STSA 2015

LAKE BUENA VISTA, FLORIDA

SOUTHERN THORACIC SURGICAL ASSOCIATION

62ND ANNUAL MEETING

DISNEY'S YACHT & BEACH CLUB RESORTS

NOVEMBER 4–7, 2015

SPECIAL THANKS

SPECIAL THANKS TO STSA
62ND ANNUAL MEETING CORPORATE SUPPORTERS

GOLD

Medtronic, Inc.

St. Jude Medical, Inc.

Terumo Cardiovascular Systems

SILVER

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Ethicon Endo-Surgery, Inc.

Additional Support Provided by:

Thoratec Corporation

FUTURE MEETINGS

November 9-12, 2016
Naples Grande Beach Resort
Naples, FL

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

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THE ANNALS OF THORACIC SURGERY
G. Alexander Patterson, *St. Louis, MO*

PROGRAM AT-A-GLANCE

WEDNESDAY, NOVEMBER 4, 2015

3:00 pm – 8:00 pm	**Registration** – *Asbury Registration Desk*
7:45 pm – 10:00 pm	**Surgical Motion Pictures** – *Grand Harbor Ballroom North*

THURSDAY, NOVEMBER 5, 2015

6:30 am – 5:00 pm	**Registration** – *Asbury Registration Desk*
6:30 am	**Continental Breakfast** – *Asbury Lobby*
7:00 am – 8:30 am	**Postgraduate General Session: Mistakes/Pitfalls Case Presentations** *Grand Harbor Ballroom North*
8:30 am – 8:45 am	**Break**
8:45 am – 10:05 am	**Postgraduate Subspecialty Breakout Sessions** Adult Cardiac Breakout – *Grand Harbor Ballroom North* General Thoracic Breakout – *Grand Harbor Ballroom VIII* Congenital Breakout – *Grand Harbor Ballroom V*
10:05 am – 10:20 am	**Break**
10:20 am – 11:20 am	**Postgraduate Program General Session: Special Topics in Cardiothoracic Surgery** *Grand Harbor Ballroom North*
11:20 am – 12:00 pm	**Postgraduate Special Session** Lifelong Observations on Heart Valve Surgery Tirone E. David, MD *Grand Harbor Ballroom North*
12:00 pm – 1:00 pm	**Break & Visit Exhibits** – *Grand Harbor Ballroom South*
12:00 pm – 4:00 pm	**Exhibits Open** – *Grand Harbor Ballroom South*
1:00 pm – 1:50 pm	**Ethics Debate** Should Family Presence Be Allowed During Cardiopulmonary Resuscitation? *Grand Harbor Ballroom North*
1:50 pm – 2:00 pm	**Public Reporting of Thoracic and Cardiac Surgical Outcomes with the STS Database: How & Why** *Grand Harbor Ballroom North*
2:00 pm – 2:30 pm	**Break & Visit Exhibits** – *Grand Harbor Ballroom South*
2:30 pm – 5:00 pm	**First Scientific Session** – *Grand Harbor Ballroom North*

FRIDAY, NOVEMBER 6, 2015

6:30 am – 5:30 pm	**Registration** – *Asbury Registration Desk*
6:45 am – 11:00 am	**Exhibits Open** – *Grand Harbor Ballroom South*
6:45 am	**Continental Breakfast** – *Grand Harbor Ballroom South*
7:00 am – 7:50 am	**Basic Science Forum** – *Grand Harbor Ballroom North*
8:00 am – 10:00 am	**Second Scientific Session** – *Grand Harbor Ballroom North*
10:00 am – 10:30 am	**Break & Visit Exhibits** – *Grand Harbor Ballroom South*
10:30 am – 10:50 am	**Kent Trinkle Education Lectureship** John S. Ikonomidis, MD Integrating the Integrated Program: The MUSC Experience Medical University of South Carolina, Charleston, SC *Grand Harbor Ballroom North*

10:50 am – 11:20 am	**President's Invited Lecturer** David A. Fullerton, MD *Grand Harbor Ballroom North*
11:20 am – 12:00 pm	**Presidential Address** John H. Calhoon, MD *Grand Harbor Ballroom North*
12:00 pm	**All Attendee Lunch** – *Yacht Club Marina*
12:00 pm – 4:00 pm	**Exhibits Open** – *Grand Harbor Ballroom South*
1:00 pm – 2:00 pm	**Dessert Served in the Exhibit Hall** – *Grand Harbor Ballroom South* **JCTSE Jeopardy in the Exhibit Hall** – *Grand Harbor Ballroom South*
2:00 pm – 3:30 pm	**Third Scientific Session A – Simultaneous Subspecialty Breakout Sessions** Adult Cardiac Breakout – *Grand Harbor Ballroom North* General Thoracic Breakout – *Grand Harbor Ballroom VIII* Congenital Breakout – *Grand Harbor Ballroom V*
3:30 pm – 4:00 pm	**Break & Visit Exhibits** – *Grand Harbor Ballroom South* **JCTSE Jeopardy in the Exhibit Hall** – *Grand Harbor Ballroom South*
4:00 pm – 5:00 pm	**Third Scientific Session B – Simultaneous Subspecialty Breakout Sessions** Adult Cardiac Breakout– *Grand Harbor Ballroom North* General Thoracic Breakout – *Grand Harbor Ballroom VIII* Congenital Breakout – *Grand Harbor Ballroom V*
5:00 pm – 6:00 pm	**STSA Annual Business Meeting** STSA Members Only – *Grand Harbor Ballroom North*
6:00 pm – 7:00 pm	**Residents Reception** – *Asbury A*
7:00 pm – 9:00 pm	**President's Mixer** – *International Gateway*

SATURDAY, NOVEMBER 7, 2015

6:45 am – 11:00 am	**Registration** – *Asbury Registration Desk*
6:45 am	**Continental Breakfast** – *Asbury Lobby*
7:00 am – 8:00 am	**Coding, RUC & SGR Update** *Grand Harbor Ballroom North*
8:00 am – 9:00 am	**Fourth Scientific Session A – Simultaneous Subspecialty Breakout Sessions** Adult Cardiac Breakout – *Grand Harbor Ballroom North* General Thoracic Breakout – *Grand Harbor Ballroom VIII* Congenital Breakout – *Grand Harbor Ballroom V* Transplant Breakout – *Asbury C*
9:00 am – 9:30 am	**Break** **JCTSE Jeopardy in the General Session Room** *Grand Harbor Ballroom North*
9:30 am – 9:50 am	**Harold Urschel History Lectureship** Erle H. Austin, MD C. Walton Lillehei – His Trials, His Triumphs, and the 200% Solution *Grand Harbor Ballroom North*
9:50 am – 11:50 am	**Recognition & Management of Cardiothoracic Surgical Misadventures** *Grand Harbor Ballroom North*
11:50 am	**Program Adjourns**
12:30 pm – 6:00 pm	**Various Social & Sporting Events** See page 8 for details
7:00 pm – 11:00 pm	**Annual Awards Dinner & Dance** – *Grand Harbor Ballroom North*

SCHEDULE OF ACTIVITIES

THURSDAY, NOVEMBER 5

Spouse/Guest Hospitality Suite – *Ariel's*
Time: 8:00 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.

FRIDAY, NOVEMBER 6

Spouse/Guest Hospitality Suite – *Ariel's*
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 – *Yacht Club Marina*
Time: 12:00 pm (Followed by dessert in the Exhibit Hall)
Cost: Complimentary

Residents Reception – *Asbury A*
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 – *International Gateway*
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.

Special Note: Tickets will be collected and each member of your party must have a ticket to enter to the President's Mixer. Small children will be allowed to enter with a ticket-holding adult.

SATURDAY, NOVEMBER 7

Spouse/Guest Hospitality Suite – *Ariel's*
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.

Golf Tournament
Location: Disney's Palm & Magnolia Golf Course
Time: 12:45 pm – Shotgun Start
Cost: $130.00 (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.

Renovated extensively in 2013 by Arnold Palmer Design Company, Disney's Palm & Magnolia Golf Course is considered one of the most naturally beautiful courses in the country by professionals and amateurs alike. The course features strategically-placed palms, 59 bunkers, and many sparkling lakes and waterways; the natural Florida woodlands provide a stunning backdrop to one of America's premier resort courses.

Please note the following dress code: For men, polo-style shirts with collars, turtleneck or mock turtleneck shirts with slacks or Bermuda-length shorts are acceptable. For women, polo-style shirts with collars, or other suitable shirts or blouses with or without a collar with slacks, a skirt or Bermuda-length shorts are acceptable. Golf shoes with metal spike alternatives are required; however soft-soled shoes and tennis shoes are acceptable.

Golf clubs and a limited number of golf shoes are available for rental if needed. Clubs may be rented for $20.00 plus tax, and shoe rental is complimentary. Confirmed golfers will be contacted after advance registration closes on October 13 to collect rental needs.

Wild Africa Trek
Time: 1:15 pm - 4:15 pm
Cost: $240.00 (Price includes transportation, souvenir water bottle, and photos.)

Participation Requirements: Children must be accompanied by paying adult and must be at least 8 years-old. Minimum height is 48 inches, minimum weight is 45 pounds.

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.

The Wild Africa Trek is an immersive experience at *Disney's Animal Kingdom®* Theme Park that gives guests a unique opportunity to enjoy unexplored areas of the Harambe Reserve and have an up-close-and-personal experience with intriguing African wildlife species.

Fishing Tournament
Time: 1:30 pm - 3:30 pm
Cost: $55.00 (Price includes non-alcoholics beverages, fishing poles, bait, tackle, and guide.)

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.

Enjoy a two-hour guided catch-and-release fishing excursion on the waterways of the *Walt Disney World®* Resort.

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

Conclude your 62nd Annual Meeting experience with the always-memorable Annual Awards Dinner & Dance. Join fellow meeting attendees and their families for an evening of dining and dancing. Advanced registration is recommended. A limited number of tickets will be sold on site.

We have a great band – comprised of several STSA members and friends – that will play songs all night long. Award presentations will be shortened this year to maximize the time to socialize and enjoy your friends at the STSA. Although black tie is always in fashion, feel free to come in your own costume (Superhero, Superwoman, Superman, Renaissance, Gatsby, etc., nothing is off limits) to compete for the best-, most originally-, or most outlandishly-dressed. And if your idea of black tie is more casual, that will be fine as well. The important thing is to be comfortable and have fun. It will be the perfect finale to a great meeting.

Kid's Sandcastle Club
Available daily from 4:30 pm to midnight. This service is limited, please make reservations in advance.

The Sandcastle Club is a delightful play space where children ages 3 to 12 are invited to enjoy games, have complimentary dinner and snacks, watch Disney movies, and interact with other children their age. The cost per child is $15.00 per hour with a two-hour minimum charge. Children must be toilet-trained. Please call 407.939.3463 for reservations or visit www.stsa.org for additional details.

Baby-sitting Services
Baby-sitting services are available through Disney's Kid's Nite Out at 407.828.0920**.** Advanced reservations are required.

Disney Theme Park Tickets & Dining Reservations
Discounted tickets and Park-Hopper passes are available to STSA attendees for Orlando-area theme parks, including *Disney's Animal Kingdom®* Theme Park, *Epcot®*, *Universal Studios®*, a variety of water parks, and more. For additional information and to purchase discounted tickets, please visit www.stsa.org.

STSA recommends making your dining reservations as early as possible, as restaurants in the area sell out quickly. Reservations can be made by calling 407.939.3463**.**

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 7, 2015. 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 educational activity for a maximum of **21.25** ***AMA PRA Category 1 Credits™***. Physicians should only claim 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 62nd 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 on-site at computer kiosks located in the **Grand Harbor Ballroom 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 21, 2015.

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 800.685.7872 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, Chair, 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 354) 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 354 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 **Hampton Room.** 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.

SURGICAL MOTION PICTURES

WEDNESDAY, NOVEMBER 4, 2015

7:45 pm – 10:00 pm
Grand Harbor Ballroom North
(Presentations are limited to ten minutes, followed by five minutes of discussion.)

CME Credits Available: 2.25
Moderators: *Charles B. Huddleston and *Himanshu J. Patel

7:45 pm - 8:00 pm (page 42)
1V. Resection of a Large Tracheal Tumor With Esophageal Involvement
Mark Shapiro, Benjamin Lee, Robert Korst
The Valley Hospital, Ridgewood, NJ

8:00 pm - 8:15 pm (page 44)
2V. Repair of Transposition (TGA) with Absent Pulmonary Valve (APV) Using Pulmonary Artery Retrenchment Technique
Graham D. Ungerleider, K C. Jones, *Yoshio Otaki, Michael Walsh, *Ross M. Ungerleider
Wake Forest University, Winston-Salem, NC

8:15 pm - 8:30 pm (page 46)
3V. Repair of Both Severe Pectus Excavatum Deformity and Ascending Aortic Root Aneurysm
Erik A. Beyer, James Jowers, Erin Gautney
Baptist Health Little Rock, Little Rock, AR

8:30 pm - 8:45 pm (page 48)
4V. The P.O.E.M. Procedure for Achalasia: From Outside to Inside in 100 years
Brian E. Louie, Andreas Schneider, Heather F. Warren, Ralph W. Aye
Swedish Cancer Institute, Seattle, WA

8:45 pm - 9:00 pm (page 50)
5V. When the Bidirectional Glenn Is an Unfavorable Option: Primary Extracardiac Inferior Cavopulmonary Connection as an Alternative Palliation
Ali Dodge-Khatami, Avichal Aggarwal, Mary B. Taylor, Douglas Maposa, *Jorge D. Salazar
Children's Heart Center, University of Mississippi Medical Center, Jackson, MS

9:00 pm - 9:15 pm (page 52)
6V. Post-infarct Ventricular Septal Rupture: Surgical Repair, Pitfalls and Safeguards
Michael S. Halbreiner, Andres Kursbaum, Jose Navia
Cleveland Clinic, Cleveland, OH

9:15 pm - 9:30 pm (page 54)
7V. Aortic Valve Reconstruction for Endocarditis
DDomenico Mazzitelli[1], Christian Noebauer[1], ***D****J. Scott Rankin[2], ***D***Christian Schreiber[1], Ruediger Lange[1]
[1]*German Heart Center Munich, Munich, Germany;* [2]*BioStable Science and Engineering, Inc., Austin, TX*

9:30 pm - 9:45 pm (page 56)
8V. Half Pantaloon ("Florida-shaped") Patch for Repair of Anomalous Left Coronary Artery from the Pulmonary Artery (ALCAPA)
Graham D. Ungerleider, K C. Jones, *Yoshio Otaki, George Verghese, *Ross M. Ungerleider
Wake Forest University, Winston-Salem, NC

9:45 pm - 10:00 pm (page 58)
9V. Mediastinal Teratoma Causing Superior Vena Cava Compression
Joshua Sonett, Gopal Singh, Joe Costa, Marc Bessler, Frank D'Ovidio, Matthew Bacchetta, Lyall Gorenstein, Mark Ginsburg
Columbia University Medical Center, New York, NY

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

POSTGRADUATE PROGRAM

THURSDAY, NOVEMBER 5, 2015

POSTGRADUATE PROGRAM

7:00 am – 12:00 pm

The first portion of the Postgraduate Program is the General Session, which will feature mistakes/pitfalls case presentations with audience response participation. Concurrent breakout sessions in adult cardiac, general thoracic, and congenital heart surgery will take place between 8:45 am and 10:05 am. The General Session will continue at 10:20 am with two talks on Special Topics in Cardiothoracic Surgery. The Special Session will begin at 11:20 am and program will adjourn at 12:00 pm.

CME Credits Available: 4.5

GENERAL SESSION *Grand Harbor Ballroom North*

Mistakes/Pitfalls Case Presentations with Audience Participation

Moderators: *D**Kevin Accola and *Joseph B. Putnam

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

- Compare management using open versus endovascular repair for complex thoracic aortic disease.
- Describe initial techniques to reduce bleeding after complex aortic surgery.
- Recognize bailout approaches for severe bleeding after complex aortic surgery.
- List differential diagnoses for post-lung transplant hypoxemia.
- Discuss diagnostic modalities to identify cause of hypoxemia.
- Discuss treatment options for hypoxemia.

7:00 am - 7:22 am

Aortic Case Presentation : Lessons Learned from Total Aortic Replacement

Presenter: *D*Anthony L. Estrera

University of Texas Houston Medical School, Houston, TX

7:22 am - 7:44 am

How to See I to I: Starting Your Own Medical Imaging Company

Presenter: *D*J. Michael DiMaio

Baylor University, Dallas, TX

7:44 am - 8:06 am

General Thoracic Case Presentation: Recovery from Esophageal Disasters & Failure

Presenter: *Scott B. Johnson

University of Texas Health Science Center, San Antonio, TX

8:06 am – 8:28 am

Transplant Case Presentation: Lung Transplantation Pulmonary Venous Obstruction

Presenter: *Thomas C. Wozniak

Methodist Hospital of Indiana, St. Vincent Hospital of Indianapolis, Indianapolis, IN

8:30 am - 8:45 am

Break

ADULT CARDIAC BREAKOUT *Grand Harbor Ballroom North*

Moderators: *D*Faisal G. Bakaeen and *Thomas M. Beaver

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

- Describe the differences between the two primary techniques of valve-sparing aortic root replacement.
- Summarize the important technical steps in performing a successful valve-sparing aortic root replacement.
- Discuss the long-term outcomes of valve-sparing aortic root replacement.
- Differentiate challenges involved with the management of complex patients undergoing durable left ventricular assist device (LVAD) implantation.
- Provide a summary of alternative options and off-pump strategies for device implantation and differentiate key considerations between implantation techniques.
- Recognize limitations of proposed approaches and discuss advantages and disadvantages for each option.

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- Discuss grades of aortic injury.
- Discuss appropriate anatomy suitable for TEVAR.
- Discuss possible situations where medical management or open surgery is more appropriate.

8:45 am - 9:12 am
Valve-sparing Root Replacement Techniques
*Edward P. Chen
Emory University, Atlanta, GA

9:12 am – 9:39 am
Minimally Invasive and Off-pump Placement of Durable VADS
*Simon Maltais
Mayo Clinic, Rochester, MN

9:39 am - 10:05 am
Current Management of Type A and B Acute Dissection
D*Himanshu J. Patel
University of Michigan Cardiovascular Center, Ann Arbor, MI

GENERAL THORACIC BREAKOUT *Grand Harbor Ballroom VIII*

Moderators: *Melanie A. Edwards and *John A. Howington
Educational Objectives: Upon completion of this program participants will be able to:
- Assess an MRI of a superior sulcus tumor to identify a lesion that is suited for an anterior surgical approach.
- Compare and contrast clavicular resection versus clavicular sparing techniques from the anterior approach.
- Describe the surgical steps to resect a Pancoast tumor involving the subclavian artery from an anterior approach.
- Recognize the current indications for robotic thymectomy.
- Recognize the options for patient positioning and port placement.
- Discuss the operative steps of robotic thymectomy.

8:45 am - 9:12 am
Pancoast Tumor Resection – Anterior Approach
*Garrett L. Walsh
University of Texas MD Anderson Cancer Center, Houston, TX

9:12 am – 9:39 am
Robotic Thymectomy: Tips, Pitfalls and Long Term Outcomes
*Richard K. Freeman
St. Vincent Health and Hospital System/Indiana Heart Institute, Indianapolis, IN

9:39 am - 10:05 am
Integrating Peroral Endoscopic Myotomy Into Clinical Practice
J. Matthew Reinersman
University of Oklahoma Health Sciences Center, Oklahoma City, OK

CONGENITAL BREAKOUT *Grand Harbor Ballroom V*

Moderators: *Carl L. Backer and *Robert J. Dabal
Educational Objectives: Upon completion of this program participants will be able to:
- Formulate a treatment plan for patients with significant AV valve regurgitation in single ventricle patients.
- Determine the surgical options, indications, and timing for AV valve regurgitation in single ventricle patients.
- Discuss the best timing for operative intervention for severe tricuspid regurgitation.
- Discuss late results of tricuspid valve intervention.
- Augment techniques of tricuspid valve repair.
- Improve understanding of cerebral protection strategies for complex arch and other congenital heart operations.

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- Compare and contrast extant strategies.
- Identify and discuss areas for future investigation.

8:45 am - 9:12 am
AV Valve Repair in Single Ventricle Patients
*Paul J. Chai
Morgan Stanley Children's Hospital of New York/Columbia University Medical Center, New York, NY

9:12 am – 9:39 am
Tricuspid Valve Repair
*Joseph A. Dearani
Mayo Clinic, Rochester, MN

9:39 am - 10:05 am
Cerebral Protection Strategies for Complex Arch and Congenital Heart Operations
*Jorge D. Salazar
University of Mississippi Medical Center, Jackson, MS

10:05 am - 10:20 am
Break

GENERAL SESSION *Grand Harbor Ballroom North*
Special Topics in Cardiothoracic Surgery
Moderators: ***D****Daniel L. Miller and *Thomas C. Wozniak
Educational Objectives: Upon completion of this program participants will be able to:
- Discuss ECMO indications, techniques, and results.
- Discuss the evidence supporting multidisciplinary rounds.
- Structure a quality assurance program.
- Describe the importance of measurement in achieving performance improvement.

10:20 am - 10:50 am
ECMO – Past, Present, and Future
DRobert H. Bartlett
University of Michigan, Ann Arbor, MI

10:50 am -11:20 am
Role of the Thoracic Surgeon in the ICU
Glenn J. R. Whitman
Johns Hopkins University, Baltimore, MD

SPECIAL SESSION *Grand Harbor Ballroom North*
Introduction: *Richard L. Prager
Educational Objectives: Upon completion of this program participants will be able to:
- Discuss effects of various operative procedures on patients' outcomes.

11:20 am - 12:00 pm
Lifelong Observations on Heart Valve Surgery
Tirone E. David
Toronto General Hospital, Toronto, ON, Canada

12:00 pm -1:00 pm
Break – Visit Exhibits
Grand Harbor Ballroom South

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12:00 pm - 4:00 pm
EXHIBITS OPEN
Grand Harbor Ballroom South

ETHICS DEBATE & PUBLIC REPORTING UPDATE *Grand Harbor Ballroom North*

1:00 pm – 2:00 pm
Educational Objectives: Upon completion of this program participants should be able to:

- Discuss reasons why allowing family members to remain in the room during resuscitations is a good idea.
- Describe objections to this practice.
- Recommend a policy to deal with this issue to their hospital administrations and medical staffs.
- Describe the methodology and rationale for public reporting of the outcomes of adult cardiac surgery and pediatric cardiac surgery.
- Describe the rationale for public reporting of the outcomes of general thoracic surgery.

CME Credits Available: 1.0

Should Family Presence Be Allowed During Cardiopulmonary Resuscitation?
Moderator: *Robert M. Sade, *Medical University of South Carolina, Charleston, SC*
Pro: Karen J. Brasel
Oregon Health & Science University, Portland, OR
Con: John W. C. Entwistle, III
Thomas Jefferson University, Philadelphia, PA

1:50 pm - 2:00 pm
Public Reporting of Thoracic and Cardiac Surgical Outcomes with the STS Database: How & Why
*Jeffrey P. Jacobs
Johns Hopkins All Children's Heart Institute, St. Petersburg, FL

2:00 pm - 2:30 pm
Break – Visit Exhibits
Grand Harbor Ballroom South

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FIRST SCIENTIFIC SESSION

THURSDAY, NOVEMBER 5, 2015

2:30 pm - 5:00 pm
Grand Harbor Ballroom North
(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: *John H. Calhoon and *Daniel L. Miller

2:30 pm - 2:45 pm (page 60)
1. Use of Del Nido Cardioplegia in Adults Undergoing Coronary Artery Bypass Surgery
Gustavo E. Guajardo Salinas, Michio Kajitani, Michael Nolen, Roger Nutt
Arkansas Heart Hospital, Little Rock, AR
Discussant: ***D***Pedro J. del Nido, *Boston Children's Hospital, Boston, MA*

2:45 pm - 3:00 pm (page 62)
2. Updated Outcomes for Coronary Reoperations: A 20-year Experience
*Simon Maltais, Chaim Locker, David Joyce, *Lyle D. Joyce, *Richard C. Daly, *Kevin L. Greason, *Hartzell V. Schaff, *John Stulak
Mayo Clinic, Rochester, MN
Discussant: *Hendrick B. Barner, *St. Louis University, St. Louis, MO*

3:00 pm - 3:15 pm (page 64)
3. Variation in Pulmonary Resection Practices: A Comparative Analysis of the STS and ESTS General Thoracic Surgery Databases
Christopher W. Seder[1], Michele Salati[2], *Benjamin D. Kozower[3], Cameron D. Wright[4], Pierre-Emmanuel Falcoz[5], Alessandro Brunelli[6], *Felix G. Fernandez[7]
[1]Rush University Medical Center, Chicago, IL; [2]Ospedali Riuniti Ancona, Ancona, Italy; [3]University of Virginia, Charlottesville, VA; [4]Massachusetts General Hospital, Boston, MA; [5]Nouvel Hopital Civil, Strasbourg, France; [6]St. James's University Hospital, Leeds, United Kingdom; [7]Emory University, Atlanta, GA
Discussant: *Betty C. Tong, *Duke University Medical Center, Durham, NC*

3:15 pm - 3:30 pm (page 66)
4. Mortality Trends in Pediatric and Congenital Heart Surgery: An Analysis of the STS Congenital Heart Surgery Database
*Jeffrey P. Jacobs[1,5], Xia He[2], *John E. Mayer, Jr.[3], *Erle H. Austin, III[4], *James A. Quintessenza[1,5], Tom R. Karl[1,5], *Luca Vricella[5], *Constantine Mavroudis[6,5], Sean M. O'Brien[2], Sara K. Pasquali[7], Kevin D. Hill[2], *S. Adil Husain[8], David M. Overman[9], Jane M. Han[10], David M. Shahian[11], *Duke Cameron[5], Marshall L. Jacobs[5]
[1]*Johns Hopkins All Children's Heart Institute, St. Petersburg, FL;* [2]*Duke Clinical Research Institute, Duke University, Durham, NC;* [3]*Boston Children's Hospital, Harvard University, Boston, MA;* [4]*University of Louisville, Louisville, KY;* [5]*Johns Hopkins University, Baltimore, MD;* [6]*Florida Hospital for Children, Orlando, FL;* [7]*C. S. Mott Children's Hospital, University of Michigan, Ann Arbor, MI;* [8]*University of Texas Health Sciences Center at San Antonio, San Antonio, TX;* [9]*The Children's Heart Clinic at Children's Hospitals and Clinics of Minnesota, Minneapolis, MN;* [10]*The Society of Thoracic Surgeons, Chicago, IL;* [11]*Massachusetts General Hospital, Department of Surgery and Center for Quality and Safety, Harvard University, Boston, MA*
Discussant: *Joseph A. Dearani, *Mayo Clinic, Rochester, MO*

3:30 pm - 3:45 pm (page 68)
5. The Society of Thoracic Surgeons Lung Cancer Resection Risk Model: Higher Quality Data and Superior Outcomes
*Felix G. Fernandez[1], Andrzej Kosinski[2], *William Burfeind[3], Bernard Park[4], Malcolm M. DeCamp[5], Christopher W. Seder[6], *M. B. Marshall[7], *Mitchell Magee[8], Cameron D. Wright[9], *Benjamin D. Kozower[10]
[1]*Emory University, Atlanta, GA;* [2]*Duke University, Durham, NC;* [3]*St. Luke's University Health Network, Bethlehem, PA;* [4]*Memorial Sloan Kettering Cancer Center, New York, NY;* [5]*Northwestern University, Chicago, IL;* [6]*Rush University, Chicago, IL;* [7]*Georgetown University, Washington, DC;* [8]*Medical City Hospital, Dallas, TX;* [9]*Massachusetts General Hospital, Boston, MA;* [10]*University of Virginia, Charlottesville, VA*
Discussant: *Stephen C. Yang, J*ohns Hopkins University School of Medicine, Baltimore, MD*

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3:45 pm - 4:00 pm (page 70)

6. Characterizing the Operative Experience of Cardiothoracic Surgery Residents in the United States: What are residents really doing in the operating room?

*Asad A. Shah[1], Muhammad Aftab[4], Vakhtang Tchantchaleishvili[12], Damien LaPar[2], Elizabeth Stephens[3], Dustin Walters[5], Walter DeNino[6], David Odell[7], Michael Robich[4], Marisa Cevasco[8], Amanda Eilers[9], Erin Gillaspie[8], Andrew Goldstone[10], Tarek Malas[13], Robert Rice[9], Ryan Shelstad[11], Nicholas D. Andersen[1]

[1]*Duke University, Durham, NC;* [2]*University of Virginia, Charlottesville, VA;* [3]*Columbia University, New York, NY;* [4]*Cleveland Clinic, Cleveland, OH;* [5]*University of Washington, Seattle, WA;* [6]*Medical University of South Carolina, Charleston, SC;* [7]*University of Pittsburgh, Pittsburgh, PA;* [8]*Harvard University, Boston, MA;* [9]*University of Texas, San Antonio, TX;* [10]*University of Pennsylvania, Philadelphia, PA;* [11]*University of Colorado, Aurora, CO;* [12]*University of Rochester, Rochester, NY;* [13]*University of Canada, Ottawa, AB, Canada*

Discussant: *T. Brett Reece, *University of Colorado Denver School of Medicine, Aurora, Colorado*

4:00 pm - 4:15 pm (page 72)

7. Cardiac Transplantation for Adults With Congenital Heart Disease: An Analysis of the UNOS Registry

Dipesh K. Shah[1], Salil V. Deo[2], Andrew D. Althouse[7], Salah Altarabsheh[4], Jeffery Teuteberg[3], Soon J. Park[2], Robert L. Kormos[1,3], Harold Burkhart[5], *Victor Morell[6]

[1]*University of Pittsburgh Medical Center, Pittsburgh, PA;* [2]*University Hospitals, Cleveland, OH;* [3]*Heart and Vascular Institute, UPMC, Pittsburgh, PA;* [4]*Queen Alia Heart Institute, Amman, Jordan;* [5]*University of Oklahoma Health Sciences Center, Oklahoma City, OK;* [6]*Children's Hospital of Pittsburgh, Pittsburgh, PA;* [7]*Biostatistician, Heart and Vascular Institute, UPMC, Pittsburgh, PA*

Discussant: Ryan R. Davies, *A.I. duPont Hospital for Children, Wilmington, DE*

4:15 pm - 4:30 pm (page 74)

8. Predictors of Major Morbidity or Mortality After Resection for Esophageal Cancer: A Society of Thoracic Surgeons General Thoracic Surgery Database Risk Adjustment Model

Daniel Raymond[1], Christopher W. Seder[2], Cameron Wright[3], *Mitchell Magee[4], Andrzej Kosinski[5], *Stephen Cassivi[6], *Eric Grogan[7], *Shanda Blackmon[6], Mark Allen[6], Bernard Park[8], *William Burfeind[9], ***D***Andrew Chang[10], Malcolm M. DeCamp[11], David Wormuth[12], *Felix G. Fernandez[13], *Benjamin D. Kozower[14]

[1]*Cleveland Clinic, Cleveland, OH;* [2]*Rush University Medical Center, Chicago, IL;* [3]*Massachusetts General Hospital, Boston, MA;* [4]*COR Specialty Associates, Dallas, TX;* [5]*Duke University Medical Center, Durham, NC;* [6]*Mayo Clinic, Rochester, MN;* [7]*Vanderbilt University, Nashville, TN;* [8]*Memorial Sloan Kettering, New York, NY;* [9]*St. Luke's Health Network, Bethlehem, PA;* [10]*University of Michigan, Ann Arbor, MI;* [11]*Northwestern University, Chicago, IL;* [12]*SUNY Upstate Medical Center, Syracuse, NY;* [13]*Emory University, Atlanta, GA;* [14]*University of Virginia Health System, Charlottesville, VA*

Discussant: *Wayne L. Hofstetter, University of Texas MD Anderson Cancer Center, Houston, TX

4:30 pm - 4:45 pm (page 76)

9. The Influence of Pulmonary Hypertension on Outcomes After Conventional and Transcatheter Aortic Valve Replacement in a Population Based Analysis

*Himanshu J. Patel[1], Morley A. Herbert[2], Edward Murphy[3], Andrew Pruitt[4], Patricia F. Theurer[1], *Richard Prager[1]

[1]*University of Michigan Cardiovascular Center, Ann Arbor, MI;* [2]*Southwest Data Consultants, Dallas, TX;* [3]*Spectrum Health Center, Grand Rapids, MI;* [4]*St. Joseph Mercy Health System, Ann Arbor, MI*

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

4:45 pm - 5:00 pm (page 78)

10. A Decade of Transapical Aortic Valve Implantation: Lessons Learned and First Data on Valve Behavior Beyond Eight Years

Nestoras Papadopoulos, Rainer Wenzel, DStephan Fichtlscherer, Marlene Thudt, Andres Beiras, Anton Moritz, Andreas Zierer

