceptance of foreign training and certification by stating that, in their opinion, it represents equivalent status. The Membership Committee and Council may recommend acceptance of individuals who, despite not meeting membership criteria regarding training, practice or research in the STSA region, have demonstrated significant involvement with the organization through their participation in the annual meeting, contributions to the scientific program, and service to the organization. Applicants so approved by the Membership Committee and the Council may become Active Members upon election by the membership at an annual meeting.

An applicant for Resident Membership must at the time of acceptance be matched or enrolled in a thoracic surgery educational program accredited by the Residency Review Committee for Thoracic Surgery under the authority of the Accreditation Council for Graduate Medical Education in one of the following states or regions: Alabama; Arkansas; Florida; Georgia; Kentucky; Louisiana; Maryland; Mississippi; Missouri; North Carolina; Oklahoma; South Carolina; Tennessee; Texas; Virginia; West Virginia; District of Columbia; the U.S. territories and commonwealths in the Caribbean. Individuals who have completed their education in one of the above programs and are in the process of acquiring certification in thoracic surgery by the ABTS are eligible to apply for Resident Membership.

An applicant for Associate Membership must at the time of acceptance be working in field of allied health related to the practice of cardiothoracic surgery in one of the following states or regions: Alabama; Arkansas; Florida; Georgia; Kentucky; Louisiana; Maryland; Mississippi; Missouri; North Carolina; Oklahoma; South Carolina; Tennessee; Texas; Virginia; West Virginia; District of Columbia; the U.S. territories and commonwealths in the Caribbean.

An applicant for Student Membership must at the time of acceptance be enrolled in medical school or general surgery residency in one of the following states or regions: Alabama; Arkansas; Florida; Georgia; Kentucky; Louisiana; Maryland; Mississippi; Missouri; North Carolina; Oklahoma; South Carolina; Tennessee; Texas; Virginia; West Virginia; District of Columbia; the U.S. territories and commonwealths in the Caribbean. They must submit a written statement of interest in cardiothoracic surgery.

Active Membership status will not become effective, nor a certificate of membership presented, unless and until such elected applicant registers at one of the next four annual meetings following his/her initial election to membership. Resident and Associate Membership status will not become effective, nor a certificate of membership presented, unless and until such elected applicant registers for and attends an annual meeting following his or her election to membership. Exception for this requirement may be granted by a majority vote of the Council. Failure to comply with this procedure will require reapplication for membership.

SECTION 3. Applications. Application forms for Active, Resident, Associate, and Student Membership are available from the Secretary-Treasurer or at www.stsa.org and are forwarded to the Chairman of the Membership Committee for verification. Applications will be verified by the Membership Committee in accordance with the policies and procedures established by the Council.

SECTION 4. Certificates. The Council shall issue a Certificate of the Association evidencing the member's admission to the Association and indicating membership status. These certificates remain the sole property of the Association and shall be surrendered upon written demand and/or for non-payment of dues.

SECTION 5. Resignation. Members may resign from the Association at any time by giving written notice to the Secretary/Treasurer of the Association. Such resignation shall not relieve the member of any obligation for dues, assessments or other charges previously accrued and unpaid. Membership is not transferable or assignable.

SECTION 6. Termination of Membership. The Council, by affirmative vote of two-thirds of all Council members present and voting at any duly constituted meeting of the Council, may suspend or expel a member for cause after an appropriate hearing in accordance with policies and procedures established by the Council. The Council, by affirmative vote of a majority of all Council members present and voting at any duly constituted meeting of the Council may terminate the membership of any member who has become ineligible for membership in accordance with the policies and procedures established by the Council.

SECTION 7. Application for Reinstatement. Any former members of the Association may apply for reinstatement through the regular application procedure.

ARTICLE V: DUES AND ASSESSMENTS

The initiation and annual dues for each category of member of the Association, the time for paying such dues, and other assessments, if any, shall be determined by the Council. Annual dues are not refundable.

ARTICLE VI: MEETING OF MEMBERS

SECTION 1. Annual Meeting. The annual meeting of the members shall be held at a date, time and place determined by the Council and shall be held in conjunction with the scientific session of the Association.

SECTION 2. Purpose. The purpose of the annual meeting is to: elect officers and councilors; receive reports from the Association on the activities of the Council; provide members an opportunity to express their opinions on matters affecting the Association; and to dispense with such other business, as necessary. The order of business for a meeting shall be determined in advance by the President and subsequently adopted at a called meeting.

SECTION 3. Special Meetings. Special meetings of the membership may be called by the President or the Council. Such special meetings shall be held at a date, time and place as determined by the Council.

SECTION 4. Notice of Meetings. Written notice stating the date, time and place of any annual or special meeting shall be delivered no less than seven (7) days, nor more than 30 days, before the date of the meeting to each member entitled to vote at the meeting. In the case of removal of one or more Council members, a merger, consolidation, dissolution or sale of assets, a written notice of no less than twenty (20) days or more than sixty (60) days before the date of the meeting will be given by, or at the direction of, the President, the Secretary, or the Council.

SECTION 5. Quorum. The quorum for the transaction of business at a meeting of members or special meeting shall be a majority of the members attending that meeting.

SECTION 6. Voting. Each member with voting rights shall be entitled to only one (1) vote. A majority of the votes present at a meeting where a quorum is present shall be necessary for the adoption of any matter voted upon by the members, except where otherwise provided by law, the articles of incorporation of the Association or these bylaws.

SECTION 7. Informal Action. Required action may be taken without a meeting if a consent in writing, setting forth the action taken, is signed by not less than the minimum number of members necessary to authorize such action at a meeting, except for dissolution of the Association, which must be voted on at a special meeting of the members entitled to vote.

ARTICLE VII: OFFICERS AND THE COUNCIL

SECTION 1. General Powers. The property, business and affairs of the Association shall be managed by the Council. The Council may adopt such rules and regulations for the conduct of its business as shall be deemed advisable and may, in the execution of the power granted, appoint such agents as necessary. In addition, the Council shall act as a Board of Censors for the trial of all alleged offenses against the bylaws. A report by the Chairman of the Council shall be made to the members at the annual meeting.

SECTION 2. Number, Tenure and Qualifications. The Council shall consist of the Past President, the Chairman of the Council (Immediate Past President), the President, the President-Elect, the Vice President, the Secretary/Treasurer, the Director of Continuing Medical Education, the Historian and three Councilors-At-Large. The Secretary/Treasurer Elect, the representative of the Board of Governors of the American College of Surgeons, representative of the Advisory Council for Cardiothoracic Surgery of the American College of Surgeons, the Editor of *The Annals of Thoracic Surgery*, the Chairman of the Program Committee, the Chairman of the Membership Committee, and the Chairman of the Postgraduate Program Committee shall attend the Council meetings without vote.