Goethe University Hospital, Frankfurt am Main, Germany

Discussant: ***D***John V. Conte, *Johns Hopkins Hospital, Baltimore, MD*

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BASIC SCIENCE FORUM

FRIDAY, NOVEMBER 6, 2015

6:45 am - 11:30 am
EXHIBITS OPEN
Grand Harbor Ballroom South

Basic Science Forum

7:00 am - 7:50 am
Grand Harbor Ballroom North
(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
Moderator: *Chadrick E. Denlinger and *Jennifer S. Lawton

7:00 am - 7:08 am (page 80)
1B. Dendrimer Nanotherapy for Brain Injury in a Canine Model of Hypothermic Circulatory Arrest
Joshua C. Grimm[1], Trent Magruder[1], Fan Zhang[1], Manoj Mishra[1], Mary E. Blue[2], Sujatha Kannan[1], Mary A. Wilson[2], Chris M. Sciortino[1], Michael V. Johnston[2], Rangaramanujam M. Kannan[1], *William A. Baumgartner[1]
[1]*Johns Hopkins University, Baltimore, MD;* [2]*Kennedy Krieger Institute, Baltimore, MD*
Discussant: Ali Dodge-Khatami, *University of Mississippi Medical Center, Jackson, MS*

7:08 am - 7:16 am (page 82)
2B. Adenosine A2B Receptor Antagonism Attenuates Lung Ischemia-reperfusion Injury
Mary E. Huerter[1], Ashish Sharma[2], *Irving L. Kron[2], Victor E. Laubach[2]
[1]*University of Illinois, Chicago, IL;* [2]*University of Virginia, Charlottesville, VA*
Discussant: *Chadrick E. Denlinger, *Medical University of South Carolina, Charleston, SC*

7:16 am - 7:24 am (page 84)
3B. Short-term Unloading by Left Ventricular Assist Device After Acute Myocardial Infarction Attenuates Left Ventricular Remodeling and Dysfunction Through Inhibition of MMP-2-mediated Apoptosis
Charlie Evans[1], Tieluo Li[1], Xufeng Wei[1], Pablo Sanchez[1], Shuying Li[1], Zhongjun Wu[2], *Bartley P. Griffith[1]
[1]*University of Maryland School of Medicine, Baltimore, MD;* [2]*University of Louisville, Louisville, KY*
Discussant: *Shahab A. Akhter, *University of Wisconsin School of Medicine and Public Health, Madison, WI*

7:24 am - 7:32 am (page 86)
4B. Partial False Lumen Thrombosis Results in an Increase in False Lumen Blood Pressure in an Ex Vivo Porcine Model of Type B Aortic Dissection
Apoorva Girish, Muralidhar Padala, Kanika Kalra, Ravi K. Veeraswamy, *Edward P. Chen, *Bradley Leshnower
Emory University, Atlanta, GA
Discussant: ***D****Eric S. Weiss, *Aurora Medical Group-St. Luke's Medical Center, Milwaukee, WI*

7:32 am - 7:40 am (page 88)
5B. Characterization of Indeterminate Pulmonary Nodules Using a Novel Algorithm Incorporating Clinical, Radiographic and Serum Biomarker Profiles
David D. Shersher, DChristopher W. Seder, Palmi Shah, Maria D. Martin, Ravi Pithadia, Sanjib Basu, Christina Fhied, Gary W. Chmielewski, William Warren, DMichael J. Liptay, DJeffrey A. Borgia
Rush University Medical Center, Chicago, IL
Discussant: *Benjamin D. Kozower, *University of Virginia, Charlottesville, VA*

7:40 am - 7:48 am (page 90)

6B. Understanding Pulmonary Valve Architecture and Variation: Implications for the Ross Procedure

Hayden Joseph[1], Conner Ryan[1], William N. Fancher[3], Lauren C. Kane[1], Nitin A. Das[1], S. Adil Husain[1], DWilliam Northrup[2], *John H. Calhoon[1]

[1]University of Texas Health Science Center San Antonio, San Antonio, TX; [2]Cryolife, Kennesaw, GA; [3]DeBusk College of Osteopathic Medicine, Cumberland Gap, TN

Discussant: *Ross M. Ungerleider, *Wake Forest School of Medicine, Winston-Salem, NC*

7:50 am - 8:00 am

Break – Visit Exhibits

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

SECOND SCIENTIFIC SESSION

FRIDAY, NOVEMBER 6, 2015

8:00 am - 10:00 am
Grand Harbor Ballroom North
(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: *Jeffrey P. Jacobs and *Stephen C. Yang

8:00 am - 8:15 am (page 92)

11. Minimally Invasive Mitral Valve Surgery Has Superior Outcomes to Conventional Sternotomy Without Increased Costs
Emily A. Downs[1], Lily Johnston[1], *Damien J. LaPar[1], *Ravi K. Ghanta[1], *Irving L. Kron[1], ***D***Alan M. Speir[2], Clifford E. Fonner[3], *John A. Kern[1], ***D***Gorav Ailawadi[1]
[1]*University of Virginia, Charlottesville, VA;* [2]*INOVA Heart and Vascular Institute, Falls Church, VA;* [3]*Virginia Cardiac Surgery Quality Initiative, Richmond, VA*
Discussant: *Vinay Badhwar, *University of Pittsburgh Medical Center, Pittsburgh, PA*

8:15 am - 8:30 am (page 94)

12. One Hundred Planned Robotic Segmentectomies: Early Results, Technical Details and Preferred Port Placement
Caroline C. Watson, ***D****Robert J. Cerfolio, Sandra Calloway, *Douglas Minnich, *Benjamin Wei
University of Alabama, Birmingham, AL
Discussant: Kemp H. Kernstine, *University of Texas Southwestern Medical Center, Dallas, TX*

8:30 am - 8:45 am (page 96)

13. Anomalous Aortic Origin of the Coronary Arteries: The Impact of Major Associated Congenital Cardiac Lesions
*James St. Louis
Children's Mercy Hospital, Kansas City, MO
Discussant: *Constantine Mavroudis, *Florida Hospital for Children, Orlando, FL*

8:45 am - 9:00 am (page 98)

14. Impact of Sublobar Resection on Pulmonary Function: Long-term Results From ACOSOG Z4032 (Alliance), A Randomized Phase III Trial
Michael Kent[6], Hiran Fernando[1], Sumithra Mandrekar[8], *Rodney J. Landreneau[2], Francis Nichols[3], Thomas DiPetrillo[4], Bryan Meyers[5], Dwight Heron[7], David Jones[11], Angelina Tan[8], Sandra Starnes[9], Joe Putnam[10]
[1]*Boston University, Boston, MA;* [2]*Allegheny General Hospital, Pittsburgh, PA;* [3]*Mayo Clinic, Rochester, MN;* [4]*Rhode Island Hospital, Providence, RI;* [5]*Washington University, St. Louis, MO;* [6]*Beth Israel Deaconess Hospital, Boston, MA;* [7]*University of Pittsburgh, Pittsburgh, PA;* [8]*Alliance Statistics and Data Center, Mayo Clinic, Rochester, MN;* [9]*University of Cincinnati, Cincinnati, OH;* [10]*Vanderbilt University Medical Center, Nashville, TN;* [11]*Memorial Sloan Kettering Cancer Center, New York, NY*
Discussant: ***D****Daniel L. Miller, *WellStar Healthcare, Marietta, GA*

9:00 am - 9:15 am (page 100)

15. Outcomes of Re-intervention on the Left Ventricular Outflow Tract Following Ross Procedure
Neeraj Bansal, S. Ram Kumar, Winfield J. Wells, Vaughn A. Starnes
University of Southern California Children's Hospital, Los Angeles, CA
Discussant: David A. Fullerton, *University of Colorado Denver School of Medicine, Aurora, CO*

9:15 am - 9:30 am (page 102)

16. The Future of the Academic Cardiothoracic Surgeon: Results of the TSRA/TSDA In-training Exam Survey

Elizabeth H. Stephens[1], Asad A. Shah[2], Michael P. Robich[3], Dustin Walters[4], Walter DeNino[5], Muhammad Aftab[3], Vakhtang Tchantchaleishvili[6], Amanda Eilers[7], Robert Rice[8], Andrew Goldstone[9], Ryan Shelstead[10], Tarek Malas[11], Marisa Cevasco[12], Erin Gillaspie[13], David Odell[15], Damien J. LaPar[14]

[1]Columbia University Medical Center, New York, NY; [2]Duke University, Durham, NC; [3]Cleveland Clinic, Cleveland, OH; [4]University of Washington, Seattle, WA; [5]Medical University of South Carolina, Charleston, SC; [6]University of Rochester, Rochester, NY; [7]University of San Antonio, San Antonio, TX; [8]University of Texas MD Anderson Cancer Center, Houston, TX; [9]University of Pennsylvania, Philadelphia, PA; [10]Oregon Health and Sciences University, Portland, OR; [11]Ottawa Heart Institute, Ottawa, ON, Canada; [12]Brigham and Women's, Boston, MA; [13]Mayo Clinic, Rochester, MN; [14]University of Virginia, Charlottesville, VA; [15]University of Pittsburgh, Pittsburgh, PA

Discussant: *Tom C. Nguyen, *University of Texas Houston Medical School, Houston, TX*

9:30 am - 9:45 am (page 104)

17. Cerebral Oximetry in Cardiac Surgery: Can We Trust It?

Daniel C. Lee[1], Douglas S. Pfeil[2], Harry L. Graber[2], Daqing Piao[3], Lei Ding[4], Han Yuan[1], Donald E. Stowell[1], *Marvin Peyton[1], Harold Burkhart[1], Randall L. Barbour[2]

[1]University of Oklahoma College of Medicine, Oklahoma City, OK; [2]State University of New York Downstate Medical Center, Brooklyn, NY; [3]Oklahoma State University, Stillwater, OK; [4]University of Oklahoma College of Engineering, Norman, OK

Discussant: Glenn J.R. Whitman, *Johns Hopkins Hospital, Baltimore, MD*

9:45 am - 10:00 am (page 106)

18. Isolated Tricuspid Valve Surgery: Outcomes, Trends and Identification of Low-risk Clinical Criteria in the Contemporary Surgical Era

*Damien J. LaPar[1,2], *John A. Kern[1,2], *Ravi K. Ghanta[1,2], Leora T. Yarboro[1,2], *Mohammed Quader[4,2], *Jeffrey B. Rich[2], *Irving L. Kron[1,2], *Alan M. Speir[3,2], *Gorav Ailawadi[1,2]

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

Discussant: *Harold G. Roberts, Jr., *Florida Heart and Vascular Care, Aventura, FL*

10:00 am – 10:30 am

Break – Visit Exhibits

Grand Harbor Ballroom South

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

GENERAL SESSION (All attendees and guests welcome)

FRIDAY, NOVEMBER 6, 2015

10:30 am – 12:00 pm
Grand Harbor Ballroom North

CME Credits Available: 1.5

10:30 am - 10:50 am
Kent Trinkle Education Lectureship: Integrating the Integrated Program: The MUSC Experience
*John S. Ikonomidis
Medical University of South Carolina, Charleston, SC

10:50 am – 11:20 am
President's Invited Lecturer
David A. Fullerton
University of Colorado Denver, Aurora, CO

11:20 am – 12:00 pm
Presidential Address
*John H. Calhoon
University of Texas Health Science Center, San Antonio, TX

12:00 pm – 4:00 pm
EXHIBITS OPEN

12:00 pm
All Attendee Lunch
Yacht Club Marina

1:00 pm – 2:00 pm
JCTSE Jeopardy & Dessert in the Exhibit Hall
Grand Harbor Ballroom South

THIRD SCIENTIFIC SESSION A

FRIDAY, NOVEMBER 6, 2015

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 *Grand Harbor Ballroom North*

(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: *Richard L. Lee and *Tom C. Nguyen

2:00 pm - 2:15 pm (page 108)

19. Equivalent Operative Risk with Improved Mid-term Survival in the David V Valve Sparing Root Replacement Compared with Mechanical Valve Conduits for Aortic Root Aneurysms
Jiro Esaki[1], *Bradley Leshnower[2], Jose Binongo[2], Yi Lasajanak[2], *Michael Halkos[2], *Robert Guyton[2], *Edward P. Chen[2]
[1]*Otsu Red Cross Hospital, Otsu, Japan;* [2]*Emory University, Atlanta, GA*
Discussant:*Tirone E. David, *Toronto General Hospital, Toronto, ON, Canada*

2:15 pm - 2:30 pm (page 110)

20. Long-term Results Following Pericardial Patch Augmentation for Incompetent Bicuspid Aortic Valves: A Single Center Experience
Marlene Thudt, Nestoras Papadopoulos, Andreas Zierer, Anton Moritz
University Hospital Frankfurt Main, Germany, Frankfurt am Main, Germany
Discussant: *D**James S. Tweddell, *Cincinnati Children's Hospital Medical Center, Cincinnati, OH*

2:30 pm - 2:45 pm (page 112)

21. Learning Alternative Access Approaches for TAVR: Implications for New TAVR Centers
Matthew C. Henn, Thomas Percival, DAlan Zajarias, Spencer J. Melby, DBrian R. Lindman, Nishath Quader, *Ralph J. Damiano, *Marc R. Moon, DJohn M. Lasala, Ravinder Rao, Jennifer Bell, Marci S. Damiano, *Hersh S. Maniar
Washington University School of Medicine, Barnes-Jewish Hospital, St. Louis, MO
Discussant: *D*Eric L. Sarin, *Emory University School of Medicine, Atlanta, GA*

2:45 pm - 3:00 pm (page 114)

22. Valve Selection in End Stage Renal Disease: Should it Always Be Biological?
*Matthew Williams, Joseph E. Bavaria, Michael Acker, Nimesh D. Desai, Prashanth Vallabhajosyula, Walter C. Hargrove, Pavan Atluri, Wilson Y. Szeto
University of Pennsylvania, Philadelphia, PA
Discussant: *Faisal G. Bakaeen, *Texas Heart Institute/Baylor College of Medicine, Houston, TX*

3:00 pm - 3:15 pm (page 116)

23. Alternative Access TAVR Is Safe at Higher Society of Thoracic Surgeons Predicted Risk of Mortality Scores
Hanna A. Jensen, Jose Condado, *Bradley Leshnower, Jose Binongo, Chandan Devireddy, *Eric Sarin, Vasilis Babaliaros, Amjad Syed, Stamatios Lerakis, Kreton Mavromatis, *James P. Stewart, Brian Kaebnick, Mohammad Rajaei, Amy Simone, Patricia Keegan, ***D***Robert Guyton, DPeter Block, *Vinod H. Thourani
Emory University, Atlanta, GA
Discussant: *D*Joshua Rovin, *Cardiac Surgical Associates, LLP, Clearwater, FL*

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

THIRD SCIENTIFIC SESSION A

3:15 pm - 3:30 pm (page 118)

24. Reinforcing Atrial P2 Stitch May Reduce Dehiscence in Undersized Mitral Annuloplasty
Dawn Hui, Jack Chen, *Richard Lee
St. Louis University School of Medicine, St. Louis, MO
Discussant: Robert L. Smith, *COR Specialty Associates of North Texas, Dallas, TX*

General Thoracic Breakout *Grand Harbor Ballroom VIII*

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

Moderators: *D**Traves B. Crabtree and *Richard K. Freeman

2:00 pm - 2:15 pm (page 120)

25. Outcomes of Major Lung Resection After Induction Therapy for Non-small Cell Lung Cancer in Elderly Patients
Chi-Fu Jeffrey Yang, Ryan Meyerhoff, Nicholas Mayne, Hanghang Wang, Sameer Hirji, *Betty C. Tong, Mark Onaitis, Matthew Hartwig, *David Harpole, ***D****Thomas A. D'Amico, *Mark Berry
Duke University, Durham, NC

2:15 pm - 2:30 pm (page 122)

26. Recurrence and Survival After Segmentectomy in Patients With Prior Lung Resection for Early Stage Non-Small Cell Lung Cancer (E-NSCLC)
Lisa M. Brown, Brian E. Louie, Nicole Jackson, Alexander S. Farivar, Ralph W. Aye, Eric Vallieres
Swedish Cancer Institute, Seattle, WA

2:30 pm - 2:45 pm (page 124)

27. The Influence of Reconstructive Technique on Perioperative Outcomes Following Chest Wall Resection
Jonathan D. Spicer, Jitesh B. Shewale, Mara B. Antonoff, Arlene M. Correa, Wayne Hofstetter, David C. Rice, *Ara Vaporciyan, Reza Mehran, *Garrett L. Walsh, *Jack A. Roth, *Swisher G. Stephen, *Boris Sepesi
University of Texas MD Anderson Cancer Center, Houston, TX

2:45 pm - 3:00 pm (page 126)

28. Does Lymph Node Count Influence Survival in Surgically Resected NSCLC?
*Elizabeth A. David[1,2], Yingjia Chen[3], David T. Cooke[1], Rosemary Cress[3,4]
[1]UC Davis Medical Center, Sacramento, CA; [2]David Grant Medical Center, Travis AFB, CA; [3]UC Davis School of Medicine, Davis, CA; [4]Cancer Registry of Greater California, Sacramento, CA

3:00 pm - 3:15 pm (page 128)

29. Robotic versus Thoracoscopic Resection for Lung Cancer: Early Results of a New Robotic Program
Benedetto Mungo, Craig M. Hooker, Janelle S. Ho, *Stephen C. Yang, Richard Battafarano, *Malcolm V. Brock, ***D****Daniela Molena
Johns Hopkins University, Baltimore, MD

3:15 pm - 3:30 pm (page 130)

30. Time Is Money: Hospital Costs Associated with VATS Lobectomies
*Onkar V. Khullar, *Felix G. Fernandez, William Knechtle, Sebastian Perez, *Allan Pickens, *Manu Sancheti, *Seth D. Force
Emory University, Atlanta, GA

Congenital Breakout *Grand Harbor Ballroom V*

(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**James A. Quintessenza and *James D. St. Louis

2:00 pm - 2:15 pm (page 132)

31. Long-term Survival and Freedom From Re-operation Following Right Ventricular Outflow Tract Reconstruction Using Xenograft Valves

George M. Alfieris[1], Michael Swartz[1], Juan Lehoux[1], *Edward Bove[2]

[1]*University of Rochester, Rochester, NY;* [2]*University of Michigan, Ann Arbor, MI*

Discussant: *David P. Bichell, Monroe Carell, *Jr. Children's Hospital at Vanderbilt, Nashville, TN*

2:15 pm - 2:30 pm (page 134)

32. Pulmonary Valve Repair for Patients With Acquired Pulmonary Valve Insufficiency

Sameh Said, *Richard D. Mainwaring, Michael Ma, Theresa Tacy, Frank L. Hanley

Stanford University School of Medicine, Stanford, CA

Discussant: *D**James A. Quintessenza, *All Children's Hospital, St. Petersburg, FL*

2:30 pm - 2:45 pm (page 136)

33. Polytetrafluoroethylene Bicuspid Pulmonary Valve Replacement: A Five-year Experience in 119 Patients With Congenital Heart Disease

Cheul Lee[1], Chang-Ha Lee[2], Jae Gun Kwak[2]

[1]*Seoul St. Mary's Hospital, College of Medicine, The Catholic University of Korea, Seoul, Korea (the Republic of);* [2]*Sejong General Hospital, Bucheon, Korea (the Republic of)*

Discussant: *D**James A. Quintessenza, *All Children's Hospital, St. Petersburg, FL*

2:45 pm - 3:00 pm (page 138)

34. The Trifecta Bioprosthetic Valve Is Associated With a Reduced Transvalvular Gradient Following Pulmonary Valve Replacement

Brian C. Gulack, Robert D. Jaquiss, Andrew J. Lodge

Duke University, Durham, NC

Discussant: *Joseph A. Dearani, *Mayo Clinic, Rochester, MN*

3:00 pm - 3:15 pm (page 140)

35. Outcomes of Redo Pulmonary Valve Replacement for Bioprosthetic Pulmonary Valve Failure in 61 Patients With Congenital Heart Disease

Cheul Lee[1], Chang-Ha Lee[2], Jae Gun Kwak[2]

[1]*Seoul St. Mary's Hospital, College of Medicine, The Catholic University of Korea, Seoul, Korea (the Republic of);* [2]*Sejong General Hospital, Bucheon, Korea (the Republic of)*

Discussant: *Paul J. Chai, *Columbia University Medical Center, New York, NY*

3:15 pm - 3:30 pm (page 142)

36. Intervention for Right Ventricular Outflow Tract Obstruction Following the Arterial Switch Operation at a Single Center

Joseph Nellis, Benton Ng, Osamah Aldoss, Dianne Atkins, *Joseph Turek

Carver College of Medicine, Iowa City, IA

Discussant: Marshall L. Jacobs, *Johns Hopkins University School of Medicine, Baltimore, MD*

3:30 pm – 4:00 pm

Break – Visit Exhibits

JCTSE Jeopardy in the Exhibit Hall

Grand Harbor Ballroom South

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

THIRD SCIENTIFIC SESSION B

FRIDAY, NOVEMBER 6, 2015

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 *Grand Harbor Ballroom North*

(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****Anthony L. Estrera and *T. Brett Reece

4:00 pm - 4:15 pm (page 144)
37. Imaging Surveillance After Proximal Aortic Surgery: Is it Necessary?
Alexander Iribarne, Jeffrey Keenan, Hanghang Wang, Ehsan Benrashid, James M. Meza, Asvin Ganapathi, *Jeffrey Gaca, *G. Chad Hughes
Duke University, Durham, NC
Discussant: *John S. Ikonomidis, *Medical University of South Carolina, Charleston, SC*

4:15 pm - 4:30 pm (page 146)
38. Bicuspid Aortic Insufficiency With Aortic Aneurysm: Root Reimplantation versus Bentall Root Replacement
Prashanth Vallabhajosyula, Caroline Komlo, Wilson Y. Szeto, Karianna Milewski, Fenton H. McCarthy, Nimesh D. Desai, Joseph E. Bavaria
[1]*University of Pennsylvania, Philadelphia, PA*
Discussant: *Edward P. Chen, *Emory University School of Medicine, Atlanta, GA*

4:30 pm - 4:45 pm (page 148)
39. Risk of Mortality After Resolution of Spinal Malperfusion in Acute Dissection
Harleen K. Sandhu[1], Kristofer M. Charlton-Ouw[1,2], Charles C. Miller1, Samuel S. Leake[1], ***D***Ali Azizzadeh[1,2], Tom C. Nguyen[1,2], *Anthony L. Estrera[1,2], *Hazim J. Safi[1,2]
[1]*University of Texas Health Science Center at Houston, Houston, TX;* [2]*Memorial Hermann Heart & Vascular Institute, Texas Medical Center, Houston, TX*
Discussant: *Thomas M. Beaver, *University of Florida, Gainesville, FL*

4:45 pm - 5:00 pm (page 150)
40. Contemporary Results of Elective Primary Aortic Root Replacement With and Without Hemiarch Repair
D*Joseph S. Coselli[1,2], ***D****Ourania Preventza[1,2], DKim I. de la Cruz[1,2], Susan Y. Green[1,2], Matt D. Price[1,2], ***D****Scott A. LeMaire[1,2]
[1]*Baylor College of Medicine, Houston, TX;* [2]*Texas Heart Institute, Houston, TX*
Discussant: *Brian T. Bethea, *Tenet Healthcare Corporation, Coral Springs, FL*

General Thoracic Breakout *Grand Harbor Ballroom VIII*

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

Moderators: *Shanda H. Blackmon and *Pierre E. de Delva

4:00 pm - 4:15 pm (page 152)
41. Clinical T2N0 Esophageal Cancer: When Is Induction Therapy Indicated?
Pamela Samson, Clifford Robinson, Craig Lockhart, Varun Puri, Stephen Broderick, *Daniel Kreisel, *A. Sasha Krupnick, *G. Alexander Patterson, *Bryan Meyers, *Traves Crabtree
Washington University, St. Louis, MO

4:15 pm - 4:30 pm (page 154)

42. Surgical Enteral Access Is Not Required to Maintain Nutritional Status in Esophagectomy Patients Undergoing Neoadjuvant Therapy

Mary E. Huerter[1], Eric J. Charles[2], Yinin Hu[2], Christine Lau[2], James Isbell[2], *Benjamin D. Kozower[2]

[1]University of Illinois, Chicago, IL; [2]University of Virginia, Charlottesville, VA

4:30 pm - 4:45 pm (page 156)

43. Palliation of Concomitant Tracheo-bronchial and Esophageal Disease Using a Combined Airway and Esophageal Approach

*Basil Nasir[1], Jordan Kazakov[2], ***D***Vicki Tiffault[3], Pasquale Ferraro[3], ***D***Moishe Liberman[3]

[1]Vancouver General Hospital, Vancouver, BC, Canada; [2]University Hospitals Case Medical Center, Cleveland, OH; [3]Centre Hospitalier de l'Université de Montréal, Montreal, QC, Canada

4:45 pm - 5:00 pm (page 158)

44. Complex Esophageal Reconstruction Procedures Have Similar Outcomes to Routine Esophagectomy

Jessica Moore, Craig M. Hooker, *Daniela Molena, Benedetto Mungo, *Malcolm V. Brock, Richard Battafarano, *Stephen C. Yang

Johns Hopkins University, Baltimore, MD

Congenital Breakout *Grand Harbor Ballroom V*

(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: *Daniel J. DiBardino and *Jeffrey P. Jacobs

4:00 pm - 4:15 pm (page 160)

45. Use of Extracellular Matrix for Repair of Congenital Defects in Pediatric Patients

Erin Harvey, ***D***Eric E. Roselli, Gosta Pettersson, Jahanzaib Idrees, *Robert Stewart

Cleveland Clinic, Cleveland, OH

Discussant: *Sunjay Kaushal, *University of Maryland Medical Center, Baltimore, MD*

4:15 pm - 4:30 pm (page 162)

46. Comparison of Right Ventricle Function After Repair of Tetralogy of Fallot Using CorMatrix versus Bovine Pericardial Patch

TK Susheel Kumar, Ronak Naik, Jason Johnson, *Christopher J. Knott-Craig

Le Bonheur Children's Hospital, Memphis, TN

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

4:30 pm - 4:45 pm (page 164)

47. Delayed Sternal Closure in Infant Heart Surgery – The Importance of Where and When: An Analysis of the STS Congenital Heart Surgery Database

Kristen Nelson McMillan[1], Christoph Hornik[3], Xia He[3], *Luca Vricella[1], *Jeffrey P. Jacobs[1,2], Kevin D. Hill[3], Sara K. Pasquali[4], Diane Alejo[1], *Duke Cameron[1], Marshall L. Jacobs[1]

[1]Johns Hopkins University, Baltimore, MD; [2]All Children's Hospital, St. Petersburg, FL; [3]Duke University, Durham, NC; [4]University of Michigan Heart Center, CS Mott Children's Hospital, Ann Arbor, MI

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

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

THIRD SCIENTIFIC SESSION B

4:45 pm - 5:00 pm (page 166)

48. Early Extubation Following Repair of Tetralogy of Fallot and the Fontan Procedure: An Analysis of The Society of Thoracic Surgeons Congenital Heart Surgery Database

William T. Mahle[2,3], *Jeffrey P. Jacobs[1], *Marshall L. Jacobs[4], *Sunghee Kim[5], Susan Nicolson[6], *Paul M. Kirshbom[7], Sara K. Pasquali[8], *Erle H. Austin[9], *Kirk R. Kanter[3], *Kevin D. Hill[10,5]

[1] Johns Hopkins All Children's Heart Institute, St. Petersburg, FL; [2]Children's Healthcare of Atlanta, Atlanta, GA; [3]Emory University, Atlanta, GA; [4]Johns Hopkins University, Baltimore, MD; [5]Duke Clinical Research Institute, Durham, NC; [6]Children's Hospital of Philadelphia, Philadelphia, PA; [7]Yale School of Medicine, New Haven, CT; [8]University of Michigan, Ann Arbor, MI; [9]University of Louisville, Louisville, KY; [10]Duke University, Durham, NC

Discussant: Gil Wernovsky, *Nicklaus Children's Hospital , Miami Children's Health System, Miami, FL*

5:00 pm – 6:00 pm
STSA ANNUAL BUSINESS MEETING (Members Only)
Grand Harbor Ballroom North

6:00 pm – 7:00 pm
Residents Reception
Asbury A

7:00 pm – 9:00 pm
President's Mixer
International Gateway

CODING, RUC & SGR UPDATE

SATURDAY, NOVEMBER 7, 2015

CODING, RUC & SGR UPDATE *Grand Harbor Ballroom North*

7:00 am – 8:00 am

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

Educational Objective: Upon completion of this program participants will be able to:
- Describe coding strategies for adult cardiac surgery, pediatric cardiac surgery and general thoracic surgery.
- Discuss the mechanism by which CMS establishes rate payment for physician services.
- Explain how reimbursement is currently calculated.
- Assess the impact of the "0 Global" methodology planned for implementation by CMS in 2016 and its impact on our specialty, which was blocked for several years by the passage of recent SGR Repeal legislation.
- Discuss the planned audits by CMS of our specialty care management, and the need to modify and document our existing care delivery models.

7:00 am - 7:20 am
Coding Update

*Jeffrey P. Jacobs
Johns Hopkins All Children's Heart Institute, St. Petersburg, FL

*Keith S. Naunheim
St. Louis University Health Sciences Center, St. Louis, MO

7:20 am - 7:40 am
RUC Update
*Peter K. Smith
Duke University, Durham, NC

7:40 am - 8:00 am
SGR Reform: "What Got Us Here, Won't Get Us There"
*Alan M. Speir
Fairfax Hospital, Falls Church, VA

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

FOURTH SCIENTIFIC SESSION

SATURDAY, NOVEMBER 7, 2015

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 *Grand Harbor Ballroom North*

(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: *Bradley G. Leshnower and *John M. Stulak

8:00 am - 8:15 am (page 168)

49. Intensive Glucose Management in Non-diabetics Improves Resource Utilization in Patients with Perioperative Hyperglycemia Undergoing CABG: A Prospective Randomized Trial
Hanna A. Jensen, Guillermo Umpierrez, Jose Condado, *Michael Halkos, *Omar Lattouf, ***D***Robert Guyton, *William B. Keeling, *Vinod H. Thourani
Emory University, Atlanta, GA
Discussant: *Emmanuel Daon, *University of Kansas Medical Center, Kansas City, KS*

8:15 am - 8:30 am (page 170)

50. Is There a Model to Predict Postoperative Pneumonia Following Isolated Coronary Artery Bypass Grafting?
Raymond J. Strobel[1], Qixing Liang[1], Min Zhang[1], Mary A. Rogers[1], Patricia F. Theurer[1], Astrid B. Fishstrom[1], Steven D. Harrington[2], Alphonse DeLucia[3], Gaetano Paone[4], *Richard L. Prager[1], DDonald S. Likosky[1], Michigan Society of Thoracic and Cardiovascular Surgeons Quality Collaborative[5]
[1]*University of Michigan, Ann Arbor, MI;* [2]*Henry Ford Macomb Hospitals, Clinton Township, MI;* [3]*Bronson Methodist Hospital, Kalamazoo, MI;* [4]*Henry Ford Hospital, Detroit, MI;* [5]*For the Michigan Society of Thoracic and Cardiovascular Surgeons Quality Collaborative, Ann Arbor, MI*
Discussant: *Vinay Badhwar, *University of Pittsburgh Medical Center, Pittsburgh, PA*

8:30 am - 8:45 am (page 172)

51. Close Follow-up and Early Office Evaluation Reduces the Most Common Causes of Readmission After Cardiac Surgery
Ilia Gogichaishvili, Karen Rosa, *Nicolas A. Brozzi, *Edward B. Savage
Cleveland Clinic Florida, Weston, FL
Discussant: *Evelio Rodriguez, *St. Thomas Heart Hospital, Nashville, TN*

8:45 am - 9:00 am (page 174)

52. Malperfusion Syndromes in Acute DeBakey I Aortic Dissection: Open Repair With Concomitant Antegrade Stent Grafting of the Descending Thoracic Aorta
*Prashanth Vallabhajosyula[1], Jean Paul Gottret[1], Zara Abbas[1], Matthew Kramer[1], Rohan Menon[1], Aaron Pulsipher[1], *Alberto Pochettino[2], Kariana Milewski[1], *Wilson Y. Szeto[1], *Joseph E. Bavaria[1]
[1]*University of Pennsylvania, Philadelphia, PA;* [2]*Mayo Clinic, Rochester, MN*
Discussant: *Anthony L. Estrera, *University of Texas Houston Medical School, Houston, TX*

General Thoracic Breakout *Grand Harbor Ballroom VIII*

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

Moderators: *Elizabeth A. David and ***D***Daniela Molena

8:00 am - 8:15 am (page 176)

53. A Propensity Matched Assessment of Factors Predicting Improvement in Dyspnea in Adults Following Diaphragm Plication

*Richard K. Freeman, *Anthony J. Ascioti, Megan Dake, Raja S. Mahidhara

St. Vincent Hospital and Health System, Indianapolis, IN

8:15 am - 8:30 am (page 178)

54. Thymic Rotational Flap: An Anastomotic Buttress Technique for Minimally Invasive Ivor-Lewis Esophagectomy

Jennifer L. Wilson, John Tillou, Sidhu P. Gangadharan, Jorind Beqari, Richard I. Whyte, Michael Kent

Beth Israel Deaconess Medical Center, Boston, MA

8:30 am - 8:45 am (page 180)

55. Implications of Early Foley Removal in Thoracic Surgical Oncology Patients Utilizing Epidural Analgesia

Natalie Sanchez, Jitesh B. Shewale, Carla Baker, Sonia A. Wilks, Arlene M. Correa, Boris Sepesi, *Reza Mehran, *David C. Rice, Jack A. Roth, *Garrett L. Walsh, *Swisher G. Stephen, *Ara Vaporciyan, *Wayne Hofstetter

University of Texas MD Anderson Cancer Center, Houston, TX

8:45 am - 9:00 am (page 182)

56. Establishing a General Thoracic Surgery Subspecialty Program Improves Early and Long-term Outcomes in Patients Undergoing Lobectomy for Lung Cancer

*Mitchell Magee[1], Lynn Tumey[1], *Syma L. Prince[2], Morley A. Herbert[1]

[1]Medical City Dallas Hospital, Dallas, TX; [2]CRSTI, Dallas, TX

Congenital Breakout *Grand Harbor Ballroom V*

(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: *Charles B. Huddleston and *Kristine J. Guleserian

8:00 am - 8:15 am (page 184)

57. Current Outcomes of Surgical Management of Aorto-pulmonary Window and Associated Cardiac Anomalies

*Bahaaldin Alsoufi, Ritu Sachdeva, Brian Schlosser, *Brian E. Kogon, *Kirk R. Kanter

Emory University, Atlanta, GA

Discussant: *Carl L. Backer, *Ann and Robert H. Lurie Children's Hospital of Chicago, Chicago, IL*

8:15 am - 8:30 am (page 186)

58. Repair of a Large Aortopulmonary Window in a 13-month Old

K C. Jones, Graham D. Ungerleider, *Yoshio Otaki, Michael Walsh, *Ross M. Ungerleider

Wake Forest University, Winston-Salem, NC

8:30 am - 8:45 am (page 188)

59. Repair of Partial Atrioventricular Septal Defect: Age and Outcomes

Paul J. Devlin, *Carl L. Backer, Osama Eltayeb, Michael C. Monge, Amanda Hauck, John M. Costello

Ann & Robert H. Lurie Children's Hospital of Chicago, Chicago, IL

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

8:45 am - 9:00 am (page 190)

60. Intentional Delay versus Usual Management for Low Birth Weight Newborns With Congenital Heart Disease

Joanne W. Ho, Aaron Lemieux, Daniel Sisti, Florin Vaida, John Lamberti, *Daniel J. DiBardino

University of California, San Diego, San Diego, CA

Discussant: Gil Wernovsky, *Nicklaus Children's Hospital , Miami Children's Health System, Miami, FL*

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

FOURTH SCIENTIFIC SESSION

Transplant Breakout *Asbury C*
(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: *Scott B. Johnson and ***D****Mark S. Slaughter

8:00 am - 8:15 am (page 192)
61. Utilization of Marginal Donors for Orthotropic Heart Transplantation Over Fifteen Years: Analysis of the United National Organ Database 2000-2014
Salil V. Deo[1], Dipesh Shah[2], Shannon Dunlay[3], Sachin Kumar[1], Salah Altarabsheh[4], Basar Sarreyupoglu[1], Benjamin Medalion[1], Jon Kobashigawa[5], Biswajit Kar[6], Robert Kormos[2], Soon J. Park[1]
[1]*University Hospitals, Cleveland, OH;* [2]*University of Pittsburgh Medical Center, Pittsburgh, PA;* [3]*Mayo Clinic, Rochester, MN;* [4]*Queen Alia Heart Institute, Amman, Jordan;* [5]*Cedars Sinai Heart Institute, Los Angeles, CA;* [6]*Memorial Hermann Health System, Houston, TX*
Discussant: *Umraan S. Ahmad, *St. Anthony's Heart and Vascular Institute, St. Louis, MO*

8:15 am - 8:30 am (page 194)
62. Timing and Frequency of Unplanned Readmissions After Lung Transplant Impacts Long-term Survival
Entela B. Lushaj, Walker Julliard, *Shahab Akhter, Satoru Osaki, James Maloney, Keith Meyer, Nilto DeOliveira
University of Wisconsin, Madison, WI
Discussant: *Christine L. Lau, *University of Virginia, Charlottesville, VA*

8:30 am - 8:45 am (page 196)
63. Unconventional Institutional Volume-outcome Associations in Adult Extracorporeal Membrane Oxygenation in the U.S.
Fenton H. McCarthy, Katherine M. McDermott, Ashley C. Hoedt, Vinay U. Kini, Pavan Atluri, Ann C. Gaffey, Wilson Y. Szeto, Michael Acker, Nimesh D. Desai
University of Pennsylvania, Philadelphia, PA
Discussant: ***D****Joseph B. Zwischenberger, *University of Kentucky, Lexington, KY*

8:45 am - 9:00 am (page 198)
64. Does Donor Cardiopulmonary Resuscitation Time Affect Heart Transplantation Outcomes and Survival?
Allen Cheng, Jaimin Trivedi, *Mark Slaughter
University of Louisville, Louisville, KY
Discussant: *Ahmet Kilic, *The Ohio State University Medical Center, Columbus, OH*

9:00 am - 9:30 am
Break
JCTSE Jeopardy in the General Session Room

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

HAROLD URSCHEL HISTORY LECTURESHIP

Harold Urschel History Lectureship *Grand Harbor Ballroom North*

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

9:30 am - 9:50 am (page 200)
65. C. Walton Lillehei – His Trials, His Triumphs, and the 200% Solution
*Erle H. Austin[1,2]
[1]*University of Louisville, Louisville, KY;* [2]*Kosair Children's Hospital, Louisville*

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

Recognition & Management of Cardiothoracic Surgical Misadventures

Grand Harbor Ballroom North

SATURDAY, NOVEMBER 7, 2015

9:50 am - 11:50 am

CME Credits Available: 2.0
Moderators: *Andrea J. Carpenter and *Richard L. Prager

9:50 am - 10:05 am (page 202)
66. Atrial-esophageal Fistula Repair After Transvenous Radiofrequency Ablation for Atrial Fibrillation
Erik A. Beyer, James Jowers, Erin Gautney
Baptist Health Little Rock, Little Rock, AR

10:05 am - 10:20 am (page 204)
67. Overcoming Obstacles in Robotic Lobectomy: Calcified Lymph Nodes
*Linda W. Martin[1], ***D****Robert J. Cerfolio[2]
[1]*University of Maryland, Baltimore, MD;* [2]*University of Alabama, Birmingham, AL*

10:20 am - 10:35 am (page 206)
68. Management of Pulmonary Artery Bleeding During Minimally Invasive Pulmonary Surgery
Kyle M. Bess, ***D****Robert J. Cerfolio
University of Alabama, Birmingham, AL

10:35 am - 10:50 am (page 208)
Techniques to Control Major Vascular Thoracic Injuries During Minimally Invasive Surgery
D*Robert J. Cerfolio
University of Alabama, Birmingham, AL

10:50 am - 11:05 am (page 210)
69. Disruptive Behavior in the Hospital
*Lynn H. Harrison, Jr., Natalie Pino
Baptist Hospital of Miami, Miami, FL
Discussant: *John H. Calhoon, *University of Texas Health Science Center San Antonio, San Antonio, TX*

11:05 am - 11:20 am (page 212)
Recognizing When Cognitive Dissonance Impedes Clinical Judgement
Gil Wernovsky
Nicklaus Children's Hospital, Miami Children's Health System, Miami, FL

11:20 am - 11:35 am (page 214)
70. Digital Drainage System Reduces Hospitalization After VATS Lung Resection
D*Daniel L. Miller, ***D****William Mayfield, *Theresa Luu, *Gerald Helms
WellStar Health System, Marietta, GA
Discussant: *Robert J. Cerfolio, *University of Alabama, Birmingham, AL*

11:35 am - 11:50 am (page 216)
71. A Systematic Approach to Prolonged Air Leak Reduction Following Pulmonary Resection
Nicholas Drahush, *James R. Headrick, Anna Royer, *Jeremy Smith, Ashley D. Miller, Marlana Spiva
University of Tennessee College of Medicine, Chattanooga, TN
Discussant: ***D****Daniel L. Miller, *WellStar Healthcare, Marietta, GA*

11:50 am
PROGRAM ADJOURNS

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

NOTES:

NOTES:

SCIENTIFIC PAPERS

1V. Resection of a Large Tracheal Tumor With Esophageal Involvement

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Authors: Mark Shapiro, Benjamin Lee, Robert Korst

Author Institution(s)*: The Valley Hospital, Ridgewood, NJ*

Objectives: Tracheal tumors involving a long segment of trachea and surrounding organs are rare and present a challenge for thoracic surgeons. We describe a successful case of resection of a tracheal tumor involving more than 40% of the tracheal length with invasion of the esophagus.

Methods: A 43 year-old female presented to the ER with complains of worsening dyspnea. Work-up showed a nearly completely obstructing 5 cm mass in the mid. trachea. The tumor was debrided with argon beam coagulation. Pathology showed adenoid cystic carcinoma. PET scan was negative for metastatic disease.

Results: The patient was taken to the OR for tracheal resection. A low collar incision was made. The anterior tracheal surface was dissected completely from the cricoid cartilage to the carina. Circumferential mobilization of the trachea was performed at the proximal and distal extents of the tumor. The trachea was transected transversely just distal to the lower extent of the tumor, and the distal trachea was intubated across the operative field. The tumor was involving the esophageal wall, which was resected sharply. The proximal trachea was then divided, requiring two re-resections to remove the gross tumor. The area of the esophageal wall involvement was repaired 3-0 silk sutures. A suprahyoid laryngeal release was then performed using a separate transverse incision directly over the hyoid bone. The anastomosis was completed by approximating the membranous portion of the trachea using running 4-0 PDS sutures and cartilaginous portion of the trachea using interrupted 3-0 Vicryl sutures. Postoperative bronchoscopy was performed and showed that the vocal cords moved appropriately and that anastomosis was widely patent. The patient was discharged home on POD#9.

Conclusion: Tracheal tumors involving a long segment of trachea with involvement of the esophagus can be safely resected. A detailed description of a suprahyoid laryngeal release is demonstrated.

NOTES:

2V. Repair of Transposition (TGA) with Absent Pulmonary Valve (APV) Using Pulmonary Artery Retrenchment Technique

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Authors: Graham D. Ungerleider, K C. Jones, *Yoshio Otaki, Michael Walsh, *Ross M. Ungerleider

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

Objectives: Video demonstrates surgical repair of TGA with APV in an infant. It specifically demonstrates a technique for pulmonary artery reduction (retrenchment) (PART) useful for aneurysmal pulmonary arteries associated with APV. The anatomy of APV is also nicely demonstrated in this HD quality video.

Methods: Repair is performed on cardiopulmonary bypass (CPB) with moderate hypothermia. The repair is a "Rastelli" type, including closure of a large atrial septal defect (ASD) and baffle closure of the ventricular septal defect (VSD) to create a left ventricle to aorta connection. A pulmonary artery reduction / reduction technique (PART), for decreasing the size of the large, aneurysmal pulmonary arteries is demonstrated and right ventricle to pulmonary artery continuity is completed with a pulmonary homograft.

Results: The patient tolerated the procedure well and was returned to the ICU on minimal inotropic support and with excellent hemodynamics.

Conclusion: TGA / APV is a rare variant of APV syndrome. A Rastelli type repair is demonstrated and the technique of pulmonary artery retrenchment is a useful and easily reproducible method for geometric diminution of aneurysmal pulmonary arteries.

NOTES:

3V. Repair of Both Severe Pectus Excavatum Deformity and Ascending Aortic Root Aneurysm

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Authors: Erik A. Beyer, James Jowers, Erin Gautney

Author Institution(s): *Baptist Health Little Rock, Little Rock, AR*

Objectives: A 23 year-old male patient presents with dyspnea, chest pain and fatigue for three days. He has no cough, fever or myalgias. He has a family history of aortic aneurysms. On exam he has a pectus excavatum deformity. A CT scan of the chest was performed which showed a 5.5 cm aortic root aneurysm. According to the Haller index, the patient also had a severe pectus excavatum deformity.

Methods: The pectus excavatum and aortic root aneurysm were repaired concurrently. A modified Ravitch procedure was performed for the pectus repair. Costal cartilage was removed from the third to the eighth rib. Prior to stabilizing the sternum, the chest cavity was entered 2.5 cm lateral and to the left of the sternum. The left internal mammary artery was preserved. The aortic root was replaced with a composite graft. The sternum was fractured transversly at the manubrium and displaced anteriorly with titanium plates.

Results: The patient was extubated within 6 hours of surgery. The pleural and pericardial drains were removed on the second and third day after surgery. The subcutaneous drains were removed by the sixth postoperative day. On POD 7 the patient was discharged home. At 9 month follow-up the patient is doing well and pleased with the cosmetic results of the pectus repair.

Conclusion: This is a unique case of concurrent pectus excavatum repair and ascending aortic root replacement. The modified approach to the pectus repair with titanium plates is also original. This is one of very few reported cases of both an aortic root replacement and severe pectus excavatum repair.

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4V. The P.O.E.M. Procedure for Achalasia: From Outside to Inside in 100 years

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Authors: Brian E. Louie, Andreas Schneider, Heather F. Warren, Ralph W. Aye

Author Institution(s): *Swedish Cancer Institute, Seattle, WA*

Objectives: Achalasia is an end stage motor disorder of the esophagus characterized by absent peristalsis and defective LES sphincter relaxation that results in patients experiencing progressive solid and liquid food dysphagia. Although there are many treatment options, surgical myotomy has produced effective and durable palliation. Per oral endoscopic myotomy or P.O.E.M. is a natural orifice approach used to perform myotomy that maintains the surgical principles that have developed over the last 100 years.

Methods: In this video, we review the evolution of the surgical myotomy and the innovations used over time to improve patient outcome in achalasia. Both the myotomy and surgical approach has changed radically since Dr. Heller's original report. An in-depth description of the per oral endoscopic myotomy approach with initial results is shown.

Results: The myotomy for achalasia has evolved from a two sided myotomy as described by Dr. Heller to a short, single esophagomyotomy as described by Dr. Zaaijer. The approach to myotomy has moved from a transthoracic operation popularized by Dr. Ellis to thoracoscopic by Dr. Pellegrini and then laparoscopic by Dr. Patti for the last 20 years. Extension onto the gastric wall by 2-3 cm results in less dysphagia. The per oral endoscopic myotomy is a surgical innovation by Dr. Inoue that is performed via a small mucosotomy in the wall of the esophagus to facilitate division of only the circular muscle layer. Initial and early results of 18 patients undergoing POEM demonstrated excellent palliation of swallowing and a low rate of GERD.

Conclusion: The approach to and the surgical myotomy for achalasia have changed radically over the last 100 years. Myotomy remains the gold standard treatment for achalasia. P.O.E.M. is a natural evolution for surgeons to embrace that adheres to existing surgical principles and achieves excellent palliation in swallowing with low rates of morbidity.

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5V. When the Bidirectional Glenn Is an Unfavorable Option: Primary Extracardiac Inferior Cavopulmonary Connection as an Alternative Palliation

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Authors: Ali Dodge-Khatami, Avichal Aggarwal, Mary B. Taylor, Douglas Maposa, *Jorge D. Salazar

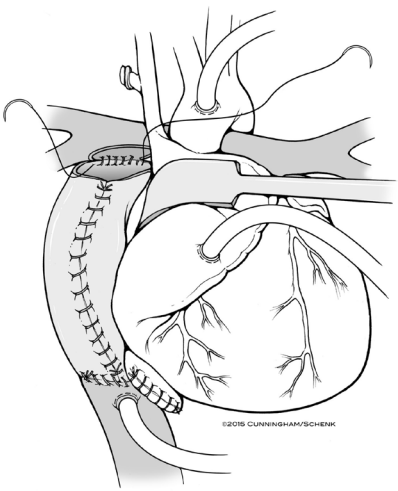
Author Institution(s): *Children's Heart Center, University of Mississippi Medical Center, Jackson, MS*

Objectives: The superior vena cava-pulmonary artery connection (bidirectional Glenn) is standard palliation for single ventricle physiology. When upper body systemic venous anatomic concerns such as superior vena cava stenosis, hypoplasia, or inadequate collateral tributaries are present, a Glenn may be precluded or have a high risk of poor outcome.

Methods: A primary inferior cavopulmonary connection with an extracardiac conduit is presented as an alternative palliation that provides a generous pathway for pulmonary blood flow, with the additional benefit of including hepatic venous return. We report a case of primary extracardiac inferior cavopulmonary connection in an infant unsuitable for Glenn.

Results: An uneventful post-operative course allowing discharge to home on day 8 and follow-up at 5 months have been satisfactory with angiographically-documented connection patency, no veno-venous collaterals or hepatic vein congestion. The infant has oxygen saturations in the mid-80's, has no ascites, and is feeding and gaining weight normally.

Conclusion: With suboptimal upper body systemic venous anatomy, the primary extracardiac inferior cavopulmonary connection was an alternative palliation with a safe early outcome in our patient, clinically similar to that after a bidirectional Glenn. More studies and longer follow-up are needed to determine its longevity and perhaps expand its indications.



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6V. Post-infarct Ventricular Septal Rupture: Surgical Repair, Pitfalls and Safeguards

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Authors: Michael S. Halbreiner, Andres Kursbaum, Jose Navia

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

Objectives: Repair of a posterior ventricular septal rupture after an acute myocardial infarction is a great challenge for cardiac surgeons. We describe a surgical technique with special attention to technical maneuvers in order to achieve a successful result.

Methods: This is a 60 year-old female with right coronary artery occlusion who developed a large posterior myocardial infarction with a 2.5 cm posterior ventricular septal rupture and a 2:1 left to right shunt.

Results: After full sternotomy the ascending aorta, the superior and inferior vena cava were cannulated. Antegrade and retrograde blood cardioplegia was used. The left ventricle was opened next to the posterior papillary muscle. We identified the mitral valve and aortic valve and then found a posterobasal ventricular septal defect of 2.5cm. We used interrupted 2-0 polyester mattress sutures with Teflon felt from inside of the right ventricle to the outside of the left ventricle. We then passed the sutures through a Dacron patch and seated the patch. After this, we finished by repairing the left ventriculotomy using a triple patch of bovine pericardium layers on either side of a Dacron patch ("empanada"). We placed interrupted 2-0 Polyester sutures with Teflon felt around the left ventricular free edge and then passed them through the triple patch. The patch was secured only after careful and adequate deairing of the ventricle was performed. The postoperative echo shows no residual VSD.

Conclusion: Postinfarction posterior VSD can be safely managed as long as careful attention is used during the repair to ensure it is both stable and durable. In this video we show all the technical aspect of the operation with particular attention to anatomical structures avoiding unnecessary injury and creating a secure repair. We recommend this surgical technique as a novel approach with an added advantage of strong support to the infarcted left ventricular wall due to the creation of the "Empanada."

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7V. Aortic Valve Reconstruction for Endocarditis

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Authors: ***D***Domenico Mazzitelli[1], Christian Noebauer[1], ***D****J. Scott Rankin[2], ***D***Christian Schreiber[1], Ruediger Lange[1]

Author Institution(s): [1]*German Heart Center Munich, Munich, Germany;* [2]*BioStable Science and Engineering, Inc., Austin, TX*

COMMERCIAL RELATIONSHIPS: Domenico Mazzitelli: Consultant: Admedus Inc, Consultant/Advisory Board, **J. Scott Rankin:** Consultant: Admedus Inc., CMO: BioStable Science and Engineering; **Christian Schreiber:** Consultant: Admedus Inc.

Objectives: Outcomes for surgical management of aortic valve endocarditis are still suboptimal and represent an excellent candidate for quality improvement. Transitioning to aortic valve repair seems logical, but a recent effort involving limited autologous pericardial leaflet patching had a high failure/reoperation rate. The goal of this video is to illustrate complete pericardial leaflet replacement by the Ozaki method, using tissue-engineered bovine pericardium (CardioCel) as the leaflet substitute.

Methods: A 30 year-old man developed fever, new aortic insufficiency (AI), and positive blood cultures. After intravenous antibiotic therapy, the blood cultures cleared, and aortic valve reconstruction was undertaken. The infection had caused thickening and defects in the fused leaflet of a Sievers Type 1 bicuspid valve, and the leaflets were not salvagable. After excision of the diseased cusps, 3 CardioCel leaflets were fashioned and sutured securely to the valve annulus, using Ozaki's technique. Good leaflet apposition was obtained.

Results: After discontinuing cardiopulmonary bypass, the reconstructed CardioCel leaflets moved well with complete competence, a coaptation height of greater than 1 cm, and a 7 mmHg mean systolic gradient. The patient recovered uneventfully with no complications. The patient remains asymptomatic with unchanged echo parameters and has returned to full work activity.

Conclusion: Complete pericardial leaflet replacement is a promising approach for treating aortic valve endocarditis, because of minimal foreign body, inherent resistence to re-infection, excellent AI reduction, low gradients, secure annular fixation producing less recurrence, and no anticoagulation requirement. Tissue-engineered bovine pericardium (CardioCel) functions well and may extend durability by converting to host-compatible tissue. However, longer followup and more clinical experience will be required for full validation.

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8V. Half Pantaloon ("Florida-Shaped") Patch for Repair of Anomalous Left Coronary Artery from the Pulmonary Artery (ALCAPA)

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Authors: Graham D. Ungerleider, K C. Jones, *Yoshio Otaki, George Verghese, *Ross M. Ungerleider

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

Objectives: The use of a pantaloon-shaped patch for repair of the pulmonary artery after coronary transfer for transposition of the great arteries (TGA) resulted in significantly reduced incidence of coronary compression and suprapulmonary stenosis. Our movie demonstrates the use of a half-pantaloon patch (Florida-Shaped) to create a similar pulmonary artery reconstruction after coronary transfer for ALCAPA

Methods: A Half-Pantaloon patch is created from homograft material and our movie demonstrates how it is placed after coronary transfer in a case of ALCAPA in a 5 month old. Our movie also demonstrates other technical features to facilitate this procedure, such as the use of retrograde cardioplegia and suture retraction of the ascending aorta.

Results: The video demonstrates how the reconstructed pulmonary artery lies loosely over the posterior, transferred left coronary artery. The patient had an excellent clinical outcome and was discharged home one week after surgery. Left ventricular function and mitral insufficiency were slightly improved by the time of discharge. Excellent flow could be visualized by echo in the re-implanted left coronary artery.

Conclusion: Unlike repair of TGA where coronary compression by the anterior pulmonary artery can be fatal, compression of the left coronary artery after repair of ALCAPA might not necessarily present as an acute problem. The most commonly used technique for pulmonary artery repair in ALCAPA is to use a sinus shaped patch. However, the results of using a large pantaloon-shaped patch in TGA repair leads us to believe that the posterior coronary artery and the pulmonary outflow would be better managed by applying a similar type of patch during ALCAPA repair–a technical modification that is simple to use.

NOTES:

9V. Mediastinal Teratoma Causing Superior Vena Cava Compression

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Authors: Joshua Sonett, Gopal Singh, Joe Costa, Marc Bessler, Frank D'Ovidio, Matthew Bacchetta, Lyall Gorenstein, Mark Ginsburg

Author Institution(s): *Columbia University Medical Center, New York, NY*

Objectives: Teratomas are tumors consisting of tissue derived from all three germinal layers: the endoderm, mesoderm, and ectoderm. Germ cell tumors are predominantly found in gonads, while the anterior mediastinum is the most common extragonadal site. We would like to present the case of a mediastinal teratoma adhering to the right upper lobe compressing the Superior Vena Cava and Innominate Vein.

Methods: Retrospective case review of a 17 year-old male that presented with chest pain. This patient was preoperatively worked up by performing a chest Xray, Computed Tomography of the chest with contrast and a CT guided Biopsy of the mass. The chest CT revealed a mass in the anterior mediastinum adherent to the right upper lobe invading the pericardium and compressing the superior vena cava and innominate vein. Pathological analysis of the biopsy revealed a non-malignant mature teratoma with keratinizing squamous epithelium with adnexal structures (skin), respiratory epithelium, intestinal epithelium, pancreatic tissue, cartilage, adipose tissue and thymic tissue.

Results: The patient was subsequently taken to the operating room for a right anterior VATS with partial resection of the pericardium. The mass was resected along with the right upper lobe and part of the pericardium followed by a careful dissection around the Right Phrenic Nerve, Superior Vena Cava and Innominate Vein to preserve these structures. The tumor was successfully separated from the surrounding structures and removed from the thoracic cavity. The resected specimen was 11.0 cm long and 9.0 cm wide. The postoperative course was uneventful.

Conclusion: This is a rare case of a mediastinal teratoma involving the right lung, pericardium, SVC and innominate vein. Due to malignant transformation, potential rupture, compression of airway or major vessels complete resection of such tumors is recommended

NOTES:

1. Use of Del Nido Cardioplegia in Adults Undergoing Coronary Artery Bypass Surgery

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Authors: Gustavo E. Guajardo Salinas, Michio Kajitani, Michael Nolen, Roger Nutt

Author Institution(s): *Arkansas Heart Hospital, Little Rock, AR*

Discussant: ***D***Pedro J. del Nido, *Boston Children's Hospital, Boston, MA*

COMMERCIAL RELATIONSHIPS: DISCUSSANT: Pedro del Nido: Consultant: Nido Surgical

Objectives: Single Dose Del Nido Cardioplegia has been used in the pediatric population for many years but very little data exist about its use in adult cardiac surgery. We sought to compare the outcomes of adult patients undergoing first time coronary artery bypass surgery (CABG) using standard 4:1 blood cardiplegia (BC) vs single dose 1:4 Del Nido cardioplegia (DNC) at out institution.

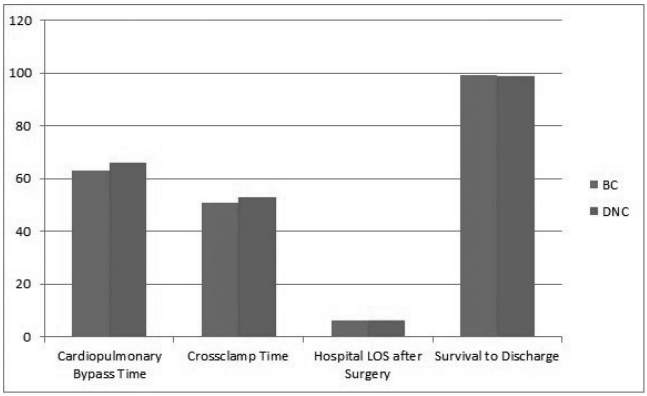
Methods: Data was retrospectively reviewed from all patients undergoing CABG during two consecutive years (2013- 2014). Baseline characteristics included age, sex, race, BMI, STS risk score, NYHA class, ejection fraction and number of grafts performed. Primary outcomes compared where: crossclamp time, cardiopulmonary bypass time (CPB), in-hospital mortality and length of stay. Secondary outcomes compared: transfusion requirement, cardioplegia volume and number of doses, cardioplegia cost, defibrillation after crossclamp removal and Hematocrit change during CPB.

Results: 249 patients underwent CABG using BC and 100 patients underwent CABG using DNC. The baseline characteristics were similar (p>0.05). Primary outcomes for BC vs. DNC: CPB time (63 vs 66 min), crossclamp time (51 vs 53 min), in-hospital mortality (<1%) and length of stay (6.4 vs 6.2 days) (p>0.05). Secondary outcomes for BC vs DNC where: percentage of patients requiring defibrillation was 41% vs 6% respectively (p 0.0001), in-hospital blood transfusion rate was 38% vs 30% (p 0.14), mean total volume of cardioplegia administered was 1140mL vs 811 mL per case (p0.0001), hematocrit change was 11.6 % vs 10.6 % (p 0.0209) and the mean cost per dose of cardioplegia was $157.00 dlls vs $5.54 dlls, with calculated savings of 15,000 dlls per 100 cases performed with DNC.

Conclusions: Single Dose DNC is an effective and economic cardioplegia which can be used safely in adult coronary artery bypass surgery. Most patients have spontaneous return of sinus rhythm and there appears to be a trend towards decrease blood transfusion.

Comparison of Blood Cardioplegia vs Del Nido Cardioplegia

	Blood Cardioplegia	Del Nido Cardioplegia
Age	64	62
BMI	30.8	32.3
Sex (F/M)	49/200	38/100
Ejection Fraction %	53%	54.7%
No. of Grafts	3.74	3.86
STS risk score	0.97	1.21
Mean Cardioplegia Volume per case	1140mL	811mL p.0001
Mean # of Doses	1.68	1 p.0001
Transfusion Rate	38%	30% p.14
Defibrillation after Cxclamp	41%	6% p.0001
Hematocrit Change after CPB	11.6	10.6 p.02
Average Cost per dose	$157.00	$5.54


120
100
80
60
40
20
0
Cardiopulmonary Bypass Time
Crossclamp Time
Hospital LOS after Surgery
Survival to Discharge
BC
DNC

NOTES:

2. Updated Outcomes for Coronary Reoperations: A 20-year Experience

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Authors: *Simon Maltais, Chaim Locker, David Joyce, *Lyle D. Joyce, *Richard C. Daly, *Kevin L. Greason, *Hartzell V. Schaff, *John Stulak

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

Discussant: *Hendrick B. Barner, *St. Louis University, St. Louis, MO*

Objectives: Percutaneous intervention (PCI) is the initial strategy for graft failure after surgical revascularization. Consequently, contemporary reoperation for coronary bypass grafting (CABG) is potentially at a higher risk. No recent large series exist in these increasingly challenging patients.

Methods: Between January 1993 and June 2014, 805 patients underwent reoperation for CABG surgery at our institution. Median age at surgery was 69 years (range, 36-88) and 689 (86%) were male. Median follow-up was 7.2 years. Number of prior CABG was 1 in 721 patients (90%), 2 in 76 (9%) and 3 in 8 (1%).

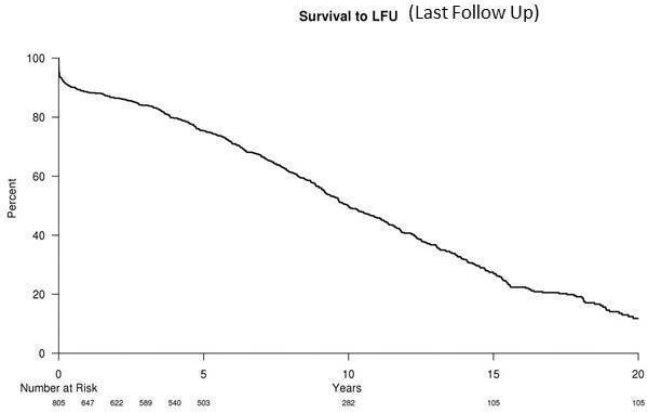
Results: All patients underwent isolated redo CABG; 765 (95%) were performed using cardiopulmonary bypass. Total # of distal anastomoses performed was [1,2]37 (562 arterial, 675 vein); median # arterial grafts was 1 and vein grafts was 2. Intra-aortic balloon pump therapy was utilized in 161 (20%) patients immediately postop. Reoperation for bleeding occurred in 28 patients (3.5%), while only 6 patients (0.7%) had reoperation for early graft complications. There were 39 early deaths (5%) for patients with one reoperation; frequent early nonfatal morbidity included renal failure in 52 (6.5%), stroke in 17 (2.1%), and pneumonia in 24 (3%). Kaplan Meier 1, 5, 10 and 15-year survival was 89%, 75%, 50%, and 27% (Figure 1). Multivariable predictors of early and late death are presented in Table 1.

Conclusions: Contemporary outcomes for CABG surgery are acceptable, and several patients and operative factors confer increased reoperation risk. Despite increased complexity, a wide range of grafts can still be utilized.

Multivariable Predictors of Early and Late Death

Early Predictors	Hazard Ratio	Lower Limit	Upper Limit	P Value
Creatinine	1.408	1.138	1.741	0.0016
Crossclamp (time)	0.983	0.969	0.996	0.01
Cardiopulmonary bypass (time)	1.013	1.008	1.018	0.0001
IABP	13.767	3.813	49.704	0.0001
Late Predictors				
Creatinine	1.362	1.11	1.671	0.003
IABP	16.68	4.732	58.802	0.0001
Cardiopulmonary bypass (time)	1.009	1.004	1.014	0.0002

Multivariable Predictors of Early and Late Death



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3. Variation in Pulmonary Resection Practices: A Comparative Analysis of the STS and ESTS General Thoracic Surgery Databases

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Authors: Christopher W. Seder[1], Michele Salati[2], *Benjamin D. Kozower[3], Cameron D. Wright[4], Pierre-Emmanuel Falcoz[5], Alessandro Brunelli[6], *Felix G. Fernandez[7]

Author Institution(s): [1]*Rush University Medical Center, Chicago, IL;* [2]*Ospedali Riuniti Ancona, Ancona, Italy;* [3]*University of Virginia, Charlottesville, VA;* [4]*Massachusetts General Hospital, Boston, MA;* [5]*Nouvel Hopital Civil, Strasbourg, France;* [6]*St. James's University Hospital, Leeds, United Kingdom;* [7]*Emory University, Atlanta, GA*

Discussant: *Betty C. Tong, *Duke University Medical Center, Durham, NC*

Objectives: Clinical guidelines are created to reduce variation in care practices, with the goal of improving patient outcomes. There is currently no international consensus on best practices for pulmonary resection. Our aim was to evaluate variation in treatment and outcomes for pulmonary resection by comparing The Society of Thoracic Surgeons (STS) and European Society of Thoracic Surgery (ESTS) General Thoracic Surgery Databases (GTSD).