SECTION 3. Election. The eligible members will elect the Council. Officers shall be elected annually to serve a one-year term, except the Secretary/Treasurer whose term shall be for four years and the historian whose term shall be for four years and who can be re-elected. The President, Vice President and Secretary/Treasurer are not eligible for re-election. The term of office of councilors-at-large shall be two years. Two Councilors shall be elected one-year and one Councilor the next year to replace the retiring members, unless a vacancy or vacancies has occurred, in which case an additional Councilor(s) shall be appointed by the President to fill the vacant term(s).

SECTION 4. Resignation. Any Council member may resign at any time by giving written notice to the President. Such resignation shall take effect when the notice is delivered, unless the notice specifies a future date. Another exception would be, unless otherwise specified therein, the acceptance of such resignation shall not be necessary to make it effective.

SECTION 5. Annual Meetings. The annual meeting of the Council shall be held at the time and place designated by the Council in connection with the annual members meeting.

SECTION 6. Regular Meetings. The Council may hold regular meetings at such place and at such times as designated by the Council.

SECTION 7. Special Meetings. Special meetings of the Council may be held at any place and time on the call of the President or at the request in writing of any three Council members.

SECTION 8. Notice of Meetings. Notice of special meetings of the Council shall be delivered by, or at the direction of, the Secretary/Treasurer to each Council member at least seven (7) days before the day on which the meeting is to be held. Notice may be waived in writing by a Council member, either before or after the meeting. Neither the business to be transacted at, nor the purpose of any special meeting of the Council, need be specified in the notice or waiver of notice of such meeting.

SECTION 9. Quorum. A majority of the Council members entitled to vote shall constitute a quorum for the transaction of business at any meeting of the Council.

SECTION 10. Manner of Acting. The act of a majority of the Council members at a meeting at which a quorum is present shall be the act of the Council, unless the act of a greater number is required by law, the articles of incorporation, or by these bylaws.

SECTION 11. Informal Action. Action may be taken by the Council without a meeting if a consent in writing, setting forth the action so taken, is signed by all the Council members.

SECTION 12. Participation at Meetings by Conference Telephone. Members of the Council, or of any committee designated by the Council, may take any action permitted or authorized by these bylaws by means of conference telephone, or similar telecommunications equipment, in which all persons participating in the meeting can communicate with each other. Participation in such a meeting shall constitute presence in person at such meeting.

SECTION 13. Compensation. Council members, as such, shall not receive any stated compensation for their services on the Council, but the Council may, by resolution, authorize reimbursement for reasonable expenses incurred in the performance of their duties. The Council will occasionally review the reimbursement policies.

ARTICLE V, III: OFFICERS AND EXECUTIVE DIRECTOR

SECTION 1. Officers. The officers of the Association shall consist of the President, the President-Elect, the Vice President, the Secretary/Treasurer, the Chairman (Immediate Past President), the Past President, the Historian, and such other officers and assistant officers as may be elected in accordance with the provisions of this Article. The Council may elect or appoint such other officers as it shall deem necessary. These officers shall have the authority to perform such duties as may be prescribed from time-to-time by the Council.

SECTION 2. President. The President shall be the principal elected officer of the Association. The President shall preside at all meetings of the Association. The President shall appoint members to the standing committees and to any other special committee, which may be deemed necessary for the welfare of the association. The President shall perform all other duties appropriate to the conduct of the office. At the conclusion of the annual meeting, the retiring President shall automatically become a Councilor for a two-year term of office in the capacity of Chairman the first year and Past President the second year.

SECTION 3. President-Elect. The President-Elect shall participate in all the meetings and deliberations of the Council during the year elected and shall accede to the office of President the following year.

SECTION 4. Vice President. In the absence of the President, or in the event of his or her inability or refusal to act, the Vice President shall perform the duties of the President. When so acting, the Vice President shall have all the powers, and be subject to all the restrictions, of the President. The Vice President shall perform such other duties as may be assigned by the President or by the Council.

SECTION 5. Secretary/Treasurer. As Secretary he/she shall: keep the minutes of the meetings of the members and of the Council in one or more books provided for that purpose; see that all notices are duly given in accordance with the provisions of these bylaws, or as required by law; be custodian of the Council's records; keep a register of the post office address of each member, which shall be furnished to the Secretary by such member; notify candidates of their election to membership; and in general perform all duties incident to the office of Secretary, and such

other duties that may be assigned by the President or by the Council. The administrative duties of the Secretary may be assigned, in whole or in part, to the Executive Director by the Council.

As Treasurer, he/she shall keep an account of all monies received and expended by the Association and shall make disbursements authorized by the Council. All sums received shall be deposited or invested in such bank, trust company, or other depositories authorized by the Council. The Treasurer shall perform all the duties incident to the office of Treasurer and such other duties as may be assigned by the President or by the Council. The administrative duties of the Treasurer may be assigned, in whole or in part by the Council, to the Executive Director.
He/she shall present an annual report to the membership for audit.

SECTION 6. Secretary/Treasurer-Elect. The Secretary/Treasurer-Elect shall serve as understudy to the Secretary/Treasurer for a term of one year.

SECTION 7. Chairman. The immediate Past President shall be the Chairman of the Council and perform such duties as occasionally may be designated by the President or by the Council. Upon termination of the term of office as President, the President shall become Immediate Past President for a one-year term.

SECTION 8. Past President. The Past President shall serve on the Council and perform such duties as may be designated by the President, Chairman of the Council, or by the Council. Upon termination of the term of office as Immediate Past President, the Immediate Past President shall become Previous Past President for a one year term.

SECTION 9. Director of Continuing Medical Education. The Director of Continuing Medical Education shall be appointed by the President for a term of four years and shall oversee and coordinate the Program and Postgraduate Programs, and the administration aspects of continuing education, and chair the Continuing Education Committee.

SECTION 10. Executive Director. The administrative duties and day-to-day operation of the Association shall be conducted by a salaried staff head or firm employed or appointed by the Council. The Executive Director shall be responsible to the Council. The Executive Director shall have the authority to execute contracts on behalf of the Association and as approved by the Council. The Executive Director may carry out the duties of the Secretary of the Association and may carry out the duties of the Treasurer as directed by the Council. The Executive Director shall employ and may terminate the employment of staff members necessary to carry out the work of the Association and shall perform such other duties as may be specified by the Council.

SECTION 11. Historian. The Historian shall record the history of the Association, keep archives of the programs and minutes of the Business and Council meetings, and report the deaths of members at the annual business meeting. In addition, he/she shall perform all other duties appropriate to this office and other duties assigned by the President for Council.