Methods: An international collaboration was established between the STS and ESTS GTSD Task Forces. Patients who underwent pulmonary resection between 2010 and 2013 were identified from the two databases. Data on patient demographics, disease characteristics, treatment strategies, morbidity, and mortality were compared.

Results: There were 78,212 lung resections captured in the STS (n=47,539) or ESTS databases (n=30,673). Patients from the STS database were more likely to be female, have no pathologic N2 disease, have had prior cardiothoracic surgery, and have received induction radiotherapy, compared to the ESTS database. In addition, patients from the STS database were more likely to undergo a thoracoscopic operation and receive a sublobar resection. Although there was an increased risk of reintubation and atrial arrhythmias in patients from the STS database, the mean hospital length of stay was shorter, regardless of operation performed. Thirty-day mortality was higher in the STS database for wedge resection, but lower for segmentectomy, lobectomy, and pneumonectomy compared to the ESTS database.

Conclusions: Differences exists in patient population, operations performed, and outcomes for pulmonary resections between the STS and ESTS databases. This variation suggests an opportunity for quality improvement initiatives.

Distribution of Pulmonary Resections Between 2010 & 2013 in the STS and ESTS Databases

	STS (n=47539)	ESTS (n=30673)
VATS, wedge resection	15557 (32.5)	3493 (11.3)
VATS, lobectomy	13147 (27.5)	2557 (8.3)
VATS, segmentectomy	923 (1.9)	605 (2)
VATS, bilobectomy	180 (0.4)	47 (0.1)
VATS, pneumonectomy	72 (0.2)	27 (0.1)
Wedge resection	3301 (6.9)	3836 (12.4)
Segmentectomy	954 (2)	1657 (5.4)
Lobectomy	10735 (22.5)	14175 (46)
Sleeve lobectomy	515 (1.1)	638 (2.1)
Bilobectomy	889 (1.9)	1407 (4.6)
Pneumonectomy	1266 (2.6)	2249 (7.3)

Data presented as n (%). STS, Society of Thoracic Surgeons; ESTS, European Society of Thoracic Surgeons; VATS, video-assisted thoracoscopic surgery

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4. Mortality Trends in Pediatric and Congenital Heart Surgery: An Analysis of the STS Congenital Heart Surgery Database

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Discussant: *Joseph A. Dearani, *Mayo Clinic, Rochester, MO*

Objectives: The STS Congenital Heart Surgery Database (STS-CHSD) was queried to assess multi-institutional trends over time in discharge mortality and postoperative length of stay (PLOS).

Methods: Since 2009, operations in the STS-CHSD have been classified according to STAT Mortality Categories. The five categories were chosen to be optimal with respect to minimizing within-category variation and maximizing between-category variation. For this study, all index cardiac operations from 1998 to 2014 were grouped by STAT Category (exclusions: PDA ligation in patents less than 2.5 kg and operations that could not be assigned to a STAT category). Endpoints were Discharge Mortality and PLOS in survivors, for the entire period and for 4-year epochs. Cochran-Armitage trend test was used to test the null hypothesis that the mortality rates were the same across epochs, by STAT category.

Results: Analysis encompassed 202,895 index operations at 118 centers. Number of centers participating in STS-CHSD increased in each epoch. Overall discharge mortality was 3.4% (6959/202,895) for 1998-2014 and 3.1% (2308/75,337) for 2011-2014. Shown in Table 1 are discharge mortality for all patients and PLOS for survivors, stratified by STAT Category, for the entire period and for 4 year analytic windows. Statistically significant improvement in discharge mortality was seen in STAT Categories 2, 3, 4, and 5 (p-values for STAT Categories 1 through 5 are 0.060, <0.001, 0.015, <0.001, and <0.001, respectively). Figure 1 plots discharge mortality versus year of surgery stratified by STAT Category, for the years 1998-2014.

Conclusions: This 16-year analysis of STS-CHSD reveals declining discharge mortality over time, especially for more complex operations. PLOS is relatively unchanged over the same time intervals.

Discharge Mortality for All Patients and PLOS for Survivors, Stratified by STAT Category, for the Entire Period and for 4-year Analytic Windows

	1998-2002	2003-2006	2007-2010	2011-2014	1998-2014
	Discharge Mortality				
STAT 1	28/3327 (0.8%)	78/12858 (0.6%)	140/22711 (0.6%)	118/22167 (0.5%)	364/61063 (0.6%)
STAT 2	80/3917 (2.0%)	210/12844 (1.6%)	386/22423 (1.7%)	313/23151 (1.4%)	989/62335 (1.6%)
STAT 3	42/1286 (3.3%)	145/5058 (2.9%)	247/9355 (2.6%)	225/9553 (2.4%)	659/25252 (2.6%)
STAT 4	240/2335 (10.3%)	712/9123 (7.8%)	1229/16427 (7.5%)	1140/17204 (6.6%)	3321/45089 (7.4%)
STAT 5	187/650 (28.8%)	352/1908 (18.4%)	575/3336 (17.2%)	512/3262 (15.7%)	1626/9156 (17.8%)
	Postoperative Length of Stay (PLOS)				
STAT 1	3	4	4	4	4
STAT 2	5	5	6	6	6
STAT 3	7	8	8	8	8
STAT 4	10	10	11	12	11
STAT 5	20	21	25	27	25

Cochran-Armitage trend test was used to test the null hypothesis that the mortality rates were the same across epochs, by STAT category. P-values for STAT Categories 1 through 5 are 0.060, <0.001, 0.015, <0.001, and <0.001, respectively.

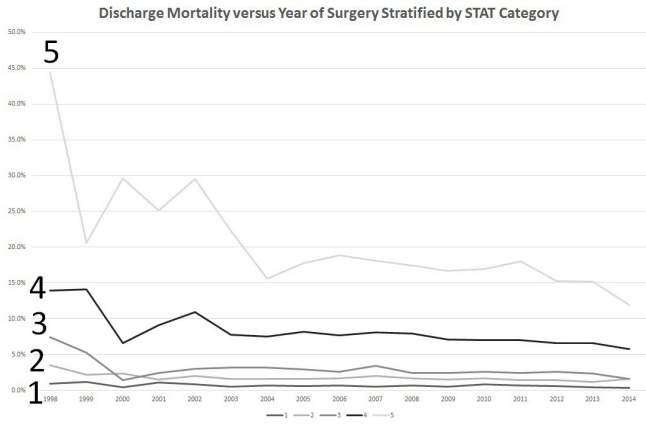

Figure 1

NOTES:

5. The Society of Thoracic Surgeons Lung Cancer Resection Risk Model: Higher Quality Data and Superior Outcomes

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Discussant: *Stephen C. Yang, *Johns Hopkins University School of Medicine, Baltimore, MD*

Objectives: Robust risk adjustment from high quality clinical registry data facilitates quality improvement initiatives and enables accurate comparison of program outcomes. Our aim was to revise the risk adjustment model for lung cancer resections from The Society of Thoracic Surgeons (STS) General Thoracic Surgery Database (GTSD) with a larger, more contemporary cohort and higher quality data, which is now more complete and regularly audited.

Methods: We queried the STS GTSD for all surgically resected primary lung cancers between July 1, 2011 through June 30, 2014 (data versions 2.081 and 2.2). Multivariate logistic regressions were used to create three separate risk models to predict adverse events: mortality, major morbidity and composite mortality OR major morbidity. In the composite model a greater weight was attributed to the mortality endpoint.

Results: 29,245 lung cancer resections were performed at 233 centers. Mean patient age was 67.2 + 10 years and 54.1% (n=15,833) were female. Lobectomy was the most common procedure at 70% (n=20,473). 59% (n=17,211) of lung cancer resections were performed via thoracoscopy. The operative mortality rate (in hospital or 30-day) was 1.6% (n=463), the major morbidity rate was 9.3% (n=2,718) and the composite mortality or major morbidity rate was 9.7% (n=2,846). The most common major morbidities were pneumonia (4%, n=1,162), unexpected return to OR (3.9%, n=1,131), reintubation (3.4%, n=984), and tracheostomy (1%, n=305). Mutlivariate predictors of mortality are illustrated in Table 1 (C statistic 0.77).

Conclusions: Operative mortality and complication rates are low for lung cancer resection among surgeons participating in the GTSD. Risk factors from the prior lung cancer resection model are refined and new risk factors such as cigarette smoking and prior thoracic surgery are identified. The GTSD risk models continue to evolve as more centers report and data is audited for quality assurance.

Multivariate Predictors of Operative Mortality

Variable	Odds Ratio	95% Confidence Interval	p value
Age (10 yr. increase)	1.666	1.463-1.898	<0.001
Male Gender	1.389	1.115-1.730	0.003
Steroids	1.805	1.197-2.722	0.009
Peripheral Vascular Disease	1.555	1.180-2.048	0.002
% Predicted FEV1 (10% decrease)	1.069	1.014-1.127	0.013
Prior Thoracic Surgery	1.422	1.096-1.823	0.007
Renal dysfunction	2.399	1.513-3.806	<0.001
Induction therapy	1.686	1.271-2.237	<0.001
Past smoker	1.630	1.050-2.532	0.034
Current smoker	1.826	1.128-2.955	0.034
Zubrod Score 1(vs 0)	1.578	1.239-2.012	<0.001
Zubrod Score 2 (vs 0)	2.306	1.496-3.554	<0.001
Zubrod Score 3 (vs 0)	1.937	0.765-4.909	<0.001
Zubrod Score 4 (vs 0)	16.072	4.770-54.155	<0.001
Thoracotomy	1.618	1.288-2.032	<0.001
Lobectomy (vs wedge)	2.009	1.202-3.098	<0.001
Sleeve lobectomy (vs wedge)	2.102	0.872-5071	<0.001
Bilobectomy (vs wedge)	4.191	2.364-7.427	<0.001
Pneumonectomy (vs wedge)	4.755	2.776-8.144	<0.001
Stage II (vs I)	1.286	1.000-1.935	0.005
Stage III (vs I)	1.297	0.986-1.738	0.005
Stage IV (vs I)	5.759	2.176-15.244	0.005

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6. Characterizing the Operative Experience of Cardiothoracic Surgery Residents in the United States: What are residents really doing in the operating room?

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Discussant: *T. Brett Reece, *University of Colorado Denver School of Medicine, Aurora, Colorado*

Objectives: Efforts to improve the training of cardiothoracic surgery residents in the United States are ongoing. The present study aimed to describe and quantify the operative experience of cardiothoracic surgery residents for basic and advanced cardiac surgical procedures.

Methods: Data was obtained from the 2015 Thoracic Surgery Directors Association Survey administered to all thoracic surgery residents taking the yearly In-Service Training Exam (N=356). Residents were asked whether they routinely served as the operative surgeon on various cardiac operations and operative tasks. Results were stratified by post-graduate year (PGY), residency type, and primary career interest.

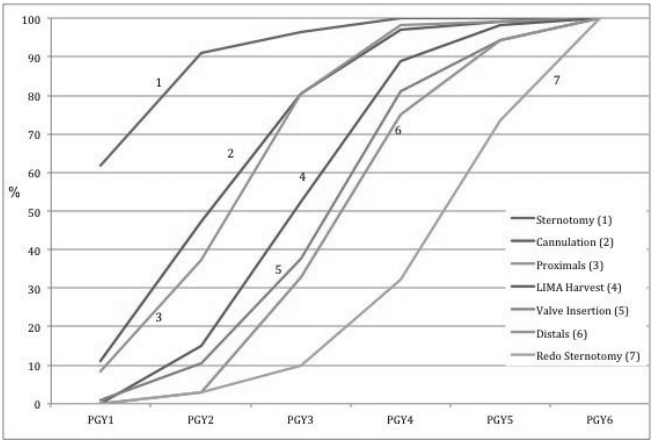
Results: The survey response rate was 100%. Integrated (I-6) residents did not routinely cannulate for cardiopulmonary bypass, perform proximal anastomoses, or harvest the mammary artery until PGY3 (Figure). The majority (>50%) of I-6 residents performed coronary artery bypass grafting (CABG) as the operative surgeon by PGY4. Considering all training pathways, the only cardiac operations routinely performed by graduating chief residents as the operative surgeon were CABG (93%) and aortic valve replacement (AVR, 89%). Off-pump CABG, minimally invasive valve surgery, and transcatheter aortic interventions were rarely performed by graduating residents as the operative surgeon (Table). These results were similar when residents with a career interest in general thoracic surgery were excluded from the analysis. 42% of all residents (64% I-6, 32% non-I-6) planned to pursue additional fellowship training after residency.

Conclusions: There is significant heterogeneity in the cardiac operative experience of cardiothoracic surgery residents in the United States, with only CABG and AVR routinely performed by graduating residents as the operative surgeon. This heterogeneity may contribute to the need for additional fellowship training after residency.

Percent of Graduating Residents Who Routinely Served as the Operative Surgeon for Select Cardiac Procedures

Program Type	I-6	4+3	2-Year	3-Year	All
CABG	100%	100%	94%	86%	93%
Off-pump CABG	55	20	26	29	30
Aortic Valve Replacement	100	100	89	83	89
Mitral Valve Replacement	73	100	60	45	60
Mitral valve repair	64	83	35	31	40
LVAD placement	80	83	46	55	55
Heart Transplant	50	67	40	59	48
Lung Transplant	50	60	46	73	56
Minimally-invasive Aortic Valve Surgery	70	83	26	25	34
Minimally-invasive Mitral Valve Surgery	44	50	6	11	14
TEVAR	70	0	25	32	31
TAVR	55	50	28	43	36
Proximal Aortic Reconstruction	91	83	72	62	72

LVAD-left ventricular assist device; TEVAR-thoracic endovascular aortic repair; TAVR-transcatheter aortic valve replacement



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7. Cardiac Transplantation for Adults With Congenital Heart Disease: An Analysis of the UNOS Registry

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Discussant: Ryan R. Davies, *A.I. duPont Hospital for Children, Wilmington, DE*

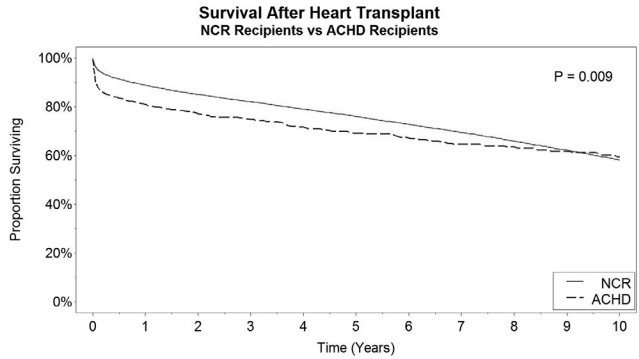
Objectives: Adults with congenital heart disease (ACHD) may present with end-stage heart failure necessitating orthotopic heart transplant (OHT). We sought to review the UNOS experience with this unique cohort with emphasis on surgical outcomes and survival.

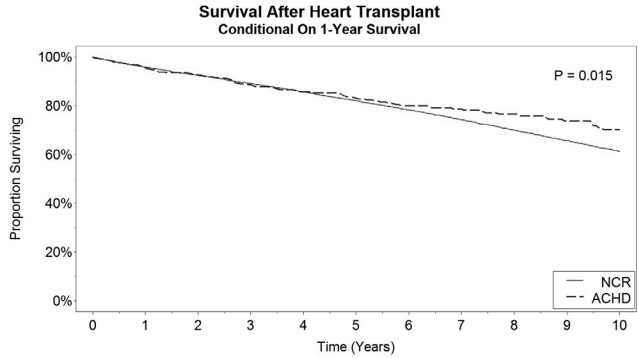
Methods: From the UNOS registry, 737 ACHD recipients out of 26993 OHT patients (2.7%) who underwent OHT were queried to analyze early and late outcomes and compare to non-congenital recipients (NCR) over a fifteen-year period (2000-2014).

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 (35 vs 53 years; p<0.01), less likely with LVAD support (4% vs 19%; p<0.01) and spent more time on wait-list (249 vs 181 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 (27 vs 20 days; p<0.01), higher operative mortality (11.5% vs 4.6%; p<0.001), and higher need for dialysis (20% vs 9%; p<0.01). Re-transplantation rate was 1.5% during the follow up period with overall estimated survival of 89%, 76% and 59% at 1, 5 and 10 years respectively. ACHD had improved survival in most recent era (p=0.085) with 1 year-conditional survival equivalent or better than NCR in long term. The need for post-operative dialysis (HR=3.18, 95% CI [2.35, 4.30], p<0.001), post-operative stroke (HR=2.54, 95% CI [1.33, 4.83], p=0.004), and longer ischemic time (HR=1.17 per additional hour, 95% CI [1.03, 1.32], p=0.013) were the strongest predictors of mortality.

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.

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





Overall survival and 1 year- conditional survival in NCR and ACHD

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8. Predictors of Major Morbidity or Mortality After Resection for Esophageal Cancer: A Society of Thoracic Surgeons General Thoracic Surgery Database Risk Adjustment Model

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Discussant: *Wayne L. Hofstetter, *University of Texas MD Anderson Cancer Center, Houston, TX*

COMMERCIAL RELATIONSHIPS: Andrew Chang: Travel support: Ethicon, Speaker Bureau/Honoraria

Objectives: To revise the model for perioperative risk for esophagectomy for cancer utilizing The Society of Thoracic Surgeons General Thoracic Surgery Database in order to provide enhanced risk stratification and quality improvement measures for contributing centers.

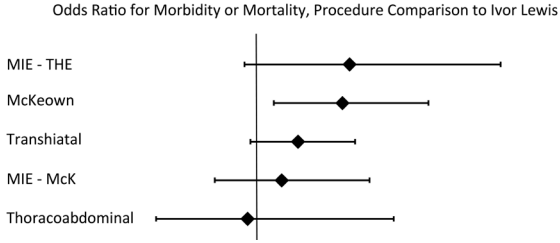
Methods: The Society of Thoracic Surgeons General Thoracic Surgery Database was queried for all patients treated for esophageal cancer with esophagectomy between July 1, 2011 and June 30, 2014. A multivariable risk model for major morbidity and mortality was created with the inclusion of surgical approach as a risk factor.

Results: 4208 esophagectomies were performed by166 participating centers. The most common procedures included: Ivor Lewis (34%), Transhiatal (23%), Minimally Invasive with thoracic anastomosis (20%) and McKeown (11%). Sixty-nine percent of patients received induction therapy. Perioperative mortality (inpatient and 30-day) was 144/4208 (3.4%). Major morbidity occurred in 1423 patients (33.8%). Major morbidities include: unexpected return to OR (16.3%), anastomotic leak (12.0%), reintubation (12.8%), initial ventilation beyond 48 hours (3.8%), pneumonia (12.8%), renal failure (2.8%), and recurrent laryngeal nerve paresis (2.1%). Predictors of major morbidity or mortality are listed in Table 1.

Conclusions: Thoracic surgeons participating in The Society of Thoracic Surgeons General Thoracic Surgery Database perform esophagectomy with low mortality. There is no difference in outcome based on open or minimally invasive approach. Revised predictors for perioperative outcome were identified to facilitate quality improvement processes and hospital comparisons.

Table 1. Independent Predictors of Major Morbidity or Mortality Following Esophagectomy for Esophageal Cancer

	Odd Ratio	95% CI	P
Congestive Heart Failure	2.05	1.34 - 3.13	<0.001
Zubrod Score 2-5 vs. 0	1.97	1.46 - 2.65	<0.001
Cigarette Smoker (Current vs. Never)	1.54	1.24 - 1.93	<0.001
ASA Class (IV or V vs. 0)	1.50	1.12 - 2.01	0.02
Peripheral Vascular Disease	1.47	1.10 - 1.97	0.01
McKeown vs. Ivor Lewis Approach	1.34	1.07 - 1.67	0.006
Age >65 (per ten year increase)	1.23	1.05 - 1.44	0.01
BMI (kg/m2; per 5 unit increase)	1.08	1.02 - 1.14	0.008
Chemotherapy or Radiation Preop	0.84	0.72 - 0.96	0.02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McKeown
Transhiatal
MIE - McK
Thoracoabdominal

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9. The Influence of Pulmonary Hypertension on Outcomes After Conventional and Transcatheter Aortic Valve Replacement in a Population Based Analysis

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COMMERCIAL RELATIONSHIPS: DISCUSSANT: Gorav Ailawadi: Consultant: Abbott, Edwards Lifesciences, St. Jude Medical, Inc.; Proctor: Atricure

Objectives: Pulmonary hypertension (PH) represents an important risk factor for adverse outcomes after AVR. We sought to evaluate its effects in a population based analysis of conventional (SAVR) and transcatheter AVR (TAVR).

Methods: Using a statewide quality collaborative database (2008-2014), 10547 patients (mean age 70.7 ± 12.0 yrs) underwent SAVR ± CABG (9565, 90.7%) or TAVR (982, 9.3%). PH was defined as mild [PA mean (PAm) 25-34 or PA systolic (PAs) 35-44 mmHg], moderate (PAm 35-44 or PAs 45-59 mmHg) or severe (PAm ≥ 45 or PAs ≥60 mmHg). Given baseline differences between groups (Table 1), a separate analysis of outcomes was conducted for each treatment group.

Results: In the SAVR group, degree of PH included none (63.6%), mild (21.0%), moderate (10.5%) or severe (4.9%). 30-day mortality progressively increased for each grade of PH (mild 3.5% OR 1.37, moderate 5.0% OR 2.02, and severe 5.8% OR 3.03, all p<0.05 vs. normal 2.8%). Rates of renal failure (moderate 6.1% OR 1.79, and severe 6.9% OR 2.11, all p<0.05 vs. normal 3.5%) and prolonged ventilation (moderate 19.1% OR 1.71, and severe 27.7% OR 2.77, all p<0.05 vs. normal 12.6%) were only affected by the presence of moderate or severe PH. In the TAVR group, degree of PH included none (53.5%), mild (14.8%), moderate (18.2%) or severe (13.5%). In contrast to the SAVR group, the presence of any degree of PH in TAVR patients did not independently influence rates of early mortality (p=0.69), renal failure (p=0.96) or prolonged ventilation (p=0.72).

Conclusions: Though SAVR can be safely performed in patients with pulmonary hypertension, progressive degrees of PH can adversely impact early outcomes. In contrast, PH does not appear to influence early TAVR outcomes suggesting that its presence is an important consideration in selecting the optimal approach for treating aortic valve disease.

Demographics and Comorbidities

PREOPERATIVE VARIABLE	SAVR	TAVR	p VALUE
Age (years)	69.6 ± 11.8	81.1 ± 9.4	< 0.001
Severe Aortic Stenosis	87.1% (8595/9864)	97.6% (931/954)	< 0.001
Severe Aortic Insufficiency	14.5% (1423/9565)	4.9% (47/982)	< 0.001
Mixed Aortic Stenosis and Insufficiency	5.3% (522/9565)	3.6% (34/982)	NS
Diabetes	34.4% (3393/9879)	40.7% (389/956)	< 0.001
Hypertension	83.3% (8231/9879)	90.8% (868/956)	< 0.001
Prior Cerebrovascular Accident	7.1% (704/9870)	12.7% (121/955)	< 0.001
Ejection Fraction (%)	55.7 ± 12.1	54.9 ± 13.4	NS
NYHA Class III or IV	6.8% (670/9879)	17.4% (171/982)	< 0.001
Left Main CAD	9.3% (863/9279)	8.2% (49/601)	NS
Prior CABG or Valve Procedure	13.0% (1280/9879)	46.0% (452/982)	< 0.001
Chronic Lung Disease	26.2% (2585/9879)	45.7% (449/982)	< 0.001
Mean Creatinine (mg/dL)	1.17 ± 0.96	1.35 ± 0.92	< 0.001
Peripheral Arterial Disease	13.2% (1305/9877)	29.3% (280/956)	< 0.001
Current Immunosuppression Therapy	4.2% (415/9879)	6.1% (58/956)	0.024

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10. A Decade of Transapical Aortic Valve Implantation: Lessons Learned and First Data on Valve Behavior Beyond Eight Years

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COMMERCIAL RELATIONSHIPS: Stephan Fichtlscherer: Consultant: Edwards, Consultant/Advisory Board; **DISCUSSANT: John V. Conte:** Research Grant (Corevalve Study): Medtronic, Inc.; Employment (Lotus Study): Boston Scientific; Surgical Advisory Board: Medtronic, Inc., Sorin

Objectives: Transcatheter-based aortic valve procedures have undergone tremendous evolution during the past decade and have led to great changes in the treatment of valvular heart disease. Being one of the three pioneering centers to start performing transapical transcatheter aortic valve implantation (TA-TAVI) back in 2005, we herein review our ten-year institutional experience with this approach.

Methods: From January 2005 through January 2015, 312 consecutive high-risk patients underwent TA-TAVI. Echocardiographic follow-up data at discharge, at 6 and 12 months, and yearly thereafter were 100% complete. Structural behavior of the balloon expandable valves in 11 patients with a mean follow-up time beyond 8 years has been additionally evaluated at latest follow-up using Computed Tomography measurements.

Results: Patient age was 79.8±5.8 years and the mean logistic EuroSCORE II and STS score were 23.9±17.2% and 9.8±8.6%, respectively. Perioperative and 30-day mortality were 1.3% and 8.2% with a decrease in 30-day mortality to 4.2% in 2014. The incidence of neurologic complications was 3.2%. Mean length of hospital stay was 8.7±4.3 days. Echocardiographic results demonstrated a significant and persistent increase of effective aortic valve orifice area (preoperative:0.69±0.1cm2 vs. late-follow-up:1.52±0.2cm2; p:0.04; Figure 1A) and decrease in mean transvalvular gradient (preoperative:49.5±8.2mmHg vs. late-follow-up:13.8±4.3mmHg; p:0.03; Figure 1B) after a mean follow-up time of 4.7±2.3 years. Overall survival was 73% and 56% at 3 and 5 years, respectively. Computed Tomography measurements revealed stable structural behavior of balloon expandable valves beyond 8 years (Figure 1C).

Conclusions: TA-TAVI provides a reliable and attractive alternative to the established gold standard of classic aortic valve replacement in high-risk patients with acceptable perioperative morbidity and mortality and stable hemodynamic and structural behavior up to 8 years.

Figure 1A:

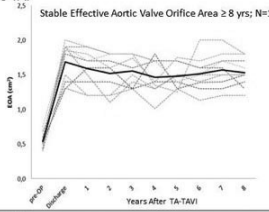


Figure 1B:

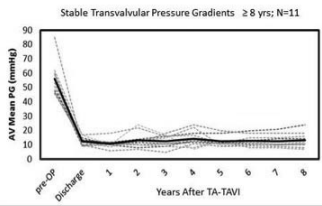
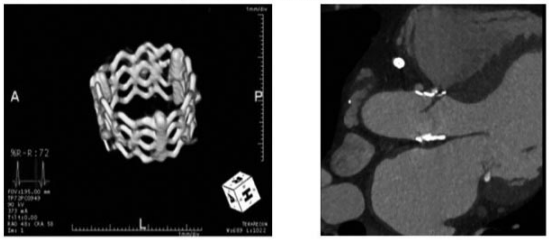


Figure 1C: First Generation Cribier Edwards Valve 9 yrs After TA-TAVI Without Structural Deterioration of the Stent or the Valve Leaflets



NOTES:

1B. Dendrimer Nanotherapy for Brain Injury in a Canine Model of Hypothermic Circulatory Arrest

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Authors: Joshua C. Grimm[1], Trent Magruder[1], Fan Zhang[1], Manoj Mishra[1], Mary E. Blue[2], Sujatha Kannan[1], Mary A. Wilson[2], Chris M. Sciortino[1], Michael V. Johnston[2], Rangaramanujam M. Kannan[1], *William A. Baumgartner[1]

Author Institution(s): [1]*Johns Hopkins University, Baltimore, MD;*[2]*Kennedy Krieger Institute, Baltimore, MD*

Discussant: Ali Dodge-Khatami, *University of Mississippi Medical Center, Jackson, MS*

Objectives: Neurocognitive dysfunction and injury remain problematic following cardiac procedures requiring hypothermic circulatory arrest (HCA). Due to poor blood-brain-barrier (BBB) penetrance and adverse effects of systemic drug therapies, clinical success has been elusive. Accordingly, we explored targeted, dendrimer-drug nanoparticle therapies in our well-established canine model of HCA, to characterize the biodistribution and cellular localization of these nanoparticles in areas of known neuronal apoptosis and necrosis, including the hippocampus, which is important in memory and cognition.

Methods: Class-A, 27-30 kg male hounds were placed on cardiopulmonary bypass via peripheral cannulation and underwent 90 minutes of HCA. A total dose of 200 mg Cy5-labeled dendrimer (D-Cy5) was given as a 10% bolus immediately before HCA, 70% infused over 6h after HCA, and 20% given 24h after HCA. The brain and solid organs were harvested 48 h later (72 h post-HCA) and analyzed for D-Cy5 biodistribution and quantitative uptake.

Results: The dorsal hippocampus demonstrated the highest uptake of D-Cy5, and the distribution of D-Cy5 closely corresponded to the distribution of apoptotic neurons in confocal imaging. Significant uptake was also evident in the cerebellum and cortex. D-Cy5 was largely cleared from off-target organs within 24-48 hours, through the urine. In injured brain regions, dendrimer traversed the BBB and localized within target cells (injured neurons and microglia).

Conclusions: This is the first known study to illustrate consistent neuronal/microglia uptake of a dendrimer-drug delivery system in a large animal model after systemic administration. These findings have exciting implications for future development of novel therapeutics to mitigate neurocognitive deficits in this demographic of patients.

NOTES:

2B. Adenosine A2B Receptor Antagonism Attenuates Lung Ischemia-reperfusion Injury

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Authors: Mary E. Huerter[1], Ashish Sharma[2], *Irving L. Kron[2], Victor E. Laubach[2]

Author Institution(s): [1]*University of Illinois, Chicago, IL;* [2]*University of Virginia, Charlottesville, VA*

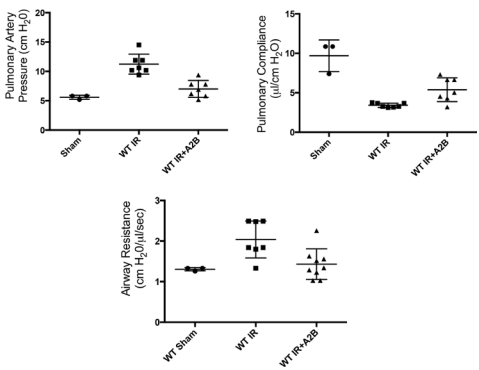
Discussant: *Chadrick E. Denlinger, *Medical University of South Carolina, Charleston, SC*

Objectives: Lung ischemia-reperfusion injury (IRI) is a major source of morbidity and mortality after lung transplantation. We have previously shown that adenosine A2B receptor (A2BR) knockout mice are protected from lung IRI. The present study tests the hypothesis that an A2BR antagonist will attenuate lung IRI and rehabilitate non-heart beating donor (NHBD) lungs.

Methods: Mice underwent sham or lung IR (1hr ischemia and 2hrs reperfusion) with or without administration of 1mg/kg A2BR antagonist (ATL-802). In a separate group, NHBD lungs underwent 15min warm ischemia, followed by 1hr cold preservation, and 1hr ex vivo lung perfusion (EVLP) with standard Krebs-Henseleit buffer (KH), Steen solution or Steen solution with 100 nM ATL-802. Human type II epithelial cells (A549 cell line) were exposed to 3hrs hypoxia (5% O2) followed by 1hr reoxygenation (21% O2) with or without ATL-802 treatment. IL-8 was measured by ELISA.

Results: Treated mice exhibited significant protection with reduced pulmonary artery pressure (5.73 ± 0.22 vs. 10.5 ± 0.57 cm H2O), airway resistance (1.20 ± 0.13 vs. 3.36 ± 0.94 cm H2O/μl/sec), and increased lung compliance (6.11 ± 0.41 vs. 3.56 ± 0.11 μl/cm H2O) compared to IR alone ($p < 0.05$, n=6-7/group). EVLP with ATL-802 demonstrated improvement of lung compliance (4.37 ± 0.06 vs. 1.90 ± 0.21 μl/cm H2O) and reduced pulmonary artery pressure (8.1 ± 0 vs. 14.0 ± 0.33 cm H2O) compared to KH or Steen alone ($p < 0.05$, n=6-7/ group). In vitro studies demonstrated attenuated IL-8 expression (47.6 ± 6.5 vs. 105.6 ± 6.14 pg/ml, respectively) ($p < 0.05$, n=8/group).