ARTICLE IX: COMMITTEES

The President shall appoint committees as may be necessary for the proper conduct and management of the Association. The standing Committees of the Association shall be:

SECTION 1. Executive Committee. The Executive Committee shall consist of the officers of the Association and the Executive Director. The Executive Director shall be ex-officio, a member of the Executive

Committee without the right to vote. The Executive Committee may exercise the authority of the Council in the management of the affairs of the Association during the intervals between meetings of the Council, subject at all times to the bylaws of the Association, and the prior resolutions, regulations and directives issued, adopted or promulgated by the Council. A majority of the members of the Executive Committee shall constitute a quorum for the transaction of business. Meetings may be called by the President or by any two Executive Committee members.

SECTION 2. Program Committee. The Program Committee shall consist of the President, the Director of Continuing Medical Education, the Secretary/Treasurer, and additional members appointed to the Program Committee. Appointment to the Program Committee shall be for a period of three years. Appointment(s) to this committee shall be made by the President each year. The senior member of the appointed members shall serve as Chairman. It shall be the duty of the committee to review the abstracts of scientific papers submitted by the members and arrange the program for the annual meeting. At least one author of each abstract for the regular scientific program should be a member of the association. No more than 25 percent of the papers presented at the annual meeting may be presented by authors who are not members, provided that such papers are of unusual merit.

SECTION 3. Postgraduate Program Committee. The Postgraduate Program Committee shall consist of the Director of Continuing Medical Education and appointed members. Appointment to the Postgraduate Program Committee shall be for a period of three years. Appointments to this committee shall be made by the President each year. The senior appointed member of the committee shall act as chair. It shall be the duty of this committee to arrange a Postgraduate Continuing Medical Education Program to cover broad and varied aspects of thoracic surgery to be presented at the time of the annual meeting.

SECTION 4. Membership Committee. This committee shall consist of four members. Appointment to the Membership Committee shall be for a period of four years. One new appointee to this committee shall be made by the President each year. The senior member of the committee shall serve as Chairman. This committee shall receive applications for membership in the association and after consideration of the applicants may propose them to the Council for approval and to the membership for election.

SECTION 5. Continuing Medical Education Committee. This committee shall consist of the Chairman of the Postgraduate Committee, the Chairman of the Program Committee, and the Director of Continuing Medical Education who shall serve as Chairman. It shall be the duty of this committee to set up the objectives of the next annual meeting with the said objectives being presented for approval by the Council at their interim meeting and forwarded to members prior to the annual meeting.

SECTION 6. Nominating Committee. This committee shall consist of the four Immediate Past Presidents with the most senior Past President serving as Chairman. This committee shall prepare a slate of nominees for officers and Councilors for the following year. This report is submitted to the organization at its annual meeting. The recommendations of the Nominating Committee are not intended to exclude direct nominations from the floor.

SECTION 7. Other Committees. Other committees may be designated by a resolution adopted by a majority of the Council present at a meeting at which a quorum is present (Ad Hoc Committees may be designated by the President with approval of the Council). Except as otherwise provided

in such resolution, members of each committee shall be members of the Association, and the President of the Association shall appoint the members thereof. Any member may be removed by the person or persons authorized to appoint such member whenever in their judgment the best interests of the Association shall be served by such removal.

SECTION 8. Term of Office. Each member of a committee shall continue as such until the next annual meeting of the Council or until a successor is appointed, unless the committee is terminated, or the member is removed from the committee, ceases to qualify as a member, or the member resigns from the committee.

SECTION 9. Vacancies. Vacancies in the membership of any committee may be filled by appointments made in the same manner as provided in the case of the original appointments.

SECTION 10. Quorum. Unless otherwise provided in the resolution of the Council designating a committee, a majority of any committee shall constitute a quorum for committee action. The act of a majority of committee members present and voting at a meeting, at which a quorum is present, shall be the act of the committee.

SECTION 11. Participation at Meetings by Conference Telephone. Committee members may participate in and act at any committee meeting through the use of a conference telephone or other communications equipment by means of which all persons participating in the meeting can communicate with each other. If the Chairman of a committee so orders, participation in such meetings shall constitute attendance at the meeting.

SECTION 12. Meetings of Committees. Subject to action by the Council, each committee by a majority vote of its members shall determine the time and place of meetings and the notice required.

SECTION 13. Informal Action. Any action required or taken at a meeting of a committee may be taken without a meeting if a consent in writing, setting forth the action so taken, is signed by all of the committee members.

SECTION 14. Rules. Each committee may adopt rules for its own government not inconsistent with these bylaws or with rules adopted by the Council.

ARTICLE X: OFFICIAL ORGAN

The Annals of Thoracic Surgery shall be the official publication of the Southern Thoracic Surgical Association. Papers read before the Association shall be forwarded to the Editor of *The Annals of Thoracic Surgery* for consideration for publication at the time requested by the Program Committee Chair and Editor of *The Annals.*

ARTICLE XI: CONTRACTS, CHECKS, DEPOSITS AND FUNDS, BONDING

SECTION 1. Contracts. The Council may authorize any officer or officers, agent or agents of the Association, in addition to the officers so authorized by these bylaws, to enter into any contract or execute and deliver any instrument in the name of, and on behalf of, the Association. Such authority may be general or confined to specific instances.

SECTION 2. Depositories. All funds of the Association not otherwise employed shall be deposited to the credit of the Association in such banks, trust companies or other depositories as the Council may designate.

SECTION 3. Checks, Drafts, Notes, Etc. All checks, drafts or other orders for the payment of money and all notes or other evidences of indebtedness issued in the name of the Association shall be signed by such officer or officers, or agent or agents, of the Association and in such manner as shall be determined by resolution of the Council.

SECTION 4. Bonding. The Council shall provide for the bonding of such officers and employees of the Association, as needed.

SECTION 5. Delivery of Notice. Any notices required to be delivered pursuant to these bylaws shall be deemed to be delivered when transferred or presented in person or deposited in the United States mail addressed to the person at his/her or its address as it appears on the records of the Association, with sufficient first-class postage prepaid thereon.

SECTION 6. Investments. Unless otherwise specified by the terms of a particular gift, bequest or devise, grant or other instrument, the funds of the Association may be invested, in such manner as the Council may deem advantageous, without regard to restrictions applicable to trusts or trust funds.

ARTICLE XII: BOOKS AND RECORDS

The Association shall keep correct and complete books and records of accounts and shall also keep minutes of the proceedings of its members, Council, and committees having any of the authority of the Council, and shall keep at the registered or principal office a record giving the names and addresses of the members entitled to vote. All books and records of the Association may be inspected by any member, or his or her agent or attorney, for any proper purpose at any reasonable time.

ARTICLE X, III: FISCAL YEAR

The fiscal year of the Association shall be established by the Council.

ARTICLE XIV: WAIVER OF NOTICE

Whenever any notice is required to be given under the provisions of the General Not For Profit Corporation Act of the State of Illinois or under the provisions of the articles of incorporation or the bylaws of the Association, a waiver in writing signed by the person or persons entitled to such notice, whether before or after the time stated therein, shall be deemed equivalent to the giving of such notice. Attendance at any meeting shall constitute waiver of notice unless the person at the meeting objects to the holding of the meeting because proper notice was not given.

ARTICLE XV: INDEMNIFICATION OF DIRECTORS, OFFICERS, EMPLOYEES AND AGENTS; INSURANCE

SECTION 1. Right to Indemnification. Each person who was or is a party or is threatened to be made a party to, or is involved in, any action, suit or proceeding—whether civil, criminal, administrative or investigative—by reason of the fact that he/she, or a person of whom he/she is the legal representative, is or was a director, officer, employee or agent of the Association, or is or was serving at the request of the Association, shall be indemnified and held harmless by the Association to the fullest extent authorized by the laws of Illinois against all costs, charges, expenses, liabilities and losses reasonably incurred or suffered by such person in connection with and such indemnification shall continue to a person who has ceased to be associated with the Association. This includes attorneys' fees, judgments, fines, ERISA excise taxes or penalties and

amounts paid, or to be paid, in settlement. The right to indemnification conferred in this Article XV shall be a contract right and shall include the right to be paid by the Association the expenses incurred in defending any such proceeding in advance of its final disposition. For the purpose of determining the reasonableness of indemnifiable expenses, the fees and expenses of separate counsel from counsel for the Association, or other joint defendants being indemnified by the Association, shall not be indemnifiable unless there exists a bonafide conflict of interest.

SECTION 2. Right of Claimant to Bring Suit. If a claim under Section 1 of Article XV is not paid in full by the Association within a reasonable amount of time after a written claim has been received by the Association, the claimant may at any time thereafter bring suit against the Association to recover the unpaid amount of the claim and, if successful in whole or in part, the claimant shall also be entitled to be paid the expenses of prosecuting such a claim. It shall be a defense to any action that the claimant has failed to meet a standard of conduct which makes it permissible under Illinois law for the Association to indemnify the claimant for the amount claimed. But the burden of proving such defense shall be on the Association.

SECTION 3. Non-Exclusive of Rights. The right to indemnification and the payment of expenses incurred in defending a proceeding in advance of its final disposition conferred in Article XV shall not be exclusive of any other right which any person may have or hereafter acquire under any statute, provision of the articles of incorporation, bylaws, agreement, vote of members or disinterested directors or otherwise.

SECTION 4. Insurance. The Association shall maintain insurance to the extent of availability at commercial reasonable rates, at its expense, to protect itself and any director, officer, employee or agent of the Association or another corporation, partnership, joint venture, trust or other enterprise against any expense, liability or loss, whether or not the Association would have the power to indemnify such person against such expense, liability or loss under Illinois law.

SECTION 5. Expenses as a Witness. To the extent that any director, officer, employee or agent of the Association is by reason of such position, or a position with another entity at the request of the Association, a witness in any proceeding, he shall be indemnified against all costs and expenses actually and reasonably incurred by him or on his behalf in connection therewith.

SECTION 6. Notification. If the Association has paid indemnity or has advanced expenses under this Article XV to a director, officer, employee or agent, the Association shall report the indemnification or advance in writing to the members with or before the notice of the next meeting of the members.

SECTION 7. Effect of Amendment. Any amendment, repeal or modification of any provision of this Article XV by the members or the directors of the Association shall not adversely affect any right or protection of a director or officer of the Association existing at the time of such amendment, repeal or modification.

ARTICLE XVI: DISSOLUTION

Upon the dissolution of the Association, and after payment of all indebtedness of the Association, any remaining funds, investments and other assets of the Association shall be distributed to such organization or organizations which are then qualified as exempt from taxation under Section 501(c) 6 of the Internal Revenue Code of 1986, as amended (or the corresponding provision of any future Internal Revenue Law

of the United States). This distribution shall only occur if the purposes and objectives of such organization(s) are similar to the purposes and objectives of the Association, as may be determined by vote of the then voting members of the Association.

ARTICLE XVII: AMENDMENTS

These bylaws may be altered, amended, or repealed at the time of the annual meeting by a two-thirds vote of the membership present, provided that the amendment has been presented to the membership in writing at least 30 days prior to the time of the annual meeting.

ARTICLE XV, III: PARLIAMENTARY AUTHORITY

The deliberations of the Association, Council, and committees shall be governed by the parliamentary rules and usages contained in the then current edition of "Roberts Rules of Order, Newly Revised", when not in conflict with the bylaws of the Association.

RELATIONSHIP DISCLOSURE INDEX

COMMERCIAL DISCLOSURE STATEMENTS OF COUNCIL MEMBERS AND PROGRAM PLANNERS

STSA would like to thank the following STSA leaders for planning the educational content of the STSA 63rd Annual Meeting. Unless otherwise noted, these STSA leaders have no relevant commercial relationships to disclose.

Andrea J. Carpenter: *President, Program Committee, Postgraduate Committee*
COMMERCIAL RELATIONSHIPS:

Faisal G. Bakaeen: *Program Committee*
COMMERCIAL RELATIONSHIPS: Consultant/Advisory Board: JACE Medical

John H. Calhoon: *Program Committee, Postgraduate Committee*

Paul Chai: *Postgraduate Committee Chair, CME Committee*

Robert J. Dabal: Postgraduate Committee

Elizabeth A. David: *Program Committee*

Melanie Edwards: *Postgraduate Committee*

Richard K. Freeman: *Program Committee, Postgraduate Committee, CME Committee Chair*

Charles B. Huddleston: *Program Committee Chair, CME Committee*

S. Adil Husain: *Program Committee*

Kirk Kanter: *Postgraduate Committee*

Richard L. Lee: *Program Committee*
COMMERCIAL RELATIONSHIPS: Consultant/Advisory Board: CryoLife

Scott A. LeMaire: *Postgraduate Committee Chair, CME Committee*
COMMERCIAL RELATIONSHIPS: Other Research Support: PI Baxter Healthcare, Co-Investigator CytoSorbants, PI Vascutek Terumo, Co-Investigator W. L. Gore & Associates, Co-Investigator Medtronic, Co-Investigator Glaxo Smith Kline

Daniel L. Miller: *Program Committee, Postgraduate Committee*
COMMERCIAL RELATIONSHIPS: Consultant/Advisory Board: Ethicon, Inc., Other Research Support: Medela, Inc., Speakers Bureau Honoraria: Medtronic, Acute Innovations

Himanshu J. Patel: *Program Committee Chair, CME Committee*
COMMERCIAL RELATIONSHIPS: Ownership Interest: WL Gore (co-patent holder), Consultant/Advisory Board: W. L. Gore, Medtronic, Terumo Cardiovascular Systems

Chad Stasik: *Postgraduate Committee*

COMMERCIAL RELATIONSHIPS OF ABSTRACT REVIEWERS
STSA would like to thank the following leaders for reviewing the abstracts submitted for consideration for presentation at the STSA 63rd Annual Meeting. Unless otherwise noted, the abstract reviewers have no relevant commercial relationships.