Conclusions: A2BR antagonism significantly inhibits lung IRI and enhances EVLP rehabilitation. ATL-802 may inhibit IRI by targeting A2BRs on alveolar epithelial cells to prevent IL-8 production. A2BR may be a novel therapeutic target for rehabilitating NHBD lungs and mitigating IRI to increase the success of lung transplantation.



Mice pre-treated with ATL-802 exhibited significant protection from IRI as evidenced by significantly reduced pulmonary artery pressure, airway resistance, and increased lung compliance compared to lungs subjected to IR alone ($p < 0.05$, n=6-7/group).

NOTES:

3B. Short-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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Authors: Charlie Evans[1], Tieluo Li[1], Xufeng Wei[1], Pablo Sanchez[1], Shuying Li[1], Zhongjun Wu[2], *Bartley P. Griffith[1]

Author Institution(s): [1]*University of Maryland School of Medicine, Baltimore, MD;* [2]*University of Louisville, Louisville, KY*

Discussant: *Shahab A. Akhter, *University of Wisconsin School of Medicine and Public Health, Madison, WI*

Objectives: In the present study, we tested the hypothesis that a catheter based left ventricular assist device (LVAD) can unload the left ventricle (LV) sufficiently for two weeks to limit remodeling, in part by reducing early myocardial stretch induced MMP-2 apoptotosis.

Methods: A 25% free wall mass myocardial infarction (MI) was created in 16 Dorsett hybrid sheep by coronary artery ligation. Eight were used as MI controls and eight were unloaded with a catheter based LVAD (50% base cardiac output targeted flow) during the first two weeks after MI and analyzed for 10 more weeks. Sonomicrometric, hemodynamic, and echocardiographic data were collected. After 12 weeks regional tissue was collected for MMP-2 apoptotic signals.

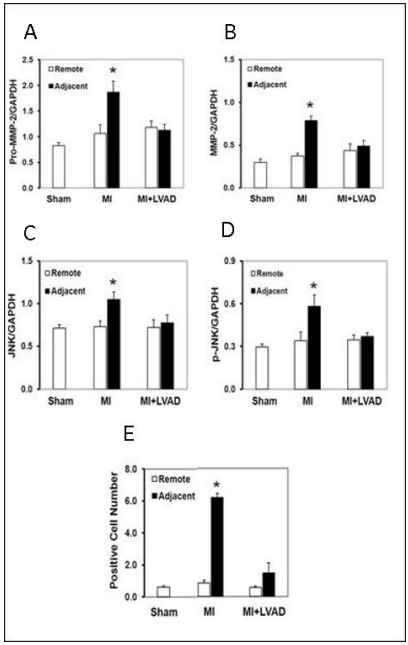
Results: The LVAD group showed smaller left ventricular end diastolic volumes (87.2±12.5 vs. 104.6±10.7 mL, $p<0.05$), left ventricular end systolic volumes (48.2±11.2 vs. 62.9±12.8 mL, $p<0.05$), and greater ejection fractions (45.7±3.7% vs. 38.1±4.3%, $p<0.05$) at 12 weeks. Adjacent zone (AZ) diastolic strain was reduced and systolic strain increased by LVAD unloading (Table 1). AZ TUNEL positive nuclei and activation of the MMP-2 apoptotic pathway could be observed in the MI group only (significant up-regulation of MMP-2, JNK, p-JNK, and 1D-Integrin) (Figure 1).

Conclusions: MMP-2/JNK apoptotic and Integrin/FAK survival pathways were concomitantly activated in the non-ischemic adjacent zone after MI in adult sheep. MMP-2 impairs integrin-mediated survival signals through inhibition of FAK activation, and activates the JNK dependent apoptotic pathway. Mechanical unloading by small catheter LVADs protects cardiac function, inhibits activity of MMP-2 and consequently attenuates the process of deleterious remodeling after MI.

Effect of LVAD 14-day Unloading on Regional Systolic and Diastolic Strain at 12 weeks

	MI Group (n=8)		MI+LVAD group (n=8)	
Zone	DS-12	SS-12	DS-12	SS-12
Remote (%)	18.0 +/- 2.5	-18.3 +/- 2.2	17.9 +/- 3.1	-22.0 +/- 2.5
Adjacent (%)	41.2 +/- 4.4	-10.2 +/- 1.5	27.5 +/- 5.6*	-16.3 +/- 1.9*
Infarct (%)	78.1 +/- 3.8	-4.8 +/- 2.3	58.2 +/- 8.8*	-10.3 +/- 1.8*

* $p<0.05$ compared to the MI group; MI=myocardial infarction; LVAD=left ventricular assist device; DS=diastolic strain; SS=systolic strain



The anti-apoptotic effect of LV unloading. (A) pro-MMP-2; (B) MMP-2; (C) JNK; (D) p-JNK; (E) Terminal deoxynucleotidyl transferase biotin-dUTP nick end labeline; GADPH=glyceraldehyde-3-phosphate dehydrogenase.

NOTES:

4B. Partial False Lumen Thrombosis Results in an Increase in False Lumen Blood Pressure in an Ex Vivo Porcine Model of Type B Aortic Dissection

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Authors: Apoorva Girish, Muralidhar Padala, Kanika Kalra, Ravi K. Veeraswamy, *Edward P. Chen, *Bradley Leshnower

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

Discussant: ***D****Eric S. Weiss, *Aurora Medical Group-St. Luke's Medical Center, Milwaukee, WI*

COMMERCIAL RELATIONSHIPS: DISCUSSANT: Eric S. Weiss: Consultant: Medtronic, Inc.

Objectives: Partial false lumen(FL) thrombosis has been identified as a risk factor for mortality in patients with Type B Aortic Dissection(TBAD). The proposed mechanism is that FL thrombus obstructs intimal tears and impedes blood flow out of the FL resulting in an increase in diastolic FL pressure. This study investigates this mechanism in an ex vivo porcine model of TBAD.

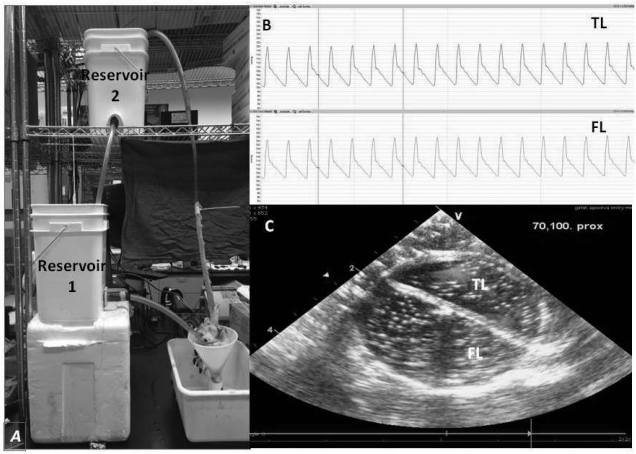
Methods: Twelve porcine aortas were harvested and preserved in 4°C saline. Three Models of TBAD were created: A)entry tear, no exit tear(n=5); B)entry tear and exit tear(n=4); C)entry tear and exit tear with FL obstruction of the entry tear (simulated partial FL thrombosis, n=3). These models were connected to a flow loop consisting of a porcine heart and a pulsatile pump. Catheters were inserted into the true(TL) and false lumens for pressure measurements. Ultrasonography was used to image the dissection flap and determine TL and FL areas. True(TLI) and false lumen(FLI) indices were calculated by dividing TL and FL areas by total aortic area.

Results: In Model A, systolic(FL 154±6 mm Hg vs TL 149±6 mm Hg, $p<0.05$) and diastolic(FL 128±7 mm Hg vs TL 123±8 mm Hg, $p<0.05$) pressures were significantly increased in the FL. There was no significant difference in the areas of the TL and FL in Model A(FLI 55% vs TLI 45%, $p>0.05$). In Model B, there was no difference in TL and FL pressures or areas(FLI 54% vs TLI 46%, $p>0.05$). In Model C, systolic(TL 147±17 mm Hg vs FL 114±21 mm Hg, $p<0.05$) and diastolic TL 125±15 mmHg vs FL 85± 7mm Hg, $p<0.05$) pressures were significantly increased in the TL. TL area was significantly greater than FL area in Model C(TLI 70% vs FLI 30%, $p<0.01$), (Table).

Conclusions: In this ex vivo model of TBAD, the FL pressure is decreased in the state of partial thrombosis. These data contradict the currently accepted mechanism of FL aneurysmal degeneration. Further studies will interrogate the importance of non-laminar retrograde flow.

	Model A Entry Tear, No Exit (n=5)	Model B Entry and Exit tear (n=4)	Model C Entry and Exit tear with Partial False Lumen thrombosis (n=3)
True Lumen			
Systolic	149±6	152±6	147±17
Diastolic	123±8	115±9	125±15
Mean	141±5	140±6	140±16
False Lumen			
Systolic	154±6	153±7	114±21
Diastolic	128±7	115±9	85±7
Mean	145±4	141±6	107±22
Δ SBP	4±1*	1±1	33±4*
Δ DBP	5±1*	0	40±8*
Δ MAP	4±1*	1±1	33±6*

All data are means +/- SD mm Hg. *$p<0.05$ difference between true and false lumen pressures within each model



A) Picture of Ex Vivo Porcine Model of TBAD flow loop. B) True (TL) and False (FL) lumen pressure wave forms. C)Ultrasound axial image of the aorta depicting the TL and FL separated by a dissection flap.

NOTES:

5B. Characterization of Indeterminate Pulmonary Nodules Using a Novel Algorithm Incorporating Clinical, Radiographic and Serum Biomarker Profiles

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Authors: David D. Shersher, ***D***Christopher W. Seder, Palmi Shah, Maria D. Martin, Ravi Pithadia, Sanjib Basu, Christina Fhied, Gary W. Chmielewski, William Warren, ***D***Michael J. Liptay, ***D***Jeffrey A. Borgia

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

Discussant: *Benjamin D. Kozower, *University of Virginia, Charlottesville, VA*

COMMERCIAL RELATIONSHIPS: Christopher W. Seder: Consultant/Advisory Board: Covidien, **Michael J. Liptay:** Consultant/Advisory Board: Covidien, **Jeffrey A. Borgia:** PI on patent application pertaining to panel utilized in this manuscript: Principle Investigator in patent, Research Grant

Objectives: Low-dose computed tomography (CT) lung cancer screening is known to have a high false-positive rate leading to potential overtreatment of indeterminate pulmonary nodules. We hypothesize that incorporation of clinical and radiographic features with our previously-validated serum biomarker panel will improve the ability to differentiate benign from malignant pulmonary nodules.

Methods: An institutional biorepository was used to identify 34 patients with Stage I (T1N0M0) non-small cell lung cancer (NSCLC) and 18 patients with benign solitary pulmonary nodules detected by CT imaging. All specimens were evaluated in a blinded manner for 55 biomarkers using multiplex immunoassays. Biomarker performance was calculated through the Mann-Whitney Rank Sum U test and a receiver operator characteristic analysis. Random forest trees were used to generate multivariate cross-validation prediction models.

Results: A total of 52 patients were included with a median nodule size of 4 mm for benign cases and 19 mm for NSCLC. Median smoking histories were 38 and 30 pack-years, and age was 59 and 68 years, respectively. An externally-reported model using age, smoking, history of extra-thoracic malignancy, nodule size, nodule spiculation, and upper lobe location, derived an accuracy of 92%, positive predictive value (PPV) of 97%, and negative predictive value (NPV) of 83% when cross-validated in our data set. Our 6-analyte serum biomarker panel of IL-6, IL-1RA, IL-10, TNF-β, IGFBP-5, IGFBP-4 demonstrated accuracy of 89%, PPV 94%, and NPV 78%. Combining the two models improved accuracy to 94%, PPV to 97%, and NPV to 89%.

Conclusions: A model combining a validated biomarker assay with clinical and radiographic features improves the ability to accurately identify malignant pulmonary nodules.

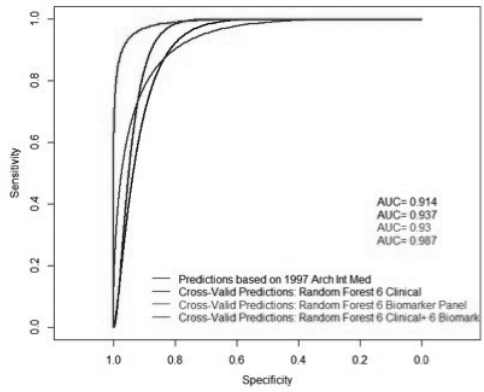
NOTES:

Demographics

		Benign Nodules (n=18)	Malignant Nodules (n=34)
Gender			
	Male	6	10
	Female	12	24
Age (a)			
	Median	59	68
	Range	27-70	48-88
Smoking History (b)			
	Median	38	30
	Range	10-110	0-100
	Non-smoker	0	9
Nodule Size (c)			
	Median	4	19
	Range	1-16	4-30
Histologic Diagnosis			
	Adenocarcinoma	-	24
	Squamous Cell	-	4
	Carcinoma/Neuroendocrine	-	6
	Indeterminate (d)	18	-
Mayo Prediction Model			
	Nodule Spiculation	1	24
	Upper Lobe Tumor Location	11	13
	Extrathoracic Malignancy (e)	4	11
Procedure Type			
	Wedge Resection	-	11
	Lobectomy	-	22
	Segmentectomy	-	-
	Pneumonectomy	-	1
	Transthoracic Biopsy	18	-

All data presented as n. (a) age in years; (b) smoking history in pack-years; (c) nodule size in millimeters (mm); (d) individuals with stable radiographic findings for a minimum of 2 years, but with no histological diagnosis performed; Blood serum collected; (e) extrathoracic malignancy within 5 years of biopsy and previous lung cancers excluded from study.

Figure 1: Receiver operator characteristics



$$(1)\ \text{Probability of Malignancy} = e^x/(1+e^x)$$

$$(2)\ x = -6.8272 + (0.0391 \times \text{Age}) + (0.7917 \times \text{Cigarettes}) + (1.3388 \times \text{Cancer}) + (0.1274 \times \text{Diameter}) + (1.0407 \times \text{Spiculation}) - (0.7838 \times \text{upper}),$$

Note: 1997 Arch Internal Medicine (Swensen *et al*) is herein referred to as the Mayo Model (see above). Mayo mathematic model used directly (black). Mayo model cross-validated using random forest analysis (blue). Biomarker panel using random forest analysis (green). Mayo criteria and biomarker panel combined random forest analysis (red).

6B. Understanding Pulmonary Valve Architecture and Variation: Implications for the Ross Procedure

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Authors: Hayden Joseph[1], Conner Ryan[1], William N. Fancher[3], Lauren C. Kane[1], Nitin A. Das[1], S. Adil Husain[1], ***D***William Northrup[2], *John H. Calhoon[1]

Author Institution(s): [1]*University of Texas Health Science Center San Antonio, San Antonio, TX;* [2]*Cryolife, Kennesaw, GA;* [3]*DeBusk College of Osteopathic Medicine, Cumberland Gap, TN*

Discussant: *Ross M. Ungerleider, *Wake Forest School of Medicine, Winston-Salem, NC*

COMMERCIAL RELATIONSHIPS: William Northrup: Provided the valve allografts: Cryolife, Other Research Support

Objectives: An understanding of variations in pulmonary valve architecture is limited. We sought to better define variations in pulmonary valve architecture and in turn identify the need for technical considerations when employing the pulmonary valve as an autograft in the aortic position.

Methods: Nineteen cadaveric pulmonary valve allografts were evaluated. Valvular anatomic components were defined (Figure 1). Commissural heights were measured on an inflatable dilator at a consistent pressure of 25-28cm of water and under standardized tension. Leaflet circumferential measurements were made on the dilator and flat surface. The posterior-facing left-right commissure (PFLR) to raphe distance was measured. ANOVA and T-tests were used to compare the means of the commissures and cusps.

Results: The PFLR height was greater at 18.3mm ± 1.7 (n=19) than the right-facing anterior commissure (RFA) at 17.1 mm ± 1.3 (mean ± sd), n=19, p=0.02. Significant variation between commissural heights was found when standardized tension was applied: the PFLR was larger at 21.4 mm ± 2.5, n=19 and the RFA was smaller at 18.9 mm ±1.5, n=19 than the average commissural height calculated from all 3 commissural measurements 19.9mm ±2.5, n=57, p=0.03 and p=0.04, respectively. When comparing average commissural heights under tension directly to one another, the PFLR height was larger at 21.4 mm ±2.5, n=19 than both the LFA (19.3mm, ±2.5) and the RFA (18.9, ±1.5), p=0.02 and p=0.001, respectively. The anterior sinus inter-commissural distance (AS) was found to be smaller 20.7mm, ± 3.0, than the right facing sinus inter-commissural distance (RFS) at 23.3mm ±3.7, n=19, p=0.02.

Conclusions: Anatomic variation of pulmonary valve leaflet and sinus architecture exists. The unequal distribution and height of the commissures should impact surgical techniques during pulmonary autograft implantation. Such careful technical considerations may improve long-term outcomes for the Ross Procedure.

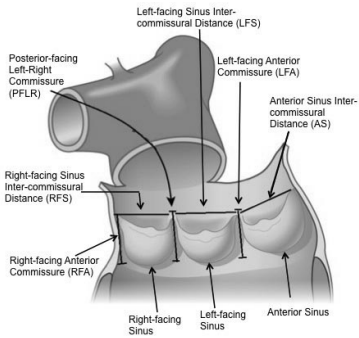

Figure 1: Pulmonary Valve Anatomic Components

NOTES:

11. Minimally Invasive Mitral Valve Surgery Has Superior Outcomes to Conventional Sternotomy Without Increased Costs

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Authors: Emily A. Downs[1], Lily Johnston[1], *Damien J. LaPar[1], *Ravi K. Ghanta[1], *Irving L. Kron[1], ***D***Alan M. Speir[2], Clifford E. Fonner[3], *John A. Kern[1], ***D***Gorav Ailawadi[1]

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

Discussant: *Vinay Badhwar, *University of Pittsburgh Medical Center, Pittsburgh, PA*

COMMERICAL RELATIONSHIPS: Alan M. Speir: Consultan/Advisory Board: Medtronic; **Gorav Ailawadi:** Consultant/Advisory Board: Mitralign, Abbott, Edwards, Consultant/Speaker Bureau/Honoraria: St. Jude

Objectives: Minimally invasive mitral valve surgery (mini-MVR) has grown in popularity. Although single centers have reported excellent outcomes, there is limited data on real world outcomes and costs of mini-MVR. Moreover, mini-MVR has been criticized as adding additional cost without clear benefit. We hypothesized that mini-MVR provides superior outcomes with incremental increased costs in a multi-institutional cohort.

Methods: Records for patients undergoing mitral valve surgery with or without tricuspid surgery or atrial ablation from 2011-2014 were extracted from a multi-institutional, regional Society of Thoracic Surgeons database and stratified according to right chest approach/ minimally invasive or conventional sternotomy. Patients undergoing CABG or other concomitant procedures were excluded. Patients were propensity matched based on factors including age, comorbidities, and surgeon; clinical outcomes and cost differences were assessed by approach.

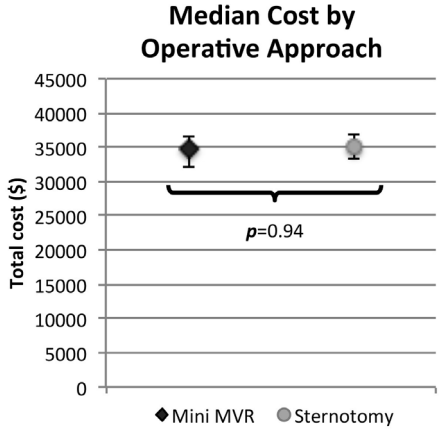
Results: A total of 1512 patients underwent mitral surgery, including 432 (28.6%) via minimally invasive approach. In the propensity-matched analysis (n=369 per group), mini-MVR patients had similar rates of mortality, stroke, atrial fibrillation, kidney injury and other morbidities. Meanwhile, mini-MVR patients experienced shorter ICU and hospital lengths of stay, as well as fewer transfusions (Table 1). Mini-MVR patients were also more likely to undergo valve repair. Importantly, total hospital costs were no different between the two matched groups. (Figure 1)

Conclusions: Compared to conventional sternotomy, mini-MVR demonstrated no differences in major morbidity, but was associated with shorter length of stay and fewer transfusions. Contrary to our hypothesis, mini-MVR can be performed with similar total hospital costs as conventional sternotomy. As such, minimally invasive mitral surgery in select patients provides superior outcomes without increased cost.

Outcomes by Operative Approach

Outcome	Mini-MVR n=369	Sternotomy n=369	P value
Mortality	1.1%	0.3%	0.373
Stroke	3.4%	2.6%	1.0
ICU length of stay (hours)	39.1	68.2	<0.001
Hospital length of stay (days)	4.98	7.17	<0.001
Any transfusion	11.1%	21.7%	<0.001

Values are presented as percentage, or median for continuous variables.



Data presented as median cost with 95% confidence interval

NOTES:

12. One Hundred Planned Robotic Segmentectomies: Early Results, Technical Details and Preferred Port Placement

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Authors: Caroline C. Watson, ***D****Robert J. Cerfolio, Sandra Calloway, *Douglas Minnich, *Benjamin Wei

Author Institution(s): *University of Alabama, Birmingham, AL*

Discussant: Kemp H. Kernstine, *University of Texas Southwestern Medical Center, Dallas, TX*

COMMERICAL RELATIONSHIPS: Robert J. Cerfolio: Speaker Bureau/Honoraria: Intuitive Surgical, Ethicon; Consultant/Advisory Board: Covidien, Community Health Systems

Objectives: Both robotic pulmonary surgery and anatomic segmentectomy are increasingly performed. The largest published series of anatomic robotic segmentectomy comprises only 35 patients and the specific details of port placement are poorly understood.

Methods: This is a review of a consecutive series of patients from a single surgeon's prospective database. All patients in the study were scheduled to undergo anatomic segmentectomy performed robotically.

Results: Between February 2010 and December 2014, 100 patients went to the operating room for a planned pulmonary segmentectomy. A robotic approach was chosen for all. Seven patients were converted to robotic lobectomy and the remaining 93 patients had an anatomic robotic segmentectomy. There were no conversions to thoracotomy. Indications for resection were lung cancer in 79, metastatic lesions in 10, fungal in 4, and other in 7. Median age was 69 years and 50 patients were men. Median blood loss was 20 cc (range, 10 - 120), median number of lymph nodes removed was 19, median operative time was 1.28 hours (88 minutes), median hospital stay was 2 days and major morbidity occurred in two patients(pneumonia in both). All had an R0 resection. There were no 30 or 90-day mortalities. Of the 79 patients with lung cancer the median follow-up was 30 months and three patients (3.4%) had recurrence in the operated lobe.

Conclusions: Completely portal robotic anatomic segmentectomy is safe, effective and offers outstanding intra-operative 30-day and 90-day results. Local recurrence rate is approximately 3.4% at 2.5 years. Our preferred port placement and other operative details are described in detail.

NOTES:

13. Anomalous Aortic Origin of the Coronary Arteries: The Impact of Major Associated Congenital Cardiac Lesions

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Authors: *James St. Louis

Author Institution(s): *Children's Mercy Hospital, Kansas City, MO*

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

Objectives: Anomalous Aortic Origin of the Coronary Arteries (AAOCA) is a relatively rare congenital cardiac lesion of which acceptable treatment strategies remain controversial. Less is understood of the impact other major associated congenital cardiac anomalies have on overall outcomes. We investigated the impact that these associated lesions have utilizing a large, multi-institutional congenital cardiac database.

Methods: A retrospective review of all patients submitted to the Pediatric Cardiac Care Consortium with one of four anatomic diagnosis codes for AAOCA was conducted. All submitted material, including data forms, operative notes, discharge summaries, and autopsy reports were reviewed for each patient. Mortality was defined as all deaths during the admission for the index diagnosis.

Results: The presentation and outcomes of patients with the diagnosis of AAOCA are reviewed in Table I. 190 patients were submitted to the PCCC (incidence: 0.14%) with a diagnosis of AAOCA. The median age at presentation was 11.3 years. For the entire cohort, 92 (48%) patients underwent surgical correction of AAOCA with a median age at operation of 13.7 years. There were 110 patients (58%) that presented without symptoms attributed to AAOCA, of which 33% underwent repair. Overall mortality was 2.6 % (5/190), with two of the deaths occurring at the time of AAOCA repair. Fifty three patients had an associated cardiac anomaly at initial presentation of which 44 (83 %) underwent surgical correction. Of the patients that underwent correction, 37 had isolate repair of the associated defect. Three deaths occurred at the time of isolated VSD closure.

Conclusions: Regardless of presentation or management strategy, mortality in patients with the diagnosis of AAOCA is low. Major associated cardiac lesions which exist at initial presentation should be considered as having an impact on overall management strategies.

Table #1

Patient Characteristics	Overall	Mortality(%)	AAOCA Surgery	Mortality(%)	No AAOCA Surgery	Mortality(%)
Overall	190	2.6	93	2.2	97	3.1
Coronary Anatomy						
Right/Left off Left-sinus	100	0	52	0	48	0
Right/Left off Right-sinus	66	6.1	37	5.4	29	6.9
Right/Left off Non-sinus	20	0	4	0	16	0
Other	4	25	0	0	4	25
Symptomatic	80	3.8	60	3.3	20	5.0
Asymptomatic	110	1.8	33	0	77	2.6
Associated Cardiac Anomaly (Surgery)	44	7	7	0	37	8
Ventricular Septal Defect	25	12	3	0	22	14
Coarctation of Aorta	8	0	1	0	7	0
Atrial Septal Defect	5	0	1	0	4	0
Other	6	0	1	0	5	0

NOTES:

14. Impact of Sublobar Resection on Pulmonary Function: Long-term Results From ACOSOG Z4032 (Alliance), A Randomized Phase III Trial

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Authors: Michael Kent[6], Hiran Fernando[1], Sumithra Mandrekar[8], *Rodney J. Landreneau[2], Francis Nichols[3], Thomas DiPetrillo[4], Bryan Meyers[5], Dwight Heron[7], David Jones[11], Angelina Tan[8], Sandra Starnes[9], Joe Putnam[10]

Author Institution(s): [1]*Boston University, Boston, MA;* [2]*Allegheny General Hospital, Pittsburgh, PA;* [3]*Mayo Clinic, Rochester, MN;* [4]*Rhode Island Hospital, Providence, RI;* [5]*Washington University, St. Louis, MO;* [6]*Beth Israel Deaconess Hospital, Boston, MA;* [7]*University of Pittsburgh, Pittsburgh, PA;* [8]*Alliance Statistics and Data Center, Mayo Clinic, Rochester, MN;* [9]*University of Cincinnati, Cincinnati, OH;* [10]*Vanderbilt University Medical Center, Nashville, TN;* [11]*Memorial Sloan Kettering Cancer Center, New York, NY*

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

COMMERICAL RELATIONSHIPS: Discussant: Daniel L. Miller: Advisory Board: Ethicon, Inc.; Speakers Bureau: Bard Davol, Inc., Medtronic/Covidien, Inc.

Objectives: Sublobar resection (SR) in high-risk patients may result in long-term decrease in pulmonary function (PFT). We previously reported 3-month PFT outcomes in the randomized phase III study (Z4032) that compared SR alone to SR with brachytherapy (SRB). Lower lobe SR was the only factor associated with a decline in FEV1%. We now report on long-term PFT after SR.

Methods: PFT was measured at baseline, and months (M) 3, 12 and 24. A ≥10% decline from baseline in FEV% or DLCO% was deemed clinically meaningful. The impact of study arm, tumor location, size, approach (VATS/thoracotomy), and SR type on PFT at 3, 12 and 24 M were assessed using a Wilcoxon rank sum test. A generalized estimating equation (GEE) model was used to assess impact of each factor on longitudinal PFT data from all 4 time-points.

Results: A total of 212 patients were available for per-protocol analysis. Complete PFT data at all time-points was available in 69 patients. There were no differences in baseline characteristics between patients with complete/incomplete PFT data. No significant differences were observed in PFT between SR and SRB, thus the study arms were combined for further analyses. A ≥10% decline (p=0.016) in FEV1% was demonstrated for lower lobe (7/25; 28%) versus other lobe (3/44; 6.8%) resections at M3, but was not seen at M12 or M24. A ≥10% decline (p=0.047) in DLCO% was seen for thoracotomy at M3 (10/25; 40%) versus VATS (8/44; 18.2%), but was not seen at M12 or M24. Patients with tumor size >2 cm had uniformly lower DLCO% at all-time points compared to patients with tumor size ≤2 cm (GEE model p=0.09) (see figure 1), but otherwise none of the factors, including brachytherapy, impacted outcomes.

Conclusions: Clinically meaningful declines in PFT occurred after lower lobe resection and after thoracotomy at 3 months, but subsequently recovered. Our study demonstrates that SR does not result in sustained decreased pulmonary finction in high-risk operable patients.

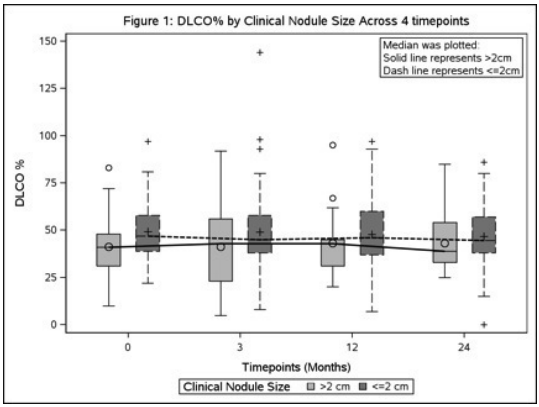

Figure 1; DLCO% by Clinical Nodule Size Over All 4 Timepoints

NOTES:

15. Outcomes of Re-intervention on the Left Ventricular Outflow Tract Following Ross Procedure

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Authors: Neeraj Bansal, S. Ram Kumar, Winfield J. Wells, Vaughn A. Starnes

Author Institution(s): *University of Southern California Children's Hospital, Los Angeles, CA*

Discussant: David A. Fullerton, *University of Colorado Denver School of Medicine, Aurora, CO*

Objectives: Following Ross procedure, a small subset of patients requires re-intervention on the left ventricular outflow tract (LVOT). We sought to determine the indications, nature and outcomes of these re-interventions.

Methods: We retrospectively reviewed the charts of 305 consecutive patients who underwent a Ross procedure at our institution. Of these, 47 patients (15%) have required LVOT re-intervention during a median follow-up of 8.2 years (0.2-19.2).

Results: 47 patients, mean age of 29±3 years, 30 (67%) men, required LVOT re-intervention for autograft dilation and/or valve regurgitation 5.5 (1.8-9.4) years after Ross. In 47% (22/47 patients), the autograft valve could be salvaged (12 valve-sparing root replacements, 7 valve repairs and 3 ascending aortic replacments). The remaining 53% underwent replacement of the root (10 mechanical, 5 homograft) or valve alone (7 mechanical, 3 bioprosthetic). Twenty patients presented without autograft root dilation 1.3 (0.5-2.9) years after Ross. 15 of these (75%) required valve and/or root replacement. The 27 patients who demonstrated root dilation, presented 5.9 (4.5-9.7, $p<0.01$) years after Ross and 17 (63%) of these valves could be spared ($p<0.01$). There was no surgical mortality. Patients were followed for 4.9 (2.1-7) years following LVOT re-intervention. For patients whose autograft valve could be spared, 3, 5 and 8-year freedom from re-intervention was 92%, 86% and 86%, respectively. At last follow-up, only one patient had greater than mild aortic insufficiency, and all but one had normal ejection fraction.

Conclusions: Need for LVOT re-intervention after Ross appears to follow a bimodal distribution. Patients with primarily autograft leaflet problems present early without root dilation and frequently require valve replacement. The autograft valve can be salvaged in the majority of patients who present later with root dilation. Valve-sparing procedures are durable and can be accomplished with low mortality.

NOTES:

16. The Future of the Academic Cardiothoracic Surgeon: Results of the TSRA/TSDA In-training Exam Survey

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Authors: Elizabeth H. Stephens[1], Asad A. Shah[2], Michael P. Robich[3], Dustin Walters[4], Walter DeNino[5], Muhammad Aftab[3], Vakhtang Tchantchaleishvili[6], Amanda Eilers[7], Robert Rice[8], Andrew Goldstone[9], Ryan Shelstead[10], Tarek Malas[11], Marisa Cevasco[12], Erin Gillaspie[13], David Odell[15], Damien J. LaPar[14]

Author Institution(s): [1]*Columbia University Medical Center, New York, NY;* [2]*Duke University, Durham, NC;* [3]*Cleveland Clinic, Cleveland, OH;* [4]*University of Washington, Seattle, WA;* [5]*Medical University of South Carolina, Charleston, SC;* [6]*University of Rochester, Rochester, NY;* [7]*University of San Antonio, San Antonio, TX;* [8]*University of Texas MD Anderson Cancer Center, Houston, TX;* [9]*University of Pennsylvania, Philadelphia, PA;* [10]*Oregon Health and Sciences University, Portland, OR;* [11]*Ottawa Heart Institute, Ottawa, ON, Canada;* [12]*Brigham and Women's, Boston, MA;* [13]*Mayo Clinic, Rochester, MN;* [14]*University of Virginia, Charlottesville, VA;* [15]*University of Pittsburgh, Pittsburgh, PA*

Discussant: *Tom C. Nguyen, *University of Texas Houston Medical School, Houston, TX*

Objectives: Traditionally cardiothoracic residents spent dedicated research time during general surgery equipping them for a potential academic career. Recent changes in training paradigms, including integrated programs that may not include research time, could affect the development of future academic cardiothoracic surgeons.