Paul Brown

Felix Fernandez

RELATIONSHIP DISCLOSURE INDEX

Bryan Helsel

David Jones

Vinayak Kamath

William Keeling

Min Kim

Bradley Leshnower
COMMERCIAL RELATIONSHIPS: Consultant/Advisory Board: CryoLife, Inc.

Keith Mortman
COMMERCIAL RELATIONSHIPS: Consultant/Advisory Board: Ethicon, Inc.; Speakers Bureau/Honoraria: Bard/Davol; Research Grant: Myriad Inc.

Charles Murrah

Basil Nasir
COMMERCIAL RELATIONSHIPS: Consultant/Advisory Board: Ethicon Endo Surgery

James Rankin

T. Brett Reece

James St. Louis

Randy Stevens

COMMERCIAL RELATIONSHIPS OF STSA STAFF
Unless otherwise noted, staff members have no relevant commercial relationships.

Nicole Schroeder: *Executive Director*

Rachel Pebworth: *Senior Coordinator*

Beth Winer: *Senior Manager*

RELATIONSHIP DISCLOSURES FROM PRESENTERS
The following presenters have indicated, in accordance with the Accreditation Council for Continuing Medical Education Standards and the STSA Disclosure Policy, that they have a financial or other relationship with a healthcare-related business or other entity whose products or services may be discussed in, or directly affected in the marketplace by the educational program/product under consideration. Listed too are abstracts whose content describes the use of a device, product, or drug, that is not FDA approved, or the off-label use of an approved device, product, or drug.

Unless noted in this program book or verbally by the speakers, speakers have no relevant financial relationships to disclose and will only be presenting information on devices, products, or drugs that are FDA approved for the purposes they are discussing.

WEDNESDAY, NOVEMBER 9, 2016

STSA/CTS NET SURGICAL MOTION PICTURES

Moderator Commercial Relationships
Helen Mari Merritt, Nothing to Disclose
Richard L. Lee, Consultant/Advisory Board: CryoLife

1V. *Robotic Repair of Mitral Commissural Endocarditis With a Bridging Patch Technique*
COMMERCIAL RELATIONSHIPS: J. Scott Rankin: Ownership Interest: BioStable Science and Engineering, Consultant/Advisory Board: Amedus Corp, Atricure

4V. *Combined Pulmonary Artery Sleeve Resection / Left Upper Lobectomy and Extended Resection of the Thoracic Aorta After TEVAR For T4 Lung Cancer*
COMMERCIAL RELATIONSHIPS: Isaac George: Consultant/Advisory Board: Bolton Medical; Joshua R. Sonett: Consultant/Advisory Board: WebMD

THURSDAY, NOVEMBER 10, 2016

POSTGRADUATE PROGRAM

GENERAL SESSION
Moderator Commercial Relationships
Scott A. LeMaire, Other Research Support: PI Baxter Healthcare, Co-Investigator CytoSorbants, PI Vascutek Terumo, Co-Investigator W. L. Gore & Associates, Co-Investigator Medtronic, Co-Investigator Glaxo Smith Kline
Paul J. Chai, Nothing to Disclose

Managing an Expanding ECMO Program
COMMERCIAL RELATIONSHIPS: Joseph B. Zwischenberger: Ownership Interest: Maquet, W-Z Biotech, LLC

Blood Conservation: Best Practices for Reducing Bleeding and Transfusion Requirements **COMMERCIAL RELATIONSHIPS: Victor A. Ferraris:** Consultant/Advisory Board: Acelity

How I Teach It: Thoracoscopic Lobectomy
COMMERCIAL RELATIONSHIPS: Joshua R. Sonett: Consultant/Advisory Board: WebMD

ADULT CARDIAC BREAKOUT
Moderator Commercial Relationships
Anthony L. Estrera, Consultant/Advisory Board: Gore (DSMB, Consulting), Speakers Bureau/Honoraria: Maquet
Neal D. Kon, Nothing to Disclose

Trouble During TAVR: Prevention and Management
COMMERCIAL RELATIONSHIPS: Vinod H. Thourani: Research Grant/PI: Edwards Lifesciences, Medtronic, St. Jude Medical, Boston Scientific; Consultant Advisory Board: Medtronic, Sorin Medical, Abbott Medical, Edwards Lifesciences

GENERAL THORACIC BREAKOUT
Moderator Commercial Relationships
Melanie A. Edwards, Nothing to Disclose
Richard K. Freeman, Nothing to Disclose

RELATIONSHIP DISCLOSURE INDEX

CONGENITAL BREAKOUT
Moderator Commercial Relationships
Paul J. Chai, Nothing to Disclose
Robert J. Dabal, Nothing to Disclose

INTERDISCIPLINARY CARE PROVIDER BREAKOUT
Moderator Commercial Relationships
James St. Louis, Nothing to Disclose

ETHICS DEBATE
Moderator Commercial Relationships
Robert M. Sade, Nothing to Disclose

Case Introduction: Should Hospital Policy Forbid Surgeons to Schedule Concurrent Cases in the Operating Room: Con
COMMERCIAL RELATIONSHIPS: Vinod H. Thourani: Research Grant/PI: Edwards Lifesciences, Medtronic, St. Jude Medical, Boston Scientific; Consultant Advisory Board: Medtronic, Sorin Medical, Abbott Medical, Edwards Lifesciences

THURSDAY NOVEMBER 10, 2016
FIRST SCIENTIFIC SESSION

Moderator Commercial Relationships
Andrea J. Carpenter, Nothing to Disclose
Daniel L. Miller, Consultant/Advisory Board: Ethicon, Inc., Other Research Support: Medela, Inc., Speakers Bureau Honoraria: Medtronic, Acute Innovations

1. *Early Surgical Intervention in Patients With Mitral Valve Infective Endocarditis and Acute Stroke: Implications for Timing of Surgery*
   COMMERCIAL RELATIONSHIPS: James S. Gammie: Consultant/Advisory Board: Edwards Lifesciences; Ownership Interest: Harpoon Medical

2. *Outcomes of Adult Extracorporeal Membrane Oxygenation With Outside Facility Transfer: A Regional Referral Center Experience*
   COMMERCIAL RELATIONSHIPS: Mani A. Daneshmand: Speakers Bureau/Honoraria: Maquet; DISCUSSANT: Joseph B. Zwischenberger: Ownership Interest: Maquet (patent holder), W-Z Biotech, LLC