Methods: Responses to the 2015 TSDA/TSRA survey accompanying the in-training exam (ITE) taken by current cardiothoracic surgery residents were analyzed. 354 residents were surveyed with a response rate of 100%. Statistical analysis included Chi-squared and Fisher's exact testing with significance set at $p=0.05$.

Results: 266/354 residents (75%) intended on performing research as part of their careers. Integrated residents as opposed to traditional residents (84% vs. 69%, $p=0.005$), males (78% vs. 65%, $p=0.043$), those pursuing additional training (84% vs. 69%, $p<0.001$), and those interested in academic careers (92% vs. 33%, $p<0.001$) were more likely to plan on pursuing research. Those specializing in congenital surgery (90% vs. 10%) and heart failure (100% vs. 0%) were also more likely to pursue research careers ($p<0.001$). Those intending on research careers were more likely to have had previous research experience and the most common type of intended research being clinical outcomes (80%, Table). 61% of residents intended on securing their own funding. Among integrated residents, required research did not increase research careers (71% vs. 85% with no research time, $p=NS$); in fact, those with optional research time were more likely to pursue research careers than those with required research (90% vs. 71%, $p<0.001$).

Conclusions: The majority of residents plan on pursuing research during their careers. Previous research experience appears to be a key determinant as well as specialty interest. Integrated programs that did not include research did not deter residents from a research career.

	No Research Career (n=88)	Research Career (n=266)	p-value
Previous Translational Research	3 (3%)	69 (26%)	<0.001
Previous Basic Science Research	2 (2%)	62 (23%)	<0.001
Previous Health Policy Research	3 (3%)	14 (5%)	0.03
Previous Device Design Research	0 (0%)	36 (14%)	<0.001
Previous Clinical Outcomes Research	31 (35%)	200 (75%)	<0.001

Intended Research Areas	
Translational Research	79 (30%)
Device Design	78 (29%)
Clinical Trials	133 (50%)
Clinical Outcomes	213 (80%)
Clinical Device Trials	95 (36%)

*multiple selections allowed

NOTES:

17. Cerebral Oximetry in Cardiac Surgery: Can We Trust It?

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Authors: Daniel C. Lee[1], Douglas S. Pfeil[2], Harry L. Graber[2], Daqing Piao[3], Lei Ding[4], Han Yuan[1], Donald E. Stowell[1], *Marvin Peyton[1], Harold Burkhart[1], Randall L. Barbour[2]

Author Institution(s): [1]*University of Oklahoma College of Medicine, Oklahoma City, OK;* [2]*State University of New York Downstate Medical Center, Brooklyn, NY;* [3]*Oklahoma State University, Stillwater, OK;* [4]*University of Oklahoma College of Engineering, Norman, OK*

Discussant: Glenn J.R. Whitman, *Johns Hopkins Hospital, Baltimore, MD*

Objectives: Near-infrared spectroscopic (NIRS) cerebral oximetry utilizing a low-density sensor array (typically 4 source-detector pairs [channels]) is often used to estimate cerebral regional oxygen saturation (rSO2) during cardiac surgery. However, the reliability of these devices in reporting clinically significant events remains unclear. The objective of this study is to examine whether sampling a limited area over the frontal cortex adequately characterizes global cerebral oxygenation in patients undergoing cardiac surgery.

Methods: A high-density NIRS array (211 channels) was used to simulate 20 oximetry devices applied simultaneously. Continuous measurement of rSO2 was obtained from each channel. Data were collected from 4 distinct sites in the frontal region from six patients (total 1266 channels) during cardiac surgery. Control time periods of hemodynamic stability and acute hypotensive intervals (events), where mean arterial pressure (MAP) dropped by at least 25mmHg, were analyzed.

Results: Using a Linear Mixed Effects Model, correlations between rSO2 from all 1266 channels and MAP were significantly different ($p<0.001$) between control ($n=24$) and event ($n=13$) periods. However, the average correlation value was different between each of the 4 sites over the frontal region for control and event periods ($p<0.04$). Analysis based on the individual rSO2 magnitude from 120 simulated oximeters (20 per patient) showed that at a false positive threshold of 10%, only 30% of simulated oximeters reported the event, i.e. a false negative rate of 70%.

Conclusions: While most of the simulated oximeters registered a decrease in rSO2 during hypotensive events, the magnitude of desaturation was spatially heterogeneous. The spatial variance in rSO2 during cardiac surgery is not detected by low density oximetry devices. These devices are unlikely to provide reliable representation of global cerebral perfusion

NOTES:

18. Isolated Tricuspid Valve Surgery: Outcomes, Trends and Identification of Low-risk Clinical Criteria in the Contemporary Surgical Era

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Authors: *Damien J. LaPar[1,2], *John A. Kern[1,2], *Ravi K. Ghanta[1,2], Leora T. Yarboro[1,2], *Mohammed Quader[4,2], *Jeffrey B. Rich[2], *Irving L. Kron[1,2], *Alan M. Speir[3,2], *Gorav Ailawadi[1,2]

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

Discussant: *Harold G. Roberts, Jr., *Florida Heart and Vascular Care, Aventura, FL*

Objectives: Tricuspid valve (TV) operations are associated with high mortality typically due to complications from right heart failure. Nevertheless, surgeons are often faced with treating this challenging group of patients with limited data. The purpose of this study was to identify patients with favorable outcomes and develop low-risk criteria for isolated TV repair and/or replacement.

Methods: Multi-institution STS database records were evaluated for isolated TV operations performed at 18 hospitals (2002-2014). The relative contribution of clinical factors to the likelihood of mortality and major morbidity was assessed by univariate and multivariate analyses.

Results: A total of 450 isolated TV operations were evaluated (repair=68% and replacement=32%). Surgical TV volume consistently increased over the time (Figure). Operative mortality (10.7%) and major morbidity (42%) did not change over time. Multivariable predictors of mortality and morbidity (Table) included: patient age, heart failure, hemodialysis, ejection fraction, and urgent or emergent operative status (all P<0.01). Importantly, endocarditis was not associated with adjusted outcomes. Composite low-risk criteria were established, which included no left-sided heart failure or hemodialysis, EF>55%, and primary/elective status. Patients meeting these criteria demonstrated reduced mortality (4 v 12%, P=0.03), major morbidity (24 v 46%, P<0.001), mechanical ventilation time (3 v 34h, P=0.01), as well as ICU (27 v 168h, P=0.002) and postoperative (4 v 15d, P<0.001) lengths of stay compared to other TV patients.

Conclusions: Although isolated tricuspid valve operations continue to confer increased operative risk, there appears to be a subgroup of patients with reduced likelihood for mortality and morbidity. Presence of low-risk criteria for isolated tricuspid operations has the potential to result in a 50-60% improvement in overall outcomes.

Multivariable risk factors associated with postoperative mortality and/or major morbidity following performance of isolated tricuspid valve operations.

Factor	Mortality	Major Morbidity
Patient Age (years)	1.05 [1.01,1.09]*	1.02 [0.99,1.04]
Hemodialysis	2.74 [1.30,5.76]*	5.14 [1.41,18.79]*
Heart Failure	23.9 [1.8,304.9]*	3.10 [1.34,7.13]*
Ejection Fraction	1.03 [0.99,1.06]	0.97 [0.95,0.99]*
Urgent Operation	7.02 [1.89,26.04]*	2.26 [1.13, 4.53]*
Emergent Operation	18.59 [1.99,174.09]*	22.52 [1.87,271.88]*

* Denotes P<0.01. Model performance: AUC= 0.92 and 0.88; Hosmer-Lemeshow P>0.05, Nagelkerke PseudoR2 0.52 and 0.54 with a total of 103 degrees of freedom. Predictor variables: Patient age, gender, hospital, surgeon, operative year, cerebrovascular disease, chronic lung disease, diabetes, hypertension, dyslipidemia, immunosuppression, endocarditis, peripheral arterial disease, stroke, renal failure (hemodialysis), heart failure, prior myocardial infarction, reoperation status, elective vs. urgent or emergent status, tricuspid valve procedure type.

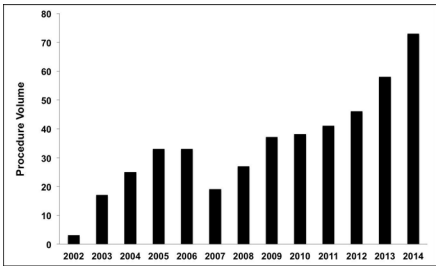

Figure: Trend in increasing annual tricuspid valve procedure volume.

NOTES:

19. Equivalent Operative Risk with Improved Mid-term Survival in the David V Valve Sparing Root Replacement Compared with Mechanical Valve Conduits for Aortic Root Aneurysms

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Authors: Jiro Esaki[1], *Bradley Leshnower[2], Jose Binongo[2], Yi Lasajanak[2], *Michael Halkos[2], *Robert Guyton[2], *Edward P. Chen[2]

Author Institution(s): [1]*Otsu Red Cross Hospital, Otsu, Japan;* [2]*Emory University, Atlanta, GA*

Discussant: *Tirone E. David, *Toronto General Hospital, Toronto, ON, Canada*

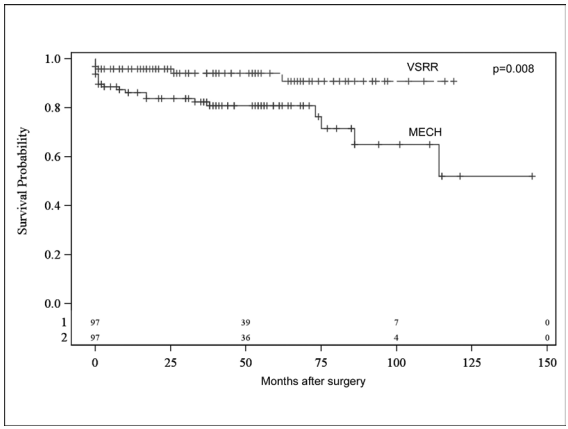
Objectives: Valve sparing root replacement (VSRR) is an attractive therapy for aortic root aneurysms; however, few reports comparing VSRR with conventional root replacement using a mechanical valve (MECH) are available. The study evaluates and compares outcomes of patients undergoing VSRR and MECH.

Methods: A retrospective review from 2002-2015 at a U.S. academic center identified 406 patients who underwent a VSRR (262 pts) or MECH (144 pts). Propensity scoring was performed for each patient using 21 preoperative and intraoperative characteristics and resulted in 97 matched pairs.

Results: Mean age of the overall series was 45.8 yrs. The incidence of Marfan syndrome (VSRR 13.4%, MECH 13.4%; p=1.00), Type A acute aortic dissection (VSRR 19.6%, MECH 21.6%; p=0.72), reoperations (VSRR 35.1%, MECH 27.8%; p=0.28), and arch replacement (VSRR 46.4%, MECH 48.5%; p=0.77) were similar. Cross clamp times (VSRR 180.9±49.8 min, MECH 191.2±49.7 min; p=0.15) and EF (VSRR 52.6±12.9, MECH 53.7±10.4%; p=0.52) were similar. Operative mortality was 3.1% in VSRR and 8.2% in MECH (p=0.14). There were no significant differences in renal failure (VSRR 3.1%, MECH 4.1%; p=0.70) or stroke (VSRR 2.1%, MECH 3.1%; p=0.65) between groups. VSRR patients had less prolonged ventilation (VSRR 13.4%, MECH 29.9%; p=0.01). ICU stay (VSRR 51±46 hrs, MECH 96±123 hrs; p=0.001) and overall hospital LOS (VSRR 6.6±4.8 days, MECH 9.7±8.6 days; p=0.004) were shorter in VSRR patients. VSSR appeared to have a protective effect in midterm (HR=0.29, 95% CI 0.18-0.72, p=0.008) with 5-year survival being longer in VSSR at 94% (95% CI 89%-99%) compared with MECH at 81% (95% CI 73%-90%).

Conclusions: In comparison to MECH, VSRR results in similar operative mortality and morbidity, but with shorter overall ICU as well as hospital stays, and better mid-term survival. In appropriately selected patients, VSRR provides an attractive and potentially superior alternative to MECH.

	VSRR (n=97)	MECH (n=97)	OR (95% CI)	p-value
Reoperation for bleeding	5 (5.2%)	8 (8.2%)	0.61 (0.19, 1.92)	0.39
Prolonged ventilation (>24h)	13 (13.4%)	29 (29.9%)	0.36 (0.18, 0.75)	0.01
ICU stay (hour)	51±46	96±123	0.67 (0.53, 0.86)	0.001
LOS (day)	6.6±4.8	9.7±8.6	0.80 (0.69, 0.93)	0.004
IABP	2 (2.1%)	11 (11.3%)	0.17 (0.04, 0.76)	0.02
New dialysis required	3 (3.1%)	4 (4.1%)	0.74 (0.16, 3.41)	0.70
Transient neurological dysfunction	1 (1.0%)	2 (2.1%)	0.50 (0.04, 5.55)	0.57
Stroke	2 (2.1%)	3 (3.1%)	0.66 (0.11, 4.04)	0.65
Pacemaker implantation	1 (1.0%)	2 (2.1%)	0.50 (0.04, 5.55)	0.57
Operative mortality	3 (3.1%)	8 (8.2%)	0.36 (0.09, 1.38)	0.14


VSRR
p=0.008
MECH
Survival Probability
1.0
0.8
0.6
0.4
0.2
0.0
1 97 39 7 0
2 97 36 4 0
0 25 50 75 100 125 150
Months after surgery

NOTES:

20. Long-term Results Following Pericardial Patch Augmentation for Incompetent Bicuspid Aortic Valves: A Single Center Experience

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Authors: Marlene Thudt, Nestoras Papadopoulos, Andreas Zierer, Anton Moritz

Author Institution(s): *University Hospital Frankfurt Main, Germany, Frankfurt am Main, Germany*

Discussant: ***D****James S. Tweddell, *Cincinnati Children's Hospital Medical Center, Cincinnati, OH*

COMMERCIAL RELATIONSHIPS: DISCUSSANT: James S. Tweddell: Scientific Advisory Committee: CorMatrix

Objectives: The bicuspid aortic valve is the most common congenital cardiac defect and represents the second most common cause of aortic valve regurgitation. The aim of the current study is to evaluate the long-term results following repair of incompetent bicuspid aortic valves using the pericardial patch augmentation technique.

Methods: This study involved 101 patients (mean age, 43±15 years) who underwent aortic valve repair using pericardial patch augmentation technique, from 2002 to 2014 in our department. The principle of operative technique was the compensation of aortic root asymmetry by deliberate overcorrection that significantly increases coaptation surface and restore the naturally belly shape of the leaflet for optimal stress distribution. In 49 patients an isolated aortic valve repair was performed. Preoperative echocardiography identified aortic dilatation in 52 cases. Of them 26 patients underwent additionaly reduction aortoplasty, 20 a David procedure and the remaining 6 patients supracoronary replacement of the ascending aorta.

The evaluation of long-term results was carried out by echocardiography. The mean follow-up-time was 4.8±4.5 years and 100% complete.

Results: There was no perioperative or early mortality. The survival at 5 and 8 years was 96% and 95.1% respectively. Freedom of reoperation at 5 and 8 years was 95.1% and 94.1% respectively. At the latest echocardiographic follow-up 94% of the patients had none to trivial aortic valve regurgitation. Mean aortic gradients were 12.7 ±10mmHg and mean height of coaptation surface was 14.5 ±2.3mm. During follow-up time two patients developed an endocarditis and three further patients had minor neurologic events.

Conclusions: In summary, current data reveal an excellent long-term outcome regarding late mortality, major neurological events and freedom of reoperation. The pericardial patch augmentation technique provides a reliable long-term competence of reconstructed bicuspid aortic valves.

NOTES:

21. Learning Alternative Access Approaches for TAVR: Implications for New TAVR Centers

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Authors: Matthew C. Henn, Thomas Percival, ***D***Alan Zajarias, Spencer J. Melby, ***D***Brian R. Lindman, Nishath Quader, *Ralph J. Damiano, *Marc R. Moon, ***D***John M. Lasala, Ravinder Rao, Jennifer Bell, Marci S. Damiano, *Hersh S. Maniar

Author Institution(s): *Washington University School of Medicine, Barnes-Jewish Hospital, St. Louis, MO*

Discussant: ***D***Eric L. Sarin, *Emory University School of Medicine, Atlanta, GA*

COMMERICAL RELATIONSHIPS: Alan Zajarias: Consultant/Advisory Board: Edwards Lifesciences; **Brian R. Lindman:** Consultant/Advisory Board: Roche, Research Grant: Roche; **John M. Lasala:** Consultant/Advisory Board: St Jude Medical, Direct Flow, Boston Scientific; **DISCUSSANT: Eric L. Sarin:** Speakers Bureau/Honoraria: Abbott Vascular

Objectives: Alternative access procedures for transcatheter aortic valve replacement (TAVR) are typically reserved for patients without adequate femoral access. Smaller TAVR delivery systems have increased the number of patients eligible for transfemoral (TF) procedures while decreasing the need for transaortic (TAo) or transapical (TA) access. Newer TAVR centers now have less exposure to these alternative access techniques, making it harder to achieve proficiency with these procedures. The purpose of this study was to evaluate the learning curve for TAVR approaches and compare perioperative outcomes.

Methods: From January 2008 to December 2014, 400 patients underwent TAVR [TF (n=179), TA (n=120), and TAo (n=101)]. Learning curves for all 3 approaches were constructed using metrics of contrast utilization, procedural and fluoroscopy times. Technical proficiency was defined as when the slope of a learning curve became <0.1. Outcomes were compared before and after proficiency was achieved.

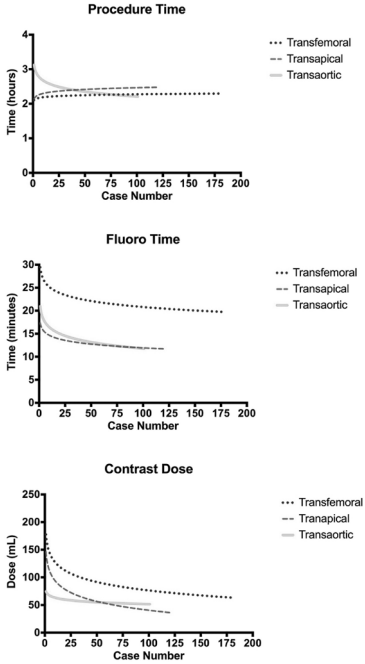
Results: Depending on the metric, learning curves for all three routes differed slightly but all demonstrated proficiency by the fiftieth case. For the TAo group, procedural times decreased (2.5±0.6 vs 2.2±0.6 hours, p=0.06) while improvements in contrast use were most notable for TA (69±40 vs 50±23, p=0.002). For both TA and TAo, less transfusions were required after proficiency was reached (62% vs 34%, p=0.003 and 42% vs 14%, p=0.002, respectively). No differences in 30-day mortality were seen before or after proficiency was reached for any approach.

Conclusions: The learning curves for TA and TAo are distinct but technical proficiency is reached within 50 cases for both approaches. These data suggest, however, that for a for new TAVR centers, with initially limited TAVR volumes, the heart team's learning curve may extend upwards of several months. Achieving technical proficiency, importantly, had no effect on 30-day mortality for any access approach.

Table - Perioperative Data

Variable	*TA early (n=50)*	*TA late (n=70)*	*TAo early (n=50)*	*TAo late (n=51)*
Intraoperative Data				
Procedure time (hours)	***2.4 ± 0.9***	***2.3 ± 0.8***	***2.5 ± 0.6***	***2.2 ± 0.6***
Fluoroscopy time (minutes)	***14 ± 6***	***12 ± 9***	***14 ± 6***	***13 ± 7***
Contrast dose (mL)	***69 ± 40***	***50 ± 23 †***	***59 ± 27***	***54 ± 25***
Packed red blood cell transfusion	***31 (62%)***	***24(34%) †***	***21 (42%)***	***7 (14%) ‡***
Postoperative Data				
Extubated in operating room	***38 (76%)***	***57 (81%)***	***44 (88%)***	***49 (96%)***
Prolonged ventilation (>24 hours)	***7 (14%)***	***3 (4%)***	***1 (2%)***	***1 (2%)***
Length of stay (days)	***8.2 ± 6.2***	***6.8 ± 3.6***	***7.8 ± 8.3***	***8.4 ± 5.0***
Cerebrovascular accidents	***1 (2%)***	***1 (1%)***	***1 (2%)***	***1 (2%)***
Operative mortality	***4 (8%)***	***7 (10%)***	***1 (2%)***	***3 (6%)***

Data presented as mean ± standard deviation or number (%); TA is transapical, TAo is transaortic; † is p<0.05 when compared to TA early group, ‡ is p<0.05 when compared to TAo early group.


Procedure Time
Time (hours)
Case Number
Transfemoral
Transapical
Transaortic
Fluoro Time
Time (minutes)
Case Number
Transfemoral
Transapical
Transaortic
Contrast Dose
Dose (mL)
Case Number
Transfemoral
Tranapical
Transaortic

NOTES:

22. Valve Selection in End Stage Renal Disease: Should it Always Be Biological?

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Authors: *Matthew Williams, Joseph E. Bavaria, Michael Acker, Nimesh D. Desai, Prashanth Vallabhajosyula, Walter C. Hargrove, Pavan Atluri, Wilson Y. Szeto

Author Institution(s): *University of Pennsylvania, Philadelphia, PA*

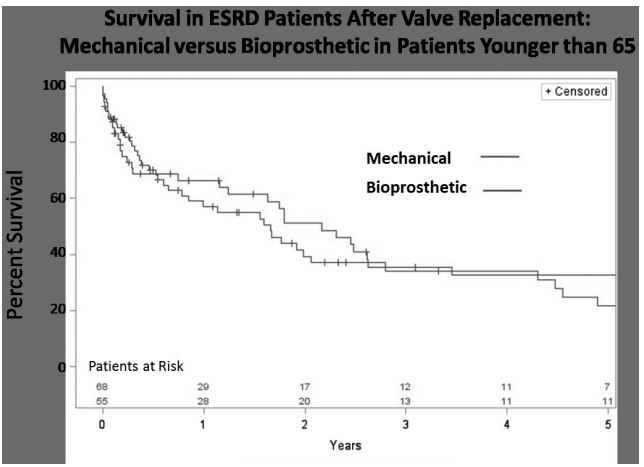
Discussant: *Faisal G. Bakaeen, *Texas Heart Institute/Baylor College of Medicine, Houston, TX*

Objectives: When valve replacement is required in patients with end-stage renal disease (ESRD), it is not clear if mechanical or bioprosthetic valve selection is better. We sought to compare outcomes between ESRD patients who underwent either mechanical or biologic valve replacements in ESRD patients at our institution.

Methods: All patients with ESRD who underwent either mitral or aortic valve replacement from 2002-2014 at our institution were reviewed (n=215; Mechanical =64). Cox proportional hazards was performed to test the hypothesis that a mechanical valve was correlated with improved long-term survival. Among patients younger than 65, (n=123) we also compared survival using the Kaplan-Meier method.

Results: There was similar survival for patients who received either a bioprosthetic or mechanical valve. (See Figure 1 - logrank=NS). Survival is clearly attenuated in this patient population, with only about half the patients younger than 65 surviving beyond two years. In the proportional hazards model, a mechanical valve was not correlated with improved survival even when controlling for other variables including shock, endocarditis, mitral valve replacement, diabetes and patient age (95% confidence interval for hazard ratio of mechanical valve 0.63-1.56).

Conclusions: It appears that there is minimal difference in post-surgical survival for ESRD patients who undergo bioprosthetic or mechanical valve replacement, even in patients younger than 65. The attenuated survival of the ESRD population after valve replacement makes the increased burden of anticoagulation (particularly in hemodialysis patients) unattractive. It is likely that only a small minority of ESRD patients benefit from the increased durability of a mechanical valve.



NOTES:

23. Alternative Access TAVR Is Safe at Higher Society of Thoracic Surgeons Predicted Risk of Mortality Scores

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Authors: Hanna A. Jensen, Jose Condado, *Bradley Leshnower, Jose Binongo, Chandan Devireddy, *Eric Sarin, Vasilis Babaliaros, Amjad Syed, Stamatios Lerakis, Kreton Mavromatis, *James P. Stewart, Brian Kaebnick, Mohammad Rajaei, ***D***Amy Simone, Patricia Keegan, ***D****Robert Guyton, ***D***Peter Block, *Vinod H. Thourani

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

Discussant: ***D****Joshua Rovin, *Cardiac Surgical Associates, LLP, Clearwater, FL*

COMMERICAL RELATIONSHIPS: Amy Simone: Consultant/Advisory Board: Edwards Lifesciences; **Robert Guyton:** Consultant/Advisory Board: Medtronic Inc; **Peter Block:** Equity/Ownership Interest: Direct Flow Medical; **DISCUSSANT: Joshua Rovin:** Proctor: Edwards Lifesciences, Medtronic, Inc.

Objectives: Non-transfemoral, alternative access transcatheter aortic valve replacement (non-TF TAVR) is often associated with worse outcomes than transfemoral TAVR (TF-TAVR). Our objective was to explore the relationship between an increasing Society of Thoracic Surgeons Predicted Risk of Mortality (STS PROM) score and our observed mortality and morbidity in TF and non-TF TAVR.

Methods: 595 consecutive patients who underwent balloon-expandable TAVR in a single academic institution between 2007 and 2014 were retrospectively reviewed. Patients were divided into TF (n=337, 57%) and non-TF (n=258, 43%) groups and clinical outcomes were compared. A composite outcome of major postoperative events was defined as death, stroke, myocardial infarction or renal failure.

Results: The mean age for the TF patients was significantly higher than the non-TF patients (82.4±8.0 and 80.8±8.7, p=0.02). Non-TF patients had higher STS PROM scores, higher procedural mortality, longer ICU and hospital stay. TF-TAVR patients had more minor vascular complications and higher rate of 30-day paravalvular leak. The probability of the composite outcome of major postoperative events at 30 days was numerically higher for non-TF TAVR (OR=0.69, p=0.08), but interestingly was not associated with increasing STS PROM scores for both groups (p=0.98). The observed/expected 30-day mortality rate was 0.20 ($p<0.001$) for TF patients and 0.43 ($p<0.001$) for non-TF patients. There was no difference in 1-year mortality between groups (19.7% for TF, 22.0% for non-TF, p=0.32).

Conclusions: As expected, non-TF TAVR patients were higher risk than TF patients with more procedural morbidity and mortality. However, unexpectedly, we found that non-TF TAVR patients do not have a significant increase in morbidity and mortality with increasing STS PROM scores. When applicable, non-TF TAVR approach should not be denied according to a high STS PROM.

Preoperative, Operative and Postoperative Characteristics of Study Cohort

Characteristic	All (n=595)	TF (n=337)	Non-TF (n=258)	p-value
Age, mean±SD	81.7±8.3	82.3±8.0	80.8±8.7	0.02
Female, n(%)	293 (49)	152 (45)	141 (55)	0.02
STS PROM %, mean±SD	11.0±5.5	10.5±5.3	11.7±6.3	0.006
Moderate / severe chronic lung disease, n(%)	179 (30)	98 (29)	81 (31)	0.66
Prior CABG, n(%)	211 (35)	105 (31)	106 (41)	0.01
Cerebrovascular disease, n(%)	180 (30)	88 (26)	92 (36)	0.01
Ejection fraction %, median (IQ-range)	55 (40-60)	55 (40-60)	55 (40-60)	0.82
Aortic Valve Area cm2, mean±SD	0.66±0.18	0.67±0.19	0.64±0.17	0.05
Mean Aortic Valve Gradient mmHg, mean±SD	45.4±14.3	46.2±15.6	44.5±12.5	0.14
In-hospital Outcomes				
Procedural mortality, n(%)	23 (3.9)	8 (2.4)	15 (5.8)	0.03
Major stroke, n(%)	8 (1.3)	5 (1.5)	3 (1.2)	1.00
Renal failure, n(%)	16 (2.7)	5 (1.5)	11 (4.3)	0.08
Minor vascular complication, n(%)	50 (8.4)	48 (14)	2 (0.8)	<0.01
Major vascular complication, n(%)	24 (4.0)	12 (3.6)	12 (4.7)	0.69
New pacemaker, n(%)	28 (4.7)	16 (4.7)	12 (4.7)	0.99
Total ICU hours, median (IQ-range)	29 (23-56)	25 (19-44)	48 (27-95)	<0.01
Length of hospital stay, median (IQ-range)	5 (3-7)	3 (2-6)	7 (5-9)	<0.01
30-day Outcomes				
Mortality, n(%)	20 (3.4)	7 (2.1)	13 (5.0)	0.09
AV mean gradient mmHg, mean±SD	10.1±4.2	10.7±4.5	9.4±3.6	<0.01
No PVL, n(%)	282 (50)	137 (42)	145 (61)	<0.01
Mild PVL, n(%)	231 (41)	148 (46)	83 (35)	
Moderate PVL, n(%)	51 (9.0)	40 (12)	11 (4.0)	

NOTES:

24. Reinforcing Atrial P2 Stitch May Reduce Dehiscence in Undersized Mitral Annuloplasty

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Authors: Dawn Hui, Jack Chen, *Richard Lee

Author Institution(s): *St. Louis University School of Medicine, St. Louis, MO*

Discussant: Robert L. Smith, *COR Specialty Associates of North Texas, Dallas, TX*

Objectives: Following mitral annuloplasty, rates of recurrent mitral regurgitation (MR) moderate or greater have been reported up to 30% in the literature. This may in part be due to dehiscence of undersized mitral rings. We developed a technique utilizing an additional central atrial-to-annular pledgeted suture at the midpoint of the posterior mitral annulus. We sought to define outcomes using this modified technique.

Methods: Retrospective single-institution review of consecutive patients undergoing mitral annuloplasty with a 26-mm ring. An additional reinforcing stitch was routinely placed at the P2 midpoint. Pre and post-operative echocardiograms were reviewed. There were no occurrences of systolic anterior motion.

Results: From March 2013 to July 2014, 21 patients (mean age 65 + 14, 14% male) had a 26-mm mitral annuloplasty. Preoperative EF was 42% + 17; LVESD 45 + 13mm, LVEDD 58 + 11 mm. Cleft repairs were performed in 19% (n=4). Concomitant procedures included coronary bypass in 33% (n=7), tricuspid repair/replacement in 24% (n=5), Maze procedure in 48% (n=10), aortic valve replacement in 9.5% (n=2); ventricular aneurysm resection (n=1); and pericardiectomy (n=1). 30-day mortality was 0%. Follow-up echocardiograms were available for 81% (n=17) at a mean of 3 months with MR being none or trace in 35% (n=6), mild in 53% (n=9), and moderate in 12% (n=2). There were no incidences of mitral stenosis, ring dehiscence, or paravalvular leak. Mean mitral gradient was 3.1 + 1.5 mm Hg.

Conclusions: Use of a reinforcing P2 stitch may be effective in reducing recurrent MR after undersized annuloplasty for mitral repair, possibly due to a reduction of dehiscence.

NOTES:

25. Outcomes of Major Lung Resection After Induction Therapy for Non-small Cell Lung Cancer in Elderly Patients

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Authors: Chi-Fu Jeffrey Yang, Ryan Meyerhoff, Nicholas Mayne, Hanghang Wang, Sameer Hirji, *Betty C. Tong, Mark Onaitis, Matthew Hartwig, *David Harpole, ***D***Thomas A. D'Amico, *Mark Berry

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

COMMERICAL RELATIONSHIPS: Thomas A. D'Amico: Consultant/Advisory Board: Scanlan

Objectives: This study quantified the impact of age on perioperative outcomes and long-term survival of patients undergoing surgery following induction chemotherapy for non-small cell lung cancer (NSCLC).

Methods: Perioperative morbidity and long-term survival of patients with NSCLC who were ≥ 70 years old and received induction chemotherapy followed by lobectomy or pneumonectomy from 1995-2012 were assessed using multivariate logistic regression, Kaplan-Meier, and Cox proportional hazard analysis. The outcomes of these elderly patients were compared with patients younger than 70 years who underwent lobectomy or pneumonectomy following induction therapy during the same study period.

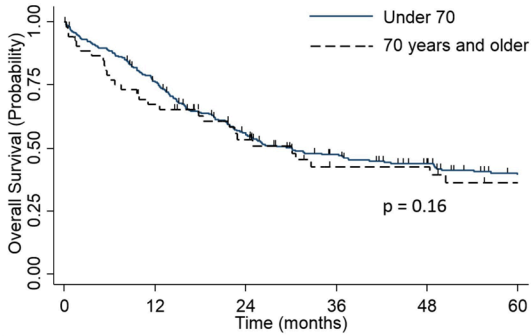
Results: Major lung resection following induction chemotherapy was performed in 316 patients, of whom 53 patients (48 lobectomy, 5 pneumonectomy) were age 70 years or older. The median age was 74 years (range 70-82 years) in the elderly group, and induction radiation was used in 24 (45%) patients. There was 1 (2%) perioperative death. There were no significant differences in the incidence of post-operative complications between patients younger than 70 years and elderly patients (49% vs. 57%, p=0.30). Patients younger than 70 years had a median survival (30 months [95% CI: 24-43]) and a 5-year survival (39% [95% CI: 33-46]) that was not significantly different from patients 70 years and older (median survival (30 months [95% CI: 18-68]) and 5-year survival of (36% [95% CI: 22, 41]) (p=0.16) (figure) although there was a trend towards worse survival in the elderly group after multivariable adjustment (Hazard Ratio, 1.48; 95% CI: 1.00-2.20; p=0.053).

Conclusions: Major lung resection after induction chemotherapy can be performed with acceptable short and long term results in appropriately selected patients aged 70 and over, with outcomes that are comparable to younger patients.

Baseline Characteristics and Perioperative Complications

Characteristic	Number of Patients	% of Patients
Sex		
Male	33	62
Female	20	38
Median Age (range, years)	Median 74	Range (70-82)
Ethnicity		
White	50	94
Black	3	6
FEV1 (%) (mean, SD)	73	3
DLCO (%) (mean, SD)	73	3
CAD	11	21
Induction Radiation Use	24	45
Pretreatment Clinical Stage		
IA	0	0
IB	4	8
IIA	5	9
IIB	7	13
IIIA	31	58
IIIB	0	0
IV	2	4
Unknown	4	8
Complications		
Any Complications	30	57
Air Leak	7	13
Pneumonia	4	8
Atrial Fibrillation	17	32
Respiratory Failure	4	8
Blood Transfusion	8	15

Overall Survival of Elderly Patients Undergoing Induction Therapy Followed by Major Lung Resection Stratified by Age Group



Number at risk						
Under 70	263	195	135	104	85	67
70 years and Older	53	34	22	14	14	9

NOTES:

26. Recurrence and Survival After Segmentectomy in Patients With Prior Lung Resection for Early Stage Non-Small Cell Lung Cancer (E-NSCLC)

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Authors: Lisa M. Brown, Brian E. Louie, Nicole Jackson, Alexander S. Farivar, Ralph W. Aye, Eric Vallieres

Author Institution(s): *Swedish Cancer Institute, Seattle, WA*

Objectives: Lobectomy is the standard of care for patients with E-NSCLC. However, the operation of choice for patients who have had a prior lung resection and develop a second primary E-NSCLC has not been established. Even if the patient's pulmonary reserves allow for lobectomy, one may favor sublobar resection to preserve lung. We compared rates and patterns of recurrence and survival in patients with and without prior lung resection for E-NSCLC treated by segmentectomy.

Methods: Retrospective cohort study of 91 patients undergoing segmentectomy for clinical stages I and II NSCLC. Patients were considered lobectomy candidates if the postoperative predicted FEV1 and DLCO were ≥40%. Logistic regression and Kaplan-Meier curves were used to determine recurrence risk and survival.

Results: Of the 91 patients, 21 (23%) had a prior lung resection (G1) and 70 (77%) had primary segmentectomy (G2). G1 tumors were larger and had a higher SUVmax (Table 1).
There were 18 (20%) recurrences: 9/21 (43%) in G1 and 9/70 (13%) in G2. Recurrence in G1 was local (2/21) and regional (5/21) compared with local (2/70) and regional (4/70) in G2. The odds of recurrence were 5.2 times greater in G1 (p=0.004). The time to recurrence was 24 months (IQR 15-37) in G1 and 20 months (IQR 12-29) in G2. The 90-day mortality rate was 0%. The overall 5-year survival was 55% in G1 and 75% in G2 (p=0.5).

In G1, 17/21 patients could not have tolerated a lobectomy, of which 6/17 (38%) developed local (2), regional (3), or distant (1) recurrences. Only 4/21 patients were lobectomy candidates, of which 3/4 (75%) had regional (2) or distant (1) recurrences. All three of these patients died (10-71 months).

Conclusions: Patients with E-NSCLC who had prior lung resection and undergo segmentectomy have higher recurrence but similar survival compared to patients who have not had prior resection. The 5-year survival of those with prior resection is encouraging and perhaps superior to wedge resection and/or SBRT.

Patient and Tumor Characteristics

	Prior Lung Resection (n=21)	No Prior Lung Resection (n=70)	p value
FEV1	68 (57-81)	86 (66-98)	0.04
DLCO	55 (49-64)	77 (59-87)	0.002
SUVmax	5.4 (4.1-7.1)	2.3 (1.3-3.9)	0.002
Tumor size (cm)	2.0 (1.5-3.5)	1.8 (1.3-2.7)	0.34
Pathologic Stage	IA (10) IB (4) IIB (5) IIIA (1) IIIB (1)	IA (46) IB (13) IIA (4) IIB (3) IIIA (2)*	0.04

FEV1, DLCO, SUVmax, and Tumor size are median (IQR); *Missing data for 2 patients

NOTES:

27. The Influence of Reconstructive Technique on Perioperative Outcomes Following Chest Wall Resection

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Authors: Jonathan D. Spicer, Jitesh B. Shewale, Mara B. Antonoff, Arlene M. Correa, Wayne Hofstetter, David C. Rice, *Ara Vaporciyan, Reza Mehran, *Garrett L. Walsh, *Jack A. Roth, *Swisher G. Stephen, *Boris Sepesi

Author Institution(s): *University of Texas MD Anderson Cancer Center, Houston, TX*

Objectives: Emerging technologies for prosthetic reconstruction following chest wall resection have yielded a wide variety of reconstructive options for thoracic surgeons. The ideal chest wall reconstruction and its impact on perioperative outcomes have not been well defined. Our goal was to determine whether mesh characteristics such as rigidity or permanent prosthetic materials altered perioperative outcomes.

Methods: This was a retrospective study of 1096 patients who underwent chest wall resection, of which 427 patients underwent reconstruction (1998-2013). Charts were evaluated for clinical and surgical variables, and perioperative outcomes. Univariate and multivariate analyses were performed to identify predictive variables for pulmonary and wound/implant related complications.

Results: Patient characteristics are summarized in Table 1. Pulmonary complications occurred in 23.9% (102/427) of patients and no difference was observed between rigid versus flexible reconstruction type (OR 1.2, 95% CI 0.73-2.2). However, chest wall resection of 4 or more ribs (OR 1.8, 95% CI 1.06-2.94), presence of lung resection (OR 2.1, 95% CI 1.25-3.56) and smoking (OR 2.2, 95% CI 1.33-3.66) were independent predictors of pulmonary complications. Local infectious complications occurred in 4.9% (21/427) of patients and the use of permanent versus non-permanent prosthetic materials was not associated ($p = 0.575$). Early re-operation was required in 3.3% (14/427) of cases of which 2 patients required mesh explant due to infection. Late re-operation was necessary in 12 patients. One was due to a broken metallic strut and all others were for local tumor recurrence.

Conclusions: The type of chest wall reconstruction, whether rigid, flexible, composed of permanent or non-permanent materials, is not associated with a significant impact on pulmonary or local infectious complications after chest wall resection. An individualized approach tailored to each patient is advocated.

Table 1: Patient characteristics

Variable	Frequency (N=427)
Mean age (range)	53 (10-88)
Male gender	236 (55)
Diabetes	29 (7.1)
Renal insufficiency	4 (1)
COPD	21 (5)
CAD	23 (7)
ASA category	
1	32 (8)
2	146 (35)
3	232 (56)
4	5 (1)
Primary chest wall tumor	150 (35.1)
Primary lung cancer	81 (19)
Metastasis to lung parenchyma	26 (6.1)
Pleural malignancy	43 (10.1)
Other	127 (26.7)
Muscle flap reconstruction	126 (29.5)
Prosthesis for reconstruction	368 (86.2)
Both muscle flap and prosthesis used	69 (16)
Type of procedure	
Lung resection	220 (53)
Diaphragm resection/reconstruction	132 (31)
Sternum resection	33 (8)
Spine resection	18 (4)
Mediastinal tumor resection	18 (4)

Data are presented as N (%)
Unless otherwise indicated.
*Other includes: metastatic chest wall lesions, mediastinal tumors and benign thoracic processes.

NOTES:

28. Does Lymph Node Count Influence Survival in Surgically Resected NSCLC?

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Authors: *Elizabeth A. David[1,2], Yingjia Chen[3], David T. Cooke[1], Rosemary Cress[3,4]

Author Institution(s): [1]*UC Davis Medical Center, Sacramento, CA;* [2]*David Grant Medical Center, Travis AFB, CA;* [3]*UC Davis School of Medicine, Davis, CA;* [4]*Cancer Registry of Greater California, Sacramento, CA*

Objectives: The prognostic significance of the number of lymph nodes sampled (NLNS) during resection for non-small cell lung cancer (NSCLC) is controversial. The NLNS is influenced by many factors; however some have argued that it should be a surrogate for quality. We sought to determine the influence of the NLNS on overall (OS) and cancer-specific survival (CSS) for surgically resected NSCLC using a diverse, population-based sample.

Methods: The California Cancer Registry was queried from 2004-2011 for cases of Stage 1-3 NSCLC treated with surgical resection (sublobar resection, lobectomy/bilobectomy, and pneumonectomy) and 16,393 patients were identified. Kaplan Meier and Cox proportional hazards modeling were used to determine the influence of NLNS on OS and CSS.

Results: 15,195 patients had information regarding nodal sampling and were included. Eighty percent (13,167/15,195) were treated with lobectomy/bilobectomy. Patients who were younger, male, non-Hispanic White, highest SES, higher stage or larger size tumor tended to have more nodes removed. Sampling fewer than 10 nodes was associated with poorer OS and CSS when compared to sampling 10+ nodes after adjustment for demographic and clinical factors (OS HR 1.74, 1.56-1.95, $p<0.0001$; HR 1.35, 1.24-1.47, $p<0.0001$; HR 1.10, 1.03-1.18, $p=0.005$) and (CSS HR 1.91, 1.66-2.20, $p<0.0001$; HR 1.37, 1.23-1.54, $p<0.0001$; HR 1.14, 1.05-1.24, $p=0.003$) for 0, 1-3, or 4-10 nodes respectively.

Conclusions: For surgically treated NSCLC, the NLNS influenced both OS and CSS. The influence is modest when comparing 4-10 nodes and >10. Surgeons should perform mediastinal lymphadectomy to maximize patient survival, but the optimal NLNS, as it relates to quality, remains unclear.

NOTES:

29. Robotic versus Thoracoscopic Resection for Lung Cancer: Early Results of a New Robotic Program

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Authors: Benedetto Mungo, Craig M. Hooker, Janelle S. Ho, *Stephen C. Yang, Richard Battafarano, *Malcolm V. Brock, ***D****Daniela Molena

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

COMMERICAL RELATIONSHIPS: Daniela Molena: Speaker Bureau/Honoraria: Novadaq Technologies

Objectives: Robotic-assisted surgical techniques have been introduced in recent years as an alternative minimally invasive approach for lung surgery. While the advantage of video-assisted thoracoscopic surgery (VATS) over thoracotomy for anatomical lung resection has been extensively reported, the results of robotic-assisted thoracoscopic surgery (RATS) as compared to VATS are still under investigation.

Methods: We performed a retrospective review of lung cancer patients, undergoing minimally invasive segmentectomy or lobectomy between December 2007 and May 2014. A robotic program was introduced in 2011. Assignment to the robotic group was dictated by surgeon's preference and robot availability at the time of the operation. Relevant early surgical outcomes were compared between the two groups, including mortality, morbidity, conversion to thoracotomy, length of stay (LOS), and reoperation.

Results: 80 (59.7%) patients underwent VATS resection, while 54 (40.3%) had a RATS procedure. The two groups presented no meaningful differences at baseline, in terms of age, race, BMI and pre-operative comorbidities. Adenocarcinoma was the most common histology in both groups (respectively 77.4% and 55.5%). Patients in the RATS group had significantly more segmentectomies (11.1% vs 1.2%, p=0.017). There were no post-operative deaths. We found no significant differences between the two groups for any of the outcomes studied (Table). Furthermore, we found no significant differences in terms of other individual complications, including tracheostomy, re-intubation, pneumonia, pulmonary embolism and cerebrovascular events.

Conclusions: According to our results the introduction of a robotic program did not negatively affect the early surgical outcomes of a well-established oncologic minimally invasive thoracic program. Potential advantages of RATS still need to be explored in terms of long-term outcomes.

Table. Estimated Association of Selected Clinical Outcomes Comparing RATS to VATS Technique

Outcomes	Point Estimate†<b/>	95% CI<b/>	p value<b/>
Conversion	0.42	0.16 - 1.07	0.068
Length of hospital stay (days)*	1.59	-0.47 - 3.64	0.129
Perioperative events	0.99	0.26 - 3.67	0.984
Reoperation	6.32	0.69 - 58.18	0.104
Postoperative mortality	No events		

† VATS = reference group
*Point estimate reflects difference in mean days of hospital stay for RATS compared to VATS.

NOTES:

30. Time Is Money: Hospital Costs Associated with VATS Lobectomies

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Authors: *Onkar V. Khullar, *Felix G. Fernandez, William Knechtle, Sebastian Perez, *Allan Pickens, *Manu Sancheti, *Seth D. Force

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

Objectives: Proposed changes in healthcare will place an increasing burden on surgeons to care for patients more efficiently in order to minimize cost. The key will be to identify areas where operational changes can lead to major cost savings. Based on this concept we looked at costs surrounding video assisted thoracoscopic surgical (VATS) lobectomies to see where changes could be made to ensure a maximum net profit.

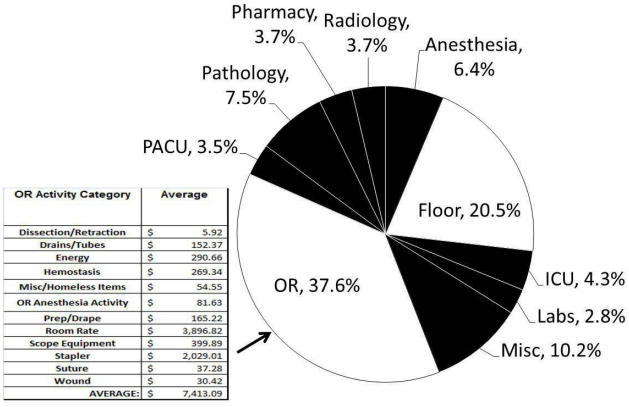
Methods: We queried our Society of Thoracic Surgeons (STS) database for all VATS lobectomies performed for lung cancer from January 2011 to December 2013. Clinical data were linked with hospital financial data to determine hospital expenditures for each patient.

Results: 265 VATS lobectomies were performed. Mean operating room (OR) time was 246 minutes and mean length of stay (LOS) was 4.7 days. Mean cost and charges were $19,735 and $50,061 respectively. Mean contribution margin and net profit were $10,703 and $1,919 respectively. The majority of cost (58%) was attributed to OR and floor costs, and the majority of OR costs were secondary to room rate and staplers (Figure 1). 66 complications, as defined by the STS, occurred in the cohort. 28 patients had only one complication, nine patients had two complications, and five patients had three or more complications. The occurrence of one complication was associated with a net loss of $2,000 while two complications in a patient led to a $3,000 net loss (Table 1). Overall complications were independently associated with significant cost increases.

Conclusions: There is greater pressure to increase efficiency surrounding surgical procedures in order to maximize profit. Our study shows that the most significant costs associated with VATS lobectomies relate to OR time, stapler use, floor charges, and cost associated with complications. Cost reducing strategies will need to concentrate on optimizing OR times and reducing LOS while at the same time minimizing complications.

VATS Lobectomies (N=265) and STS complications, excluding "others."

STS # of complications	Frequency	Mean				
		Total Charges	Total Cost	Best Payment Estimate	Net Profit	Contribution Margin
0	223	$45,120.63	$17,822.13	$19,903.78	$2,081.66	$9,909.78
1	28	$59,328.57	$24,205.93	$22,186.86	-$2,019.07	$9,149.81
2	9	$78,090.00	$29,519.89	$26,353.22	-$3,166.67	$10,151.23



OR Activity Category	Average
Dissection/Retraction	$ 5.92
Drains/Tubes	$ 152.37
Energy	$ 290.66
Hemostasis	$ 269.34
Misc/Homeless Items	$ 54.55
OR Anesthesia Activity	$ 81.63
Prep/Drape	$ 165.22
Room Rate	$ 3,896.82
Scope Equipment	$ 399.89
Stapler	$ 2,029.01
Suture	$ 37.28
Wound	$ 30.42
AVERAGE:	$ 7,413.09

VATS Lobectomy Cost Break Down by Center

NOTES:

31. Long-term Survival and Freedom From Re-operation Following Right Ventricular Outflow Tract Reconstruction Using Xenograft Valves

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Authors: George M. Alfieris[1], Michael Swartz[1], Juan Lehoux[1], *Edward Bove[2]

Author Institution(s): [1]*University of Rochester, Rochester, NY;* [2]*University of Michigan, Ann Arbor, MI*

Discussant: *David P. Bichell, *Monroe Carell, Jr. Children's Hospital at Vanderbilt, Nashville, TN*

Objectives: The optimal choice for right ventricular outflow tract reconstruction (RVOT) remains controversial. Further, there is minimal data regarding the long-term survival and freedom from re-operation following RVOT reconstruction. We hypothesized that xenografts used for RVOT reconstruction would result in prolonged long-term survival and freedom from re-operation.

Methods: Children and adults with congenital heart disease requiring RVOT reconstruction using a xenograft from 1980-1985 were reviewed. In all cases, the xenograft valve was either sewn or manufactured into a Dacron conduit, and the conduit sewn to the pulmonary artery bifurcation and RVOT. Clinical data were analyzed, and survival and freedom from re-operation determined using Kaplan-Meier analysis.

Results: Twenty-four patients received a xenograft for RVOT reconstruction at 14.6 ± 5.6 years. Conduit size ranged from 21-27 mm. The majority of patients received a Carpentier Edwards prosthesis (n=17), followed by a Hancock (n=5) and Ionescu-Shiley (n=2). There was no peri-operative mortality. The majority of patients required re-operation for pulmonary stenosis (72.7%), followed by pulmonary insufficiency (18.2%), or both stenosis and insufficiency (9%). Freedom from re-operation was 84, 54, 47, and 16% at 10, 20, 25, and 30 years respectively (Figure 1). Survival was 90.1% at 30 years.

Conclusions: Right ventricular outflow tract reconstruction using xenografts results in prolonged freedom from re-operation and excellent long-term survival. This data provides truly long-term follow-up for xenograft valves following RVOT reconstruction, which is unique, as rarely are patients followed for this extensive period of time.

NOTES:

32. Pulmonary Valve Repair for Patients With Acquired Pulmonary Valve Insufficiency

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Authors: Sameh Said, *Richard D. Mainwaring, Michael Ma, Theresa Tacy, Frank L. Hanley

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

Discussant: ***D****James A. Quintessenza, *All Children's Hospital, St. Petersburg, FL*

COMMERCIAL RELATIONSHIPS: DISCUSSANT: James A. Quintessenza: License Agreement/Consultant: Genesse Biomedical

Objectives: Pulmonary valve (PV) insufficiency is often an acquired condition following treatment for PV stenosis or atresia. It is recognized that PV insufficiency has serious long-term deleterious effects. While surgical replacement of the PV is efficacious, artificial valves inevitably fail and require re-intervention. The purpose of this study was to summarize our experience with PV repair in patients with acquired PV insufficiency.

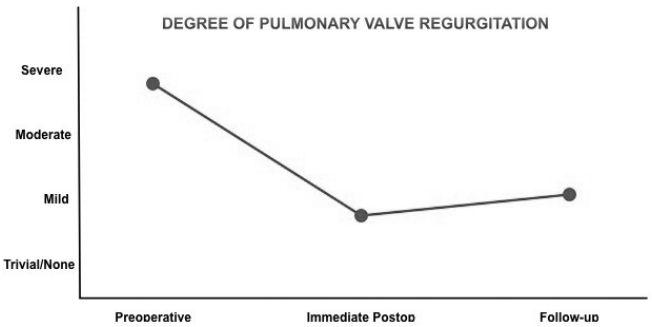
Methods: This was a retrospective review of 16 patients with severe PV insufficiency who underwent PV repair. Thirteen patients originally had pulmonary stenosis, and three had pulmonary atresia. The median age of the patients was 14 years, and the median interval between the initial surgical procedure and re-operation was 11 years.

Results: The 16 patients underwent surgical repair of their PV using several techniques. Eleven patients had resection of a transannular patch with bicuspidization of the native PV. Three patients had repair of defective leaflets, and two patients had addition of a pericardial leaflet.

The degree of PV insufficiency was decreased in all 16 patients, with 14 of 16 achieving none or mild insufficiency post-operatively (summarized in Figure 1). The median gradient following surgical repair was 15 mmHg.

The average duration of follow-up for this cohort of patients has been three years. None of the patients have required re-operation or re-intervention. Two patients have had an increase in the degree of pulmonary insufficiency at mid-term follow-up, both of whom originally had pulmonary atresia.

Conclusions: The data demonstrate the feasibility of performing PV repair in a highly select group of patients. All patients experienced a significant decrease in pulmonary insufficiency, with stable results at mid-term follow-up. While the duration of follow-up is limited, we would speculate that some patients may not require further re-interventions on their PV.



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

NOTES:

33. Polytetrafluoroethylene Bicuspid Pulmonary Valve Replacement: A Five-year Experience in 119 Patients With Congenital Heart Disease

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Authors: Cheul Lee[1], Chang-Ha Lee[2], Jae Gun Kwak[2]

Author Institution(s): [1]*Seoul St. Mary's Hospital, College of Medicine, The Catholic University of Korea, Seoul, Korea (the Republic of);* [2]*Sejong General Hospital, Bucheon, Korea (the Republic of)*

Discussant: ***D****James A. Quintessenza, *All Children's Hospital, St. Petersburg, FL*

REGULATORY DISCLOSURE: This presentation describes the off-label use of 0.1 mm-thickness polytetrafluoroethylene membrane as a pulmonary valve substitute.

COMMERCIAL RELATIONSHIPS: DISCUSSANT: James A. Quintessenza: License Agreement/Consultant: Genesse Biomedical

Objectives: Durability of bioprosthetic valves in the pulmonary position is suboptimal. The objective of this study was to evaluate mid-term outcomes of hand-sewn polytetrafluoroethylene (PTFE) bicuspid pulmonary valve replacement (PVR).

Methods: A retrospective review of 119 patients who underwent bicuspid PVR using a 0.1 mm-thickness PTFE membrane between June 2009 and May 2014 was performed. Reintervention was defined as any surgical or percutaneous catheter procedure on the PTFE pulmonary valve (PV). Structural valve deterioration (SVD) was defined as development of a peak pressure gradient equal to or greater than 50 mm Hg or at least a moderate amount of pulmonary regurgitation (PR) on follow-up echocardiography.

Results: The median age at PVR was 16.9 years (range, 5 months to 57.1 years). Fundamental diagnoses were tetralogy of Fallot (n = 71), pulmonary atresia with ventricular septal defect (n = 21), double outlet right ventricle (n = 13), and others (n = 14). The median valve diameter was 26 mm (range, 12 to 30 mm). There were 2 hospital deaths (1.7%) due to ventricular dysfunction and infective endocarditis. At discharge, no patient showed significant PR or pulmonary stenosis. Follow-up completeness was 94.0% and the median duration of follow-up was 2.6 years (range, 0.1 to 5.2 years). There was 1 late death due to infective endocarditis involving the PTFE PV. Actuarial survival was 97.1 ± 1.6% at 5 years. One patient underwent excision of the PTFE PV due to infective endocarditis. Freedom from PV reoperation was 99.1 ± 0.9% at 5 years. Ten patients developed SVD during follow-up and 6 of them underwent interventional catheter procedure. Freedom from PV reintervention and SVD at 5 years was 90.7 ± 3.4% and 86.5 ± 4.0%, respectively.

Conclusions: Mid-term outcomes of hand-sewn PTFE bicuspid PVR were acceptable. Long-term follow-up of this cohort is mandatory to determine the durability of this valve.

NOTES:

34. The Trifecta Bioprosthetic Valve Is Associated With a Reduced Transvalvular Gradient Following Pulmonary Valve Replacement

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Authors: Brian C. Gulack, Robert D. Jaquiss, Andrew J. Lodge

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

Discussant: *Joseph Dearani, *Mayo Clinic, Rochester, MN*

REGULATORY DISCLOSURE: This presentation describes the off-label use of the Trifecta Aortic Valve for Pulmonary Valve Replacement.

Objectives: Outcomes after surgical pulmonary valve replacement (PVR) are limited by long-term valve degeneration. This may be hastened by turbulent flow from higher transvalvular gradients. Recent use of the Trifecta valve (St Jude Medical) for this indication at our institution appeared to result in low post-implantation transvalvular gradients. We therefore performed this analysis to evaluate the early transvalvular gradient associated with the Trifecta valve, and compare it to two other valves commonly used for PVR.

Methods: We performed a single institution review of patients undergoing PVR with the Perimount valve (Carpentier-Edwards), the Biocor valve (St Jude Medical), or the Trifecta valve between November 1993 and January 2014. Multivariable linear regression modeling was utilized to determine the adjusted association between valve type and transvalvular gradient as determined by early post-operative echocardiography.

Results: A total of 188 patients met study criteria; 56 (30%) received a Biocor, 87 (46%) received a Perimount, and 45 (24%) received a Trifecta. There were no baseline differences between the groups, but the peak transvalvular gradient was significantly decreased among patients with the Trifecta valve (Table). After adjustment for age, valve size, and time from the operation to the echocardiographic assessment, as compared to the Trifecta valve, the Biocor valve was associated with a 48% higher peak valve gradient ($p<0.01$). The Perimount valve was associated with a nonsignificant 18% higher peak valve gradient ($p=0.14$).

Conclusions: Outcomes after PVR with the Trifecta valve have not been previously reported. PVR with the Trifecta valve is associated with a reduced early transvalvular gradient. This may be associated with reduced valve deterioration over time.

Patient Characteristics and Outcomes by Valve Type

Variable	Overall	Trifecta Valve	Biocor Valve	Perimount Valve	p-value
N	188	45 (24%)	56 (30%)	87 (46%)	
Age (years)	18.7 (11, 39)	26 (12, 46)	20 (13, 35)	17 (10, 37)	0.23
Female Gender	71 (38%)	17 (38%)	19 (34%)	35 (40%)	0.75
Valve Size (mm)	27 (23, 27)	27 (25, 27)	27 (25, 27)	25 (23, 27)	0.89
Peak Valve Gradient (mm Hg)	20 (15, 26)	16 (10, 20)	24 (18, 28)	19 (14, 25)	<0.01
Time to Echo (days)	35 (4, 238)	36 (4, 163)	6 (3, 45)	54 (4, 526)	<0.01

Continuous variables are presented as median (interquartile range). Categorical variables are presented as frequency (percentage).

NOTES:

35. Outcomes of Redo Pulmonary Valve Replacement for Bioprosthetic Pulmonary Valve Failure in 61 Patients With Congenital Heart Disease

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Authors: Cheul Lee[1], Chang-Ha Lee[2], Jae Gun Kwak[2]

Author Institution(s): [1]*Seoul St. Mary's Hospital, College of Medicine, The Catholic University of Korea, Seoul, Korea (the Republic of);* [2]*Sejong General Hospital, Bucheon, Korea (the Republic of)*

Discussant: *Paul J. Chai, *Columbia University Medical Center, New York, NY*

Objectives: The objective of this study was to evaluate outcomes of redo pulmonary valve replacement (PVR) for bioprosthetic pulmonary valve (PV) failure in patients with congenital heart disease.

Methods: A retrospective review of 61 patients who underwent redo PVR for bioprosthetic PV failure between November 1999 and June 2013 was performed. Univariable analyses were used to identify the factors associated with postoperative adverse events (PAE).

Results: The median age at initial PVR was 7.0 years (range, 1.6 to 36.5 years) and the median age at redo PVR was 13.5 years (range, 7.6 to 43.3 years). Fundamental diagnoses were tetralogy of Fallot (n = 20), pulmonary atresia with ventricular septal defect (n = 20), double outlet right ventricle (n = 7), and others (n = 14). The median valve size was 25 mm (range, 18 to 28 mm). There were 2 hospital deaths (3.3%). Eighteen patients (29.5%) experienced PAE (Table). PAE were associated with higher preoperative right ventricular (RV) systolic pressure (105 ± 22 mm Hg vs 89 ± 19 mmHg, p = 0.016) and longer bypass time (219 ± 77 minutes vs 164 ± 59 minutes, p = 0.007). Follow-up completeness was 95.8% and the median duration of follow-up was 5.5 years (range, 0.1 to 14.3 years). There were 3 late deaths. Actuarial survival at 10 years was 83.7 ± 8.0%. Eleven patients underwent the second redo PVR during follow-up. Freedom from the second redo PVR at 10 years was 58.8 ± 11.9%. Freedom from both PV reintervention and structural valve deterioration (SVD) at 10 years was 32.0 ± 13.3%.

Conclusions: A substantial number of the patients experienced mortality or morbidities after redo PVR. Higher preoperative RV systolic pressure and longer bypass time were associated with PAE. By 10 years after the redo PVR, approximately two thirds will require PV reintervention or manifest SVD.

Postoperative Adverse Events

Event	Number (%)
Reoperation	12 (19.7)
Prolonged mechanical ventilation (> 48 hours)	6 (9.8)
Death	2 (3.3)
Arrhythmia	2 (3.3)
Deep sternal infection	2 (3.3)
Renal failure	1 (1.6)

NOTES:

36. Intervention for Right Ventricular Outflow Tract Obstruction Following the Arterial Switch Operation at a Single Center

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Authors: Joseph Nellis, Benton Ng, Osamah Aldoss, Dianne Atkins, *Joseph Turek

Author Institution(s): *Carver College of Medicine, Iowa City, IA*

Discussant: Marshall L. Jacobs, *Johns Hopkins University School of Medicine, Baltimore, MD*

Objectives: The arterial switch operation (ASO) is the standard of care for infants born with dextro-transposition of the great arteries (d-TGA). Supravalvular pulmonary stenosis (PS) is a common complication with reported reintervention (RI) rates as high as 42%. Improvements in RI rates have been made with time, yet a subset of patients continues to require multiple RIs - balloon angioplasty (BA), stenting or surgical augmentation. We performed a longitudinal review of patients who have undergone ASO and required multiple RIs.

Methods: A retrospective review of patients underwent ASO for d-TGA at a single institution between August 1990 and January 2014. Anatomical, perioperative and follow-up data were collected. RIs were stratified in a site-specific manner, to evaluate the longevity of each treatment option. Statistical analysis was performed using SPSS 21.

Results: Of the 103 patients who met inclusion criteria, 28% (29) required RI for supravalvular PS. Twelve patients (12% of the total and 41% of those requiring at least one RI) required 21 additional RIs. BA of the main pulmonary artery (MPA) and left pulmonary artery (LPA) was associated with the need for multiple RIs (OR 4.9, 95% CI 0.99-24, p=0.051) and (OR 5.1, 95% CI 1.2-22, p=0.029) respectively. Freedom from future RI at the MPA and LPA was significantly shorter following BA as opposed to alternative RI options (HR 10, 95% CI 2.0-50, p=0.005) and (HR 3.2, 95% CI 1.2-8.7, p=0.02) respectively. BA at the right pulmonary artery was not associated with an increased risk of RI (OR 0.51, 95% CI 0.10-2.6, p=0.42).

Conclusions: Supravalvular PS following ASO for d-TGA is common and multiple RIs are required in a subset of patients. The benefit of BA at the MPA and LPA was shown to be temporary in nature. Attempting BAs at these locations remains reasonable, although families should be counseled about the increased incidence of, and time to, subsequent RI that is associated with this treatment option.

NOTES:

37. Imaging Surveillance After Proximal Aortic Surgery: Is it Necessary?

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Authors: Alexander Iribarne, Jeffrey Keenan, Hanghang Wang, Ehsan Benrashid, James M. Meza, Asvin Ganapathi, *Jeffrey Gaca, *G. Chad Hughes

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

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

Objectives: Current guidelines for imaging surveillance after proximal aortic repair are not evidence based. This study sought to characterize the incidence and causes for re-intervention following proximal aortic surgery to provide data regarding the frequency and duration of post-operative surveillance.