5. *The Changing Spectrum of Tracheostomy Related and Post Intubation Tracheal Stenosis: Implications for Surgical Treatment*
   COMMERCIAL RELATIONSHIPS: DISCUSSANT: Daniel L. Miller: Consultant/Advisory Board: Ethicon, Inc., Other Research Support: Medela, Inc., Speakers Bureau Honoraria: Medtronic, Acute Innovations

6. *Contemporary Practice Patterns and Outcomes of Surgery for Acute Type A Aortic Dissection: An Analysis of a Multi-Institutional Regional STS Database*
   COMMERCIAL RELATIONSHIPS: DISCUSSANT: Ourania Preventza: Consultant/Advisory Board: Medtronic, Gore; **Gorav Ailawadi:** Consultant/Advisory Board: Abbott Vascular, Edwards Lifesciences, St. Jude, Medtronic; Speakers Bureau/Honoraria: Atricure, Convatec

7. *Determinants of Hospital Variation in Pneumonia Rates After Coronary Artery Bypass Grafting: An Analysis of 324,085 Consecutive CABG Patients*
   COMMERCIAL RELATIONSHIPS: J.Scott Rankin: Ownership Interest: BioStable Science and Engineering, Consultant/Advisory Board: Amedus Corp, Atricure; **DISCUSSANT: Jay D. Pal:** Consultant/Advisory Board: St. Jude, HeartWare

8. *Improved Lymph Node Staging in Early Stage Non-Small Cell Lung Cancer in the National Cancer Database*
COMMERCIAL RELATIONSHIPS: DISCUSSANT: Robert J. Cerfolio: Consultant/Advisory Board: Baird, Community Health Service, Fruitstreet, Myriad, Intuitive, Ethicon, C-SATS, Bovie

FRIDAY, NOVEMBER 11, 2016

BASIC SCIENCE FORUM

Moderator Commercial Relationships
Min P. Kim, Nothing to Disclose
T. Brett Reece, Nothing to Disclose

2B. *Ex Vivo Lung Perfusion Rehabilitates Sepsis-Induced Lung Injury*
COMMERCIAL RELATIONSHIPS: DISCUSSANT: Joshua Sonett: Consultant/Advisory Board: WebMD

4B. *Erythropoietin Attenuation of Spinal Cord Ischemia Injury is cR-Receptor Dependent*
COMMERCIAL RELATIONSHIPS: Joseph C. Cleveland: Research Grant: St. Jude Medical, HeartWare; **DISCUSSANT: Scott LeMaire:** Other Research Support: PI Baxter Healthcare, Co-Investigator CytoSorbants, PI Vascutek Terumo, Co-Investigator W. L. Gore & Associates, Co-Investigator Medtronic, Co-Investigator Glaxo Smith Kline

SECOND SCIENTIFIC SESSION

Moderator Commercial Relationships
Charles B. Huddelston, Nothing to Disclose
Himanshu J. Patel, COMMERICAL RELATIONSHIPS: Ownership Interest: WL Gore (co-patent holder), Consultant/Advisory Board: W. L. Gore, Medtronic, Terumo Cardiovascular Systems

11. *Variability in Integrated Cardiothoracic Surgery Training Program Curriculum*
COMMERICAL RELATIONSHIPS: DISCUSSANT: Richard L. Lee: Consultant/Advisory Board: CryoLife

12. *Concomitant Atrial Fibrillation Ablation Remains Underutilized Despite No Additive Risk*
COMMERICAL RELATIONSHIPS: Alan Speir: Consultant/Advisory Board: Medtronic, Inc.; Jonathon Philpott: Speakers Bureau/Honoraria: AtriCure, Inc.; Gorav Ailawadi: Consultant/Advisory Board: Abbott Vascular, Edwards Lifesciences, St. Jude, Medtronic; Speakers Bureau/Honoraria: Atricure, Convatec

15. *Surgical Outcomes in Clinical Stage IIIA – N2 Positive, Older Lung Cancer Patients in The Society of Thoracic Surgeons Database*
COMMERICAL RELATIONSHIPS: Patricia Cowper: Research Grant: BMS, Tenax Therapeutics, Gilead, Lilly, AGA Medical, GE, AstraZeneca, Medtronic Inc.

17. *Outcomes of Reoperative Mitral Valve Replacement in Patients With Prior Mitral Valve Repair and Replacement: A Benchmark for Future Valve-in-Valve Transcatheter Mitral Valve Replacement*
COMMERICAL RELATIONSHIPS: Tsuyoshi Kaneko: Speakers Bureau Honoraria:Edwards Lifescience

18. *Contemporary Outcomes for Low-risk Surgical Aortic Valve Replacement: A Benchmark for Evaluating Transcatheter Aortic Valve Technology*
COMMERICAL RELATIONSHIPS: Alan Speir: Consultant/Advisory Board: Medtronic, Inc.; **Gorav Ailawadi:** Consultant/Advisory Board: Abbott Vascular, Edwards Lifesciences, St. Jude, Medtronic; Speakers Bureau/

Honoraria: Atricure, Convatec

THIRD SCIENTIFIC SESSION A
ADULT CARDIAC BREAKOUT

Moderator Commercial Relationships
Dawn S. Hui, Nothing to Disclose
Chad N. Stasik, Nothing to Disclose

19. *Risk Factors for Late Aortic Valve Dysfunction Following the David V Valve Sparing Root Replacement*
COMMERCIAL RELATIONSHIPS: Brad Leshnower: Consultant/Advisory Board: CryoLife, Inc.

20. *Whole Body Perfusion Strategy for Aortic Arch Repair Under Moderate Hypothermia: Simultaneous Antegrade Cerebral Perfusion and Lower Body Perfusion*
COMMERICAL RELATIONSHIPS: Michael Chu: Speakers Bureau/Honoraria: Medtronic, Edwards Lifesciences; **DISCUSSANT: Jospeh S. Coselli:** Other Research Support: Bolton Medical, Glaxo Smith Kline, WL Gore & Associates, Medtronic, Inc., Edwards Lifesciences, Vascutek Terumo; Consultant/Advisory Board: St. Jude Medical, Inc., Vascutek Terumo, Medtronic, Inc., WL Gore & Associates; **Bob Kiaii:** Speakers Bureau/Honoraria: Medtronic, LivaNova, Symetis; Consultant/Advisory Board: Johnson and Johnson

21. *Moderate Hypothermia and Unilateral Selective Antegrade Cerebral Perfusion is a Safe Perfusion Strategy for Extended Arch Replacement in Patients with Acute Aortic Dissection*
COMMERICAL RELATIONSHIPS: Brad Leshnower: Consultant/Advisory Board: CryoLife, Inc.; **DISCUSSANT: Anthony Estrera:** Consultant/Advisory Board: Gore (DSMB, Consulting), Speakers Bureau/Honoraria: Maquet

22. *Frozen Elephant Trunk is Not the "Bad Boy" Compared With the Traditional Elephant Trunk: Current Trends and Lessons Learned Using the Simplified US Version of the FET*
COMMERCIAL RELATIONSHIPS: Ourania Preventza: Consultant/Advisory Board: Medtronic, Gore; Scott A. LeMaire: ; Joseph S. Coselli: Other Research Support: Bolton Medical, Glaxo Smith Kline, WL Gore & Associates, Medtronic, Inc., Edwards Lifesciences, Vascutek Terumo; Consultant/Advisory Board: St. Jude Medical, Inc., Vascutek Terumo, Medtronic, Inc., WL Gore & Associates

23. *Transcatheter Aortic Valve Implantation for Patients With Bicuspid Aortic Valves: Still a Contraindication?*
COMMERICAL RELATIONSHIPS: Won Kim: Speakers Bureau/Honoraria: Symetis, St. Jude Medical; **DISCUSSANT: Vinod H. Thourani:** Research Grant/PI: Edwards Lifesciences, Medtronic, St. Jude Medical, Boston Scientific; Consultant Advisory Board: Medtronic, Sorin Medical, Abbott Medical, Edwards Lifesciences

24. *Statewide Impact of Transcatheter Aortic Valve Replacement on Surgical Aortic Valve Replacement*
COMMERICAL RELATIONSHIPS: Alan Speir: Consultant/Advisory Board: Medtronic, Inc.; **Gorav Ailawadi:** Consultant/Advisory Board: Abbott Vascular, Edwards Lifesciences, St. Jude, Medtronic; Speakers Bureau/Honoraria: Atricure, Convatec

THIRD SCIENTIFIC SESSION A
GENERAL THORACIC BREAKOUT

Moderator Commercial Relationships
Elizabeth A. David, Nothing to Disclose
Richard K. Freeman, Nothing to Disclose

25. *Multi-institutional Validation of a Modified Thoracic Revised Cardiac Risk Index (m-ThRCRI) for Predicting Cardiac Complications Following Lung Resection*
COMMERICAL RELATIONSHIPS: Frank C. Detterbeck: Research Grant: Medela; Other Research Support: Olympus

26. *Is Repeat Pulmonary Metastasectomy Indicated for Soft Tissue Sarcoma?*
COMMERICAL RELATIONSHIPS: Rodrigo R. Munhoz: Speakers Bureau/ Honoraria: BMS, Roche; Research Grant: Eli-Lilly; Consultant/Advisory Board: MSD, Eli-Lilly; **Daniela Molena:** Speakers Bureau/Honoraria: Novadaq, Inc.; **Bernard J. Park:** Speakers Bureau/Honoraria: Bard

28. *Evaluation of Esophageal Anastomotic Integrity With Serial Pleural Amylase Levels*
COMMERCIAL RELATIONSHIPS: Daniel L. Miller: Consultant/Advisory Board: Ethicon, Inc., Other Research Support: Medela, Inc., Speakers Bureau Honoraria: Medtronic, Acute Innovations

THIRD SCIENTIFIC SESSION A
CONGENITAL BREAKOUT

Moderator Commercial Relationship
James D. St. Louis, Nothing to Disclose
Mark Plunkett, Nothing to Disclose

THIRD SCIENTIFIC SESSION B
ADULT CARDIAC BREAKOUT

Moderator Commercial Relationships
Faisal G. Bakaeen, Consultant/Advisory Board: JACE Medical
Bryan S. Helsel, Nothing to Disclose

37. *Similar Outcomes in Diabetic Patients After CABG With Single ITA Plus Radial Artery Grafting & Bilateral ITA Grafting*
COMMERICAL RELATIONSHIPS: Eugene Blackstone: Research Grant: Edwards Lifesciences; **Joseph Sabik:** Consultant/Advisory Board: Medtronic, Sorin; Research Grant:Edwards Lifesciences, Abbott

38. *Diagnosis and Surgical Management of Pericardial Constriction After Cardiac Surgery*
COMMERICAL RELATIONSHIPS: Richard Daly: Ownership Interest: Neochord, Inc.; **DISCUSSANT: Douglas Johnston:** Consultant/Advisory Board: St. Jude Medical, Other Research Support: PI Edwards Lifesciences

39. *Incidence, Risk Factors, and Outcomes of Conversion from Off-pump Coronary Artery Bypass Grafting to On-pump Coronary Artery Bypass Grafting: A Report from the STS Adult Cardiac National Database*
COMMERCIAL RELATIONSHIPS: Vinod H. Thourani: Research Grant PI: Edwards Lifesciences, Medtronic, St. Jude Medical, Boston Scientific; Consultant Advisory Board: Medtronic, Sorin Medical, Abbott Medical, Edwards Lifesciences; **Gorav Ailawadi:** Consultant/Advisory Board: Abbott Vascular, Edwards Lifesciences, St. Jude, Medtronic; Speakers Bureau/Honoraria: Atricure, Convatec; **DISCUSSANT: Faisal G. Bakaeen:** Consultant/Advisory Board: JACE Medical

40. *Surgical Ablation of Atrial Fibrillation in the United States*
COMMERCIAL RELATIONSHIPS: Niv Ad: Speakers Bureau/Honoraria: Atricure, Medtronic, Advisory Board: LivaNova; **J.S. Rankin:** Ownership Interest: BioStable Science and Engineering, Consultant/Advisory Board: Amedus Corp, Atricure; **Ralph J. Damiano:** Speakers Bureau/Honoraria: AtriCure; **Patrick McCarthy:** Consultant/Advisory Board: Edwards Lifesciences, Abbot Vascular; Ownership Interest: Edwards Lifesciencs; **A.M. Gillinov:** Speakers Bureau/Honoraria: Medtronic, Edwards Lifesciences, St. Jude Medical, AtriCure; Consultant/Advisory Board: On-X Life Technologies, Abbott, Ownership Interest: ClearFlow; **Vinod H. Thourani:** Research Grant/PI: Edwards Lifesciences, Medtronic, St. Jude Medical, Boston Scientific; Consultant Advisory Board: Medtronic, Sorin Medical, Abbott Medical, Edwards Lifesciences; **James L. Cox:** Consultant/Advisory Board: Atricure, Inc., SentreHEART, Inc.; Ownership Interest: Adagio Medical, Inc.; **DISCUSSANT: Gorav Ailawadi:** Consultant/Advisory Board: Abbott Vascular, Edwards Lifesciences, St. Jude, Medtronic; Speakers Bureau/Honoraria: Atricure, Convatec

THIRD SCIENTIFIC SESSION B
GENERAL THORACIC BREAKOUT

Moderator Commercial Relationships
Linda W. Martin, Nothing to Disclose
Basil Nasir, Consultant/Advisory Board: Ethicon Endo Surgery

41. *Transcervical Extended Mediastinal Lymphadenectomy (TEMLA) – Experience from a North American Cancer Center*
COMMERICAL RELATIONSHIPS: Elisabeth Dexter: Employment: Up to Date

42. *Transversus Abdominis Plane (TAP) Block Improves Perioperative Outcomes After Esophagectomy Compared to Thoracic Epidural (TE)*
COMMERCIAL RELATIONSHIPS: Brian E. Louie: Consultant/Advisory Board:
Torax Medical, Inc.; Research Grant: Torax Medical, Inc.

43. *Office-Based Spirometry: A New Model of Care in Preoperative Assessment for Low-Risk Pulmonary Resections*
COMMERCIAL RELATIONSHIPS: Traves D. Crabtree: Consultant/Advisory Board: Ethicon Endo Surgery

THIRD SCIENTIFIC SESSION B
CONGENITAL BREAKOUT

Moderator Commercial Relationships
Karla Christian, Nothing to Disclose
Kristine J. Guleserian, Nothing to Disclose

45. *Medium-Term Outcomes After Implantation of Expanded-Polytetrafluoroethylene Valved Conduit (ePTFE VC) for Right Ventricular Outflow Tract*
COMMERICAL RELATIONSHIPS: DISCUSSANT: James A. Quintessenza:

SATURDAY, NOVEMBER 12, 2016

Cardiothoracic Coding and Reimbursement Update for 2017

Moderator Commercial Relationships
Jeffrey P. Jacobs, Nothing to Disclose

Cardiothoracic CPT Coding Changes
COMMERCIAL RELATIONSHIPS: Joseph C. Cleveland: Research Grant: St. Jude Medical, HeartWare

FOURTH SCIENTIFIC SESSION
ADULT CARDIAC BREAKOUT

Moderator Commercial Relationships
Tom C. Nguyen, Nothing to Disclose
Ourania Preventza, Consultant/Advisory Board: Medtronic, Gore

49. *Midterm Results of Hybrid Arch Repair With Zone 0 Stent Graft Deployment*
COMMERCIAL RELATIONSHIPS: Adam Beck: Consultant/Advisory Board: Medtronic, Inc., Cook Medical; Research Grant: W.L. Gore & Associates; **Robert Feezor:** Consultant/Advisory Board: Medtronic, Inc., Cook Medical; Research Grant: Cook Medical; **Tomas Martin:** Consultant/Advisory Board: Medtronic, Terumo, Johnson & Johnson

50. *Transmyocardial Laser Revascularization (TMR) for Class IV Angina: 30-Day Outcomes from a Contemporary, Multi-Center Patient Registry*
COMMERCIAL RELATIONSHIPS: V. Seenu Reddy: Consultant/Advisory Board: Cryolife

51. *Intermediate Outcomes After Conservative Repair of Type A Aortic Dissection*
COMMERCIAL RELATIONSHIPS: Michael E. Bowdish: Research Grant: Medtronic, HeartWare, Inc., Sunshine Heart, Inc.

FOURTH SCIENTIFIC SESSION
GENERAL THORACIC BREAKOUT

Moderator Commercial Relationships
Traves Crabtree, Consultant/Advisory Board: Ethicon Endo Surgery
DuyKhanh Ceppa, Nothing to Disclose

FOURTH SCIENTIFIC SESSION A
CONGENITAL BREAKOUT

Moderator Commercial Relationships
Jeffrey P. Jacobs, Nothing to Disclose
Randy Stevens, Nothing to Disclose

57. *AvalonElite DLC Provides Reliable Total Cavopulmonary Assist in Failing Fontan Sheep Model Using Valved Extracardiac Conduit*
COMMERCIAL RELATIONSHIPS: Dongfang Wang: Ownership Interest: Maquet; **Cherry Ballard-Croft:** Employment: W-Z Biotech, LLC; **Joseph Zwischenberger:** Ownership Interest: Maquet, W-Z Biotech, LLC

FOURTH SCIENTIFIC SESSION A
TRANSPLANT BREAKOUT

Moderator Commercial Relationships
Chadrick R. Denlinger, Nothing to Disclose
Jay D. Pal, Consultant/Advisory Board: St. Jude, HeartWare

62. *Donation After Cardiac Death Donors: A Single Center Experience*
COMMERCIAL RELATIONSHIPS: Joshua R. Sonett: Consultant/Advisory Board: WebMD

63. *Minimally Invasive Left Ventricular Assist Device (LVAD) Implantation Reduces Blood Product Utilization After Heart Transplant*
COMMERCIAL RELATIONSHIPS: Simon Maltais: Consultant/Advisory Board: Heartware, Thoratec

RELATIONSHIP DISCLOSURE INDEX

HAROLD URSCHEL HISTORY LECTURESHIP

Moderator Commercial Relationships
David R. Jones, Nothing to Disclose
S. Adil Husain, Nothing to Disclose

FOURTH SCIENTIFIC SESSION B

Moderator Commercial Relationships
Andrea J. Carpenter, Nothing to Disclose
Richard L. Prager, Nothing to Disclose

66. *Individual Assessment of Frailty Parameters in High- And Extreme-Risk Patients Who Underwent Transcatheter Aortic Valve Replacement*
COMMERCIAL RELATIONSHIPS: Brad Leshnower: Consultant/Advisory Board: CryoLife, Inc.; Chandan Devireddy: Consultant/Advisory Board: Medtronic Inc., Vascular Dynamics; Vinod H. Thourani: Research Grant/PI: Edwards Lifesciences, Medtronic, St. Jude Medical, Boston Scientific; Consultant Advisory Board: Medtronic, Sorin Medical, Abbott Medical, Edwards Lifesciences

69. *Left Ventricular Outflow Tract Obstruction After Transcatheter Mitral Valve-in-Ring Implantation: A Word of Caution*
COMMERCIAL RELATIONSHIPS: Charanjit Rihal: Research Grant: Abbott Vascular, Edwards Lifesciences

HOW TO DO IT

Hyperthermic Intrathoracic Chemotherapy for Pleural Malignancies
COMMERCIAL RELATIONSHIPS: Daniel L. Miller: Consultant/Advisory Board: Ethicon, Inc., Other Research Support: Medela, Inc., Speakers Bureau Honoraria: Medtronic, Acute Innovations

Axillary Artery Cannulation: Workhorse and Gold Standard
COMMERCIAL RELATIONSHIPS: Ourania Preventza:
Consultant/Advisory Board: Medtronic, Gore

PROGRAM PARTICIPANTS

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