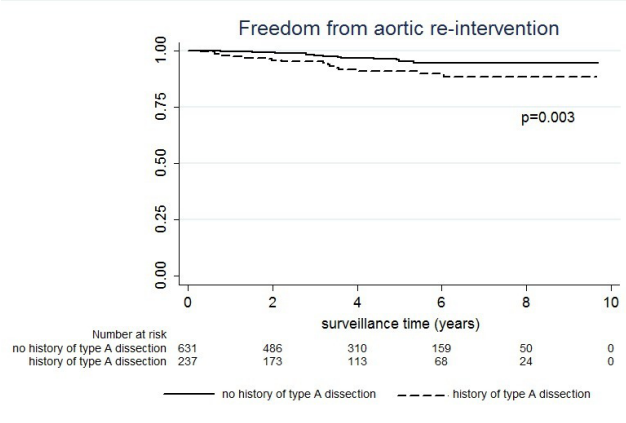
Methods: All patients undergoing proximal aortic surgery (ascending, ±root, ±AVR, ±arch) over 9 years (n=869) at a single institution were prospectively followed with at least annual CTA + TTE, or MRA. Patients who required re-intervention on the proximal or distal aorta were identified and causes for re-intervention determined. Planned two-stage repairs and index procedures done at outside hospitals were excluded. The primary endpoint was time to first re-intervention and Cox regression was used to model re-intervention risk.

Results: Re-interventions occurred in 4.3% of patients (n=37), with 48.6% (n=18) involving the proximal aorta and 51.4% (n=19) the distal. Mean time to re-intervention was 2.8 ± 1.6 years. For index aneurysm cases (Table), re-intervention for aneurysm of the descending/thoracoabdominal aorta and root were most common. For index type A dissections (Table), re-intervention for aneurysm of the descending/thoracoabdominal aorta and arch were most common. The mean duration of follow up was 4.2 ± 2.5 years. The nine year actuarial freedom from re-intervention was 92.9% (Figure). In Cox regression, index type A dissection was a significant predictor of time to aortic re-intervention (HR=2.3 ± 0.7, p=0.02).

Conclusions: Re-interventions after proximal aortic surgery are uncommon; most occur within 3 years of index surgery and involve the distal aorta. Patients with type A dissection or stentless porcine roots require aggressive surveillance, while a more liberal approach is suitable for patients without such risk factors. This approach may reduce lifetime radiation burden and healthcare costs.

Summary of Reinterventions After Proximal Aortic Surgery

	Reinterventions after Aneurysm Repair (N=21)	Reinterventions after Dissection Repair (N=15)	Reinterventions after Aortic Root Abscess Repair (N=1)
Median time to Reintervention (years, Q1, Q3)	3.0 (2.2, 4.4)	1.9 (0.7, 3.4)	3.5
Indication for Reinterventions			
Aortic Insufficiency	3 (14.3%)	0 (0%)	0 (0%)
Endocarditits	1 (4.8%)	0 (0%)	0 (0%)
Root Aneurysm/Pseudoaneurysm	6 (28.6.%)	2 (13.3%)	1 (100%)
Transverse Arch Aneurysm	1 (27.8%)	4 (26.6%)	0 (0%)
Descending/Thoracoabominal Aneurysm	10 (47.6%)	9 (60.0%)	0 (0%)
Type of Reintervention Performed			
Aortic Valve Replacement	4 (19.1%)	0 (0%)	0 (0%)
Redo Root/Ascending Aorta Replacement	6 (28.6%)	2 (13.3%)	1 (100%)
Arch Replacement	1 (4.8%)	4 (26.7%)	0 (0%)
Open Thoracoabdominal Aorta Replacement	1 (4.8%)	7 (46.7%)	0 (0%)
TEVAR	9 (42.9%)	2 (13.3%)	0 (0%)



Figure

NOTES:

38. Bicuspid Aortic Insufficiency With Aortic Aneurysm: Root Reimplantation versus Bentall Root Replacement

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Authors: Prashanth Vallabhajosyula, Caroline Komlo, Wilson Y. Szeto, Karianna Milewski, Fenton H. McCarthy, Nimesh D. Desai, Joseph E. Bavaria

Author Institution(s): *University of Pennsylvania, Philadelphia, PA*

Discussant: *Edward P. Chen, *Emory University School of Medicine, Atlanta, GA*

Objectives: In bicuspid aortic valve (BAV) patients presenting with aortic insufficiency (AI) and root aneurysm, we assessed whether outcomes of primary valve repair with root reimplantation were equivalent to the gold standard Bentall aortic root replacement.

Methods: From 2002 to 2014, 710 BAV patients underwent aortic root procedures. Of these, only patients presenting with non-calcified BAV with AI (n=165) were included to maintain anatomic and physiologic homogeneity between the groups. Aortic stenosis, endocarditis, redo root and emergency cases were excluded. Patients undergoing valve sparing root reimplantation (David V technique) (Reimplantation group, n=45) were compared to those undergoing Bentall root replacement (Bentall group, n=120) in a retrospective review.

Results: Bentall patients were older (52 ± 13 vs 46 ± 12 years, p=<0.01), had lower EF (53 ± 12% vs 58 ± 8%, p<0.01), but LV diastolic diameter was similar (58 ± 10 mm vs 57± 9 mm, p=0.5). In Bentall group, 85 patients (71%) had tissue composite, and 35 patients (29%) had mechanical composite grafts. In Reimplantation group, 100% had primary valve repair.

30-day/in-hospital mortality and stroke was zero; permanent pacemaker rate was similar (6% (n=7) vs 0, p=0.2). On discharge echocardiography, AI grade and transvalvular gradients were similar (Table 1). Mean follow-up was 7.5 ± 3.2 and 3.4 ± 2.9 years (p<0.001). There were 14 TIA/stroke events in Bentall group (5 in patients with mechanical valve); none in Reimplantation group. One patient in each group developed AI>3+. Actuarial survival (log-rank p=0.8) and freedom from aortic reoperation at 5 years (log-rank p=0.6) were similar (Figure 1).

Conclusions: In patients with BAV AI with root aneurysm, primary valve repair with root reimplantation can be performed with equivalent midterm outcomes compared to Bentall root replacement.

Table 1. Postoperative outcomes and discharge echocardiography values

	Bentall group (n=120)	Reimplantation group (n=45)	p
Outcome			
In-hospital/30-day mortality	0	0	1
Stroke/transient ischemic attack	0	0	1
Aortic valve reoperation	0	0	1
Reoperation for bleeding	5 (4%)	0	0.3
Permanent pacemaker	6 (5%)	0	0.2
Hospital duration of stay (days)	9 ± 5	7 ± 4	0.02
Discharge echocardiography			
Aortic insufficiency grade			
≤1+	120 (100%)	45 (100%)	1.0
Ejection fraction (%)	56 ± 14	60 ± 9	0.09
Peak gradient (mmHg)	14 ± 6	12 ± 6	0.08
Mean gradient (mmHg)	7 ± 3	6 ± 3	0.14

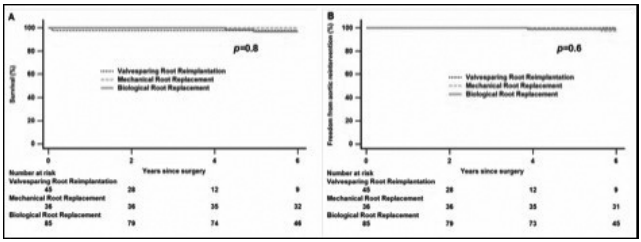

Figure 1. Kaplan Meier curves. A. Actuarial survival B. Freedom from aortic reintervention

NOTES:

39. Risk of Mortality After Resolution of Spinal Malperfusion in Acute Dissection

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Authors: Harleen K. Sandhu[1], Kristofer M. Charlton-Ouw[1,2], Charles C. Miller[1], Samuel S. Leake[1], DAli Azizzadeh[1,2], Tom C. Nguyen[1,2], *Anthony L. Estrera[1,2], *Hazim J. Safi[1,2]

Author Institution(s): [1]*University of Texas Health Science Center at Houston, Houston, TX;* [2]*Memorial Hermann Heart & Vascular Institute, Texas Medical Center, Houston, TX*

Discussant: *Thomas M. Beaver, *University of Florida, Gainesville, FL*

COMMERICAL RELATIONSHIPS: Ali Azizzadeh: Consultant/Advisory Board: W.L Gore, Medtronic

Objectives: Some patients presenting with acute aortic dissection and spinal cord ischemia (SCI) recover function with treatment of the dissection. We sought to determine how SCI recovery affects outcome.

Methods: We reviewed patients with SCI in acute type A aortic dissection (AAAD) and acute type B aortic dissection (ABAD) from 1999-2014. SCI was defined as paraplegia or paraparesis present on admission. Monoparesis/plegia, paraesthesia, or numbness was defined as ischemic neuropathy (IN). All ABAD patients were managed with anti-impulse therapy. Indications for surgery included rupture, rapid aortic expansion, malperfusion, or intractable pain. AAAD patients were managed with urgent aortic replacement.

Results: Of 979 acute dissections (490 AAAD; 489 ABAD), 181 (19%) had neurological symptoms. Of these, SCI with/without IN (SCI±IN) presented in 49/181 (27%) patients (mean age 60; 80% male). On admission, 23/49 (47%) had paraplegia, 12 (25%) paraparesis, 33 (67%) paresthesia/numbness, and 24 (49%) leg ischemia. 31/49 (63%) SCI±IN patients underwent aortic surgery. Symptom resolution was seen in 29/49 (59%). 30-day mortality was 22% (11/49) and was significantly less in those with resolution of SCI±IN (7% vs 45%, $p<0.001$). In ABAD, when surgical intervention is required, mortality is 60% ($p=0.001$). SCI±IN and symptom resolution significantly affected overall survival (Fig 1). SCI±IN is associated with significantly high risk of overall mortality (HR 4.2, $p<0.001$) and SCI±IN resolution completely offsets this risk (HR 0.23, $p<0.001$). These effects were consistent between AAAD and ABAD ($p=0.213$).

Conclusions: Spinal malperfusion in acute aortic dissection portends a poor prognosis. However, reversal of deficits is associated with a long-term survival outcome comparable to patients unaffected with SCI with/without IN.

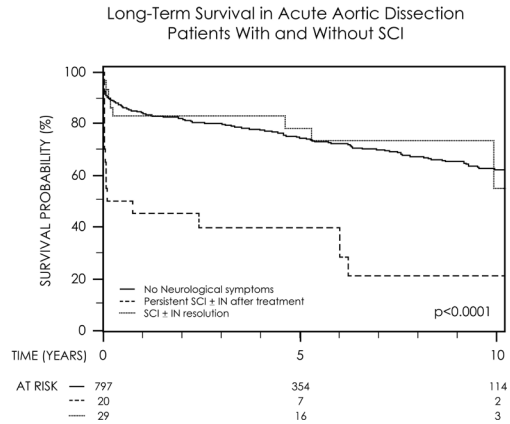

Figure 1: Long-term Survival for Type A Dissection by Spinal Cord Ischemia Status

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

NOTES:

40. Contemporary Results of Elective Primary Aortic Root Replacement With and Without Hemiarch Repair

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Authors: ***D****Joseph S. Coselli[1,2], ***D****Ourania Preventza[1,2], ***D***Kim I. de la Cruz[1,2], Susan Y. Green[1,2], Matt D. Price[1,2], ***D****Scott A. LeMaire[1,2]

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

Discussant: *Brian T. Bethea, *Tenet Healthcare Corporation, Coral Springs, FL*

COMMERICAL RELATIONSHIPS: Joseph S. Coselli: Consultant/Advisory Board: Vascutek Terumo, Research Grant: Vascutek Terumo; **Ourania Preventza:** Research Grant: Vascutek Terumo; **Kim I. de la Cruz:** Research Grant: Vascutek Terumo; **Scott A. LeMaire:** Research Grant: Vascutek Terumo

Objectives: Although excellent outcomes have been established for elective aortic root replacement (ARR), it is less clear whether extending the repair into the proximal aortic arch increases risk. Open hemiarch repair in which the lesser curvature of the aortic arch is replaced is usually performed when the aneurysm extends partly into the arch. Such repair usually requires brief hypothermic circulatory arrest (HCA)–a risk factor for postoperative stroke. We examined outcomes of elective, primary surgical ARR, with and without hemiarch repair, for aneurysm of the proximal aorta.

Methods: From November 1, 2010 to February 28, 2015, data were collected prospectively for 139 patients (age 51±15 y, range 15-81 y) who underwent open, elective, primary ARR for aneurysms without dissection; 117 (84%) procedures included hemiarch replacement. A connective tissue disorder was present in 34 patients (24%), bicuspid aortic valve in 56 (40%), and cerebrovascular disease in 6 (4%). Valve-sparing ARR was performed in 40 cases (29%) and valve-replacing ARR in 99 (71%) (mechanical, 55 [40%]; tissue, 44 [32%]). Moderate HCA (lowest temperature 23.7±2.2°C) and antegrade cerebral perfusion (ACP) were used in 116 hemiarch repairs (99%)–ACP was bilateral in 101 (87%) and unilateral in 15 (13%). The composite endpoint, adverse event, comprised operative death and permanent stroke, paraplegia, paraparesis or renal failure necessitating dialysis.

Results: There were no operative deaths or adverse events. Complications included temporary need for renal dialysis in 1 patient (0.7%) and 2 strokes (1.4%) that resolved before hospital discharge–none of these occurred after hemiarch repairs.

Conclusions: Contemporary elective primary ARR has excellent early outcomes, regardless of whether repair is extended into the proximal arch. Patients undergoing elective hemiarch repair with moderate HCA and ACP have a low risk of neurologic complications.

NOTES:

41. Clinical T2N0 Esophageal Cancer: When Is Induction Therapy Indicated?

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Authors: Pamela Samson, Clifford Robinson, Craig Lockhart, Varun Puri, Stephen Broderick, *Daniel Kreisel, *A. Sasha Krupnick, *G. Alexander Patterson, *Bryan Meyers, *Traves Crabtree

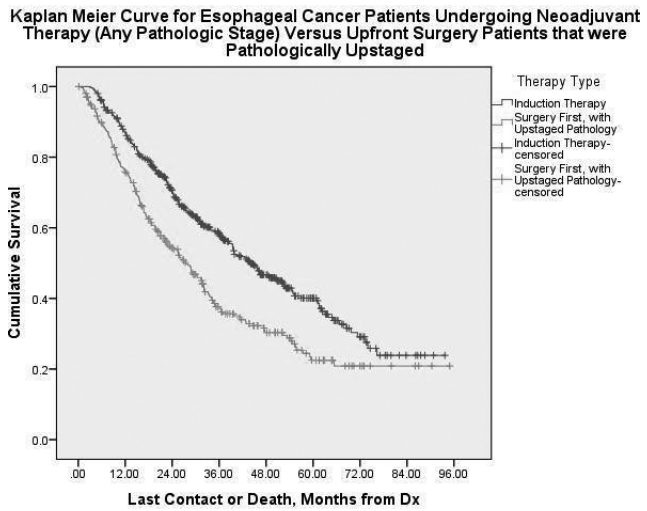
Author Institution(s): *Washington University, St. Louis, MO*

Objectives: Recent studies have recommended against induction therapy for clinical T2N0 esophageal cancer patients. We evaluated predictors of upstaging in cT2N0 patients receiving primary surgery and compared their overall survival to patients receiving induction therapy first.

Methods: Treatment data for cT2N0 esophageal cancer patients receiving either induction therapy or upfront esophagectomy was abstracted from the National Cancer Data Base (NCDB). Primary surgery patients were dichotomized as either 1) pathologically upstaged or 2) same-or down-staged. Logistic regression models identified variables associated with upstaging and Kaplan-Meier analysis compared overall median survival.

Results: From 2006-2012, 734 (56%) cT2N0 patients received primary surgery, while 575 received induction therapy first. 347 (47%) primary surgery patients were upstaged, while 387 (52.7%) were same- or down-staged. 87 (25.1%) patients had T upstaging, 119 (34.3%) had N upstaging, and 141 (40.6%) had both T and N upstaging. 150 (43.2%) upstaged primary surgery patients received adjuvant therapy. Upstaged primary surgery patients had higher tumor grade (56.2% versus 35.1% Grade 3), larger tumor sizes (38.5mm ± 19.4 versus 30.4mm ± 18.3), and a higher rate of lymphovascular invasion (LVI, 53.7% versus 17.7%), all $p<0.001$. Variables associated with pathologic upstaging included LVI (4.5, 2.2 - 9.3, $p<0.001$) and tumor grade 3 (5.4, 1.3 - 23.4, $p=0.02$), with a c-statistic of 0.73. The median overall survival for cT2N0 patients upstaged after primary surgery was 27.5 ± 2.5 months versus 43.9 ± 2.9 months for those receiving induction therapy with any resultant pathologic stage ($p<0.001$).

Conclusions: Half of all cT2N0 patients were upstaged after primary surgery with worse survival compared to cT2N0 patients undergoing induction therapy. Future efforts to create a model of upstaging may help in the tailored selection of patients for primary surgery versus induction therapy.



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42. Surgical Enteral Access Is Not Required to Maintain Nutritional Status in Esophagectomy Patients Undergoing Neoadjuvant Therapy

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Authors: Mary E. Huerter[1], Eric J. Charles[2], Yinin Hu[2], Christine Lau[2], James Isbell[2], *Benjamin D. Kozower[2]

Author Institution(s): [1]*University of Illinois, Chicago, IL;* [2]*University of Virginia, Charlottesville, VA*

Objectives: Maintaining or improving the nutritional status of esophageal cancer patients during neoadjuvant therapy is challenging. The objective of this study was to determine if feeding tube placement improved nutritional status and perioperative outcomes for patients undergoing neoadjuvant therapy.

Methods: The Society of Thoracic Surgeons database was used to identify all patients at our institution who underwent esophagectomy and neoadjuvant therapy between 2010-2014. Nutritional status before and after neoadjuvant therapy were determined through standardized nutrition consultations. The relationship between feeding tube placement and preoperative nutritional status was determined using multivariable logistic regression.

Results: 234 esophagectomy patients were identified, 127 (54%) receiving neoadjuvant therapy. 80% (102/127) of neoadjuvant patients presented with dysphagia, and 49% (62/127) of them received enteral feeding access. The average albumin at initial visit was 4.1 g/dL. The enteral access complication rate was 35% (44/62). 27% (17/62) of patients who received feeding access did not use it at all or did not use it consistently during the course of preoperative treatment. Multivariable regression revealed that high initial albumin level and the presence of enteral access were associated with nutritional stability during neoadjuvant therapy (Table 1). Enteral access was also associated with improved nutrition among patients who initially presented in malnourished states.

Conclusions: Enteral access can improve nutritional status for patients undergoing neoadjuvant therapy for esophageal cancer. However, complications and improper use are common. These results support judicious patient selection for enteral access, expedited neoadjuvant therapy, and collaboration with nutritionists for optimization.

Predictors of Stable or Improved Nutrition During Neoadjuvant Therapy

	Odds Ratio	95% CI	p-value
Enteral Access	4.624	1.749-12.227	0.002
Smoking	2.664	0.803-8.838	0.1093
ASA, 2 vs. 3	1.544	0.524-4.548	0.4305
Age, years	0.395	0.148-1.056	0.0642
Albumin, g/dL	3.315	1.239-8.866	0.017
Initial BMI, kg/m^2	0.968	0.346-2.707	0.9504

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43. Palliation of Concomitant Tracheo-bronchial and Esophageal Disease Using a Combined Airway and Esophageal Approach

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Authors: *Basil Nasir[1], Jordan Kazakov[2], ***D***Vicki Tiffault[3], Pasquale Ferraro[3], ***D***Moishe Liberman[3]

Author Institution(s): [1]*Vancouver General Hospital, Vancouver, BC, Canada;* [2]*University Hospitals Case Medical Center, Cleveland, OH;* [3]*Centre Hospitalier de l'Université de Montréal, Montreal, QC, Canada*

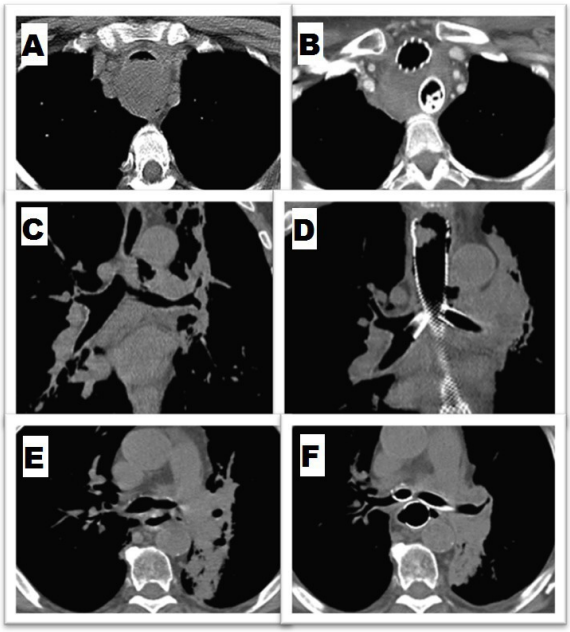
COMMERICAL RELATIONSHIPS: Vicki Tiffault: Research Grant: Boston Scientific, Educational and Research Grant: Ethicon Endo-Surgery; **Moishe Liberman:** Research Grant: Boston Scientific, Educational and Research Grant: Ethicon Endo-Surgery

Objectives: Neoplastic involvement of the mediastinum can contribute to both airway and esophageal pathology. This can manifest as combined esophageal and airway stenosis or tracheobroncho-esophageal fistula (TEF). Conventional palliative treatment of these problems consists of endoluminal stent insertion. The double-stenting approach consists of insertion of a tracheobronchial and an esophageal stent in parallel and allows concomitant symptomatic relief of both the airway and esophageal pathology.

Methods: The study consists of a retrospective case series of patients who underwent a double stenting procedure for concomitant airway and esophageal disease between August 2009 and March 2015. The type of airway stent chosen was determined based on the pathology and the level of the lesion (simple tubular in the mid-trachea or mainstem bronchus, Y-stent for carina).

Results: Thirty-nine patients were treated using the double stenting approach during a combined procedure over 5-years; including 15 with TEF and 24 with stenosis. Immediate relief of symptoms, defined as resuming oral intake and breathing without an external tracheal device, was observed in 25 patients (64%). Thirty-two patients (82%) were discharged from hospital and 7 patients died in hospital (18%). Of these 7 mortalities, 4 patients died from overwhelming metastatic disease and 3 patients died due to pneumonia complicating their disease. In hospital complications occurred in 11 patients (28%). Of the patients discharged from the hospital, 14 died during a mean follow-up period of 54 days. Mean and median survival were 49 and 20 days, respectively (range: 1-448 days) and median hospital stay was 3 days (range: 1-46 days).

Conclusions: Treatment of combined airway and esophageal pathology using a double stenting approach is safe, feasible, provides reasonable immediate palliation of symptoms and is associated with acceptable morbidity. It allows for early hospital discharge in the majority of patients.



A patient with obstruction of the proximal trachea and esophagus before (A) and after (B) stenting of the esophagus and trachea with a tubular stent

A patient with obstruction of the distal trachea and esophagus. Coronal (C) and axial (E) images before stenting. The same patient is shown after esophageal stenting and airways stenting with a Y stent; coronal (D) and axial (F) images are shown

NOTES:

44. Complex Esophageal Reconstruction Procedures Have Similar Outcomes to Routine Esophagectomy

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Authors: Jessica Moore, Craig M. Hooker, *Daniela Molena, Benedetto Mungo, *Malcolm V. Brock, Richard Battafarano, *Stephen C. Yang

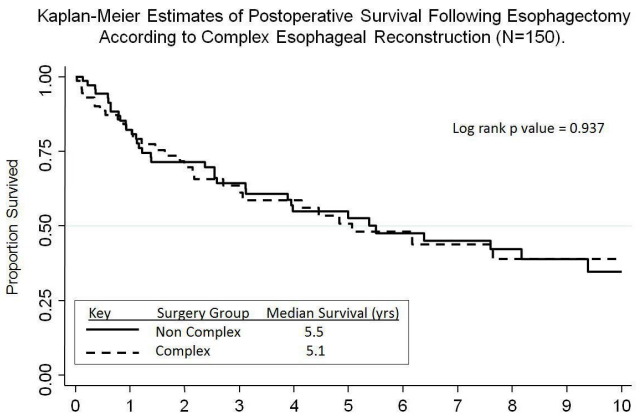
Author Institution(s): *Johns Hopkins University, Baltimore, MD*

Objectives: While most patients undergoing esophagectomy possess an undisturbed stomach for reconstruction, some require a more complex esophageal reconstruction (CER). CER is defined as restoring esophageal continuity using a non-gastric conduit, in a previously operated field, and/or following esophageal diversion. This study compares the outcomes of CER and non-CER (NCER), which uses an undisturbed stomach for reconstruction.

Methods: We performed a single-institution retrospective cohort study comparing 75 CER to 75 NCER from 1995-2014 matched for cancer versus benign disease. Distributions of demographic characteristics, comorbidities, and complications were compared between CER and NCER. Associations with complications and 30/90 day mortality were estimated using logistic regression. Overall survival (OS) was illustrated using Kaplan-Meier method and Cox proportional hazards regression.

Results: While patients were similar in age, sex, and pre-op comorbidities, more non-white patients underwent CER (p=0.04). Most NCER patients had adenocarcinoma (44%) or Barrett's high grade dysplasia (39%); CER patients had other benign disease (44%) or squamous cell carcinoma (24%; p<0.001). CER had higher rates of reoperation (29% vs. 11%, p=0.004), pneumonia (5% vs. 0%, p=0.04), systemic or surgical site infection (34% vs. 18%, p=0.02), and GI complications (25% vs. 11%, p=0.02) and a longer median length of stay (LOS, 18 vs. 9 days, p<0.001) than NCER. Mortality for CER and NCER at 30 days (1% vs. 1%, OR[95% CI] = 1.0[0.1-16.3]), 90 days (7% vs. 3%, OR[95% CI] = 2.6[0.49-13.9]; p=0.25) and overall (HR=1.56[0.89-2.74]; p=0.12) were similar.

Conclusions: Compared to NCER, CER patients had higher rates of return to the OR, postoperative infections, and GI complications, and longer LOS, but similar 30- and 90-day survival and OS. Therefore, CER is a viable option for patients with acceptable risks and anticipated long-term survival despite its apparent complexity.



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45. Use of Extracellular Matrix for Repair of Congenital Defects in Pediatric Patients

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Authors: Erin Harvey, ***D***Eric E. Roselli, Gosta Pettersson, Jahanzaib Idrees, *Robert Stewart

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

Discussant: *Sunjay Kaushal, *University of Maryland Medical Center, Baltimore, MD*

COMMERICAL RELATIONSHIPS: Eric E. Roselli: Investigator/ Research Support: CorMatrix

REGULATORY DISCLOSURE: This presentation describes the off-label use of extracellular matrix.

Objectives: Repair of congenital heart defects frequently involves the use of non-autologous patches. Extracellular matrix (ECM) is a readily available material that has the appeal of potential normal tissue ingrowth. We retrospectively assessed the technical outcomes of ECM patches used in pediatric congenital heart operations at our center.

Methods: All patients (<18 y) undergoing heart surgery between 4/2011 and 12/2013 using ECM were reviewed. Follow-up is 100% at a mean time of 13.5±8 months. There were 67 patches placed in 54 patients with a mean age of 3.2 y (2d to 17y), 31(57%) were less than one year. In 27(50%) patients ECM was used during initial repair, and in the other half during subsequent operations. Patients who required reintervention, either surgical or catheter based, were classified as failures.

Results: There were 8 total ECM failures in 7 patients (Table). Five failures (62%) were stenoses of branch pulmonary artery patches (3), tubularized grafts (1) or composite grafts (1) requiring stenting. Two sequential patches in the mitral valve dehisced in 1 patient. One patch used to close a systemic right ventricle developed a large aneurysm. No patch in the main pulmonary artery, RVOT or as a septal closure failed.

Conclusions: ECM performed reasonably well as a patch in low pressure areas surrounded by healthy tissue. In other areas, especially small pulmonary artery patches, there is a considerable failure rate, typically as stenosis.

	Number of Patches	Failures	Rate of Failure
RVOT and MPA	33	0	0%
Septal Defect Closure	7	0	0%
Branch PA	12	3	25%
Composite Graft + Hood	6	1	17%
Mitral Valve	2	2	100%
Closure of Ventriculotomy	1	1	100%
Tubularized Interposition Graft	2	1	50%
Sutureless Repair of Atrium	2	0	0%
Arch Augmentation	1	0	0%
Tricuspid Valve Repair	1	0	0%
Totals	67	8	12%

NOTES:

46. Comparison of Right Ventricle Function After Repair of Tetralogy of Fallot Using CorMatrix versus Bovine Pericardial Patch

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Authors: TK Susheel Kumar, Ronak Naik, Jason Johnson, *Christopher J. Knott-Craig

Author Institution(s): *Le Bonheur Children's Hospital, Memphis, TN*

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

Objectives: CorMatrix (extracellular matrix bioscaffold patch) is purported to have the potential to develop architecture organization that leads to viable tissue. We designed a study to compare echocardiographic characteristics of the right ventricle after non-transannular patch repair of TOF with CorMatrix versus bovine pericardium.

Methods: Subjects with greater than one year follow up after repair of TOF with a non-transannular patch formed the study group (n=19). A comprehensive echocardiogram focusing on the RV was prospectively obtained on all the subjects. Three dimensional (3D) RV ejection fraction (EF), RV global longitudinal strain and tricuspid annular plane systolic excursion (TAPSE) were used to assess RV function. Six segments RV longitudinal strain was obtained from the four chamber view as recommended by American Society of Echocardiography. 3D EF calculation and strain analysis of the data was performed using Echopac software. The data was interpreted in a blinded fashion.

Results: Ten patients had CorMatrix patch while 9 had bovine pericardium patch. The groups were similar in demographic and operative characteristics (Table 1). Mean RV 3D EF in the CorMatrix group was 55.7 ± 4.8 and 55.1 ± 5.4 in the bovine group (p=0.6). The average global RV strain was -18.5 ± 3.2 in the CorMatrix group compared to -18.0 ± 2.44 in the bovine group (p=0.39). Both the groups have lower global RV longitudinal strain compared to the healthy children. Decreased TAPSE values were noted in both the CorMatrix and bovine groups of 1.59 ± 0.16 and 1.57 ± 0.2 respectively (p=0.73)

Conclusions: There was no significant difference in RV function (3D RVEF or TAPSE) between the groups having CorMatrix versus bovine pericardium patches followed for more than 1 year after TOF repair. We were unable to demonstrate any benefit for patients having CorMatrix as a patch material.

Group Characteristics

	Cormatrix group	Bovine pericardium group	P - value
Age at operation (months)	3.8 ± 5.4	2.1 ± 2.2	0.09
duration of operation (min)	115.10 ± 32	128.38 ± 51.	0.19
follow up period (months)	44.5 ± 18	24.9 ± 11	0.001
Global RV longitudinal strain (%)	-18.0 ± 2.44	-18.5 ± 3.2	0.39
3D RV Ejection Fraction (%)	55.1 ± 5.4	55.7 ± 4.8	0.60
TAPSE (cm)	1.57 ± 0.2	1.59 ± 0.16	0.73

TAPSE tricuspid annular plane systolic excursion

NOTES:

47. Delayed Sternal Closure in Infant Heart Surgery – The Importance of Where and When: An Analysis of the STS Congenital Heart Surgery Database

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Authors: Kristen Nelson McMillan[1], Christoph Hornik[3], Xia He[3], *Luca Vricella[1], *Jeffrey P. Jacobs[1,2], Kevin D. Hill[3], Sara K. Pasquali[4], Diane Alejo[1], *Duke Cameron[1], Marshall L. Jacobs[1]

Author Institution(s): [1]*Johns Hopkins University, Baltimore, MD;* [2]*All Children's Hospital, St. Petersburg, FL;* [3]*Duke University, Durham, NC;* [4]*University of Michigan Heart Center, CS Mott Children's Hospital, Ann Arbor, MI*

Discussant: *James D. St. Louis, *University of Missouri, Kansas City, MO*

Objectives: Delayed sternal closure (DSC) is often used to optimize hemodynamic stability after neonatal and infant heart surgery. We hypothesized that duration of sternum left open (SLO) and closure in non-operating room (n-OR) location are associated with increased risk of postoperative infection.

Methods: Infants (≤365 days) undergoing index operations with cardiopulmonary bypass and DSC at STS-CHSD centers (2007-2013) with adequate data quality were included. Operations missing important covariates and/or outcomes data and those without a complication of "sternum left open" were excluded. Infectious complication was defined as any one or more of the following: Endocarditis, pneumonia, wound infection, wound dehiscence, sepsis, or mediastinitis. Multivariable regression models were fit to assess association of infectious complication with the following predictor variables: Duration of SLO (days), location of DSC procedure (OR vs n-OR), and patient and procedural factors.

Results: Of 6127 index operations with SLO (median duration 3 days, IQR: 2-5) at 100 centers, median age and weight at index operation were 8 days (IQR: 5-24) and 3.3 kg (IQR: 2.9-3.8). 58% were male and 66% of index operations were STAT Mortality Category 4 or 5. Infectious complications occurred in 19% (1144/6127). Infectious complications were more common with increasing duration of SLO ($p<0.001$). This was true for all 6 types of infectious complications. In adjusted analysis, SLO≥7 days was significantly associated with increased odds of infectious complication (table). DSC procedure was performed in an OR in16%, ICU in 67% and other in 17% (Figure). Location of DSC was not associated with occurrence of infectious complications (Table).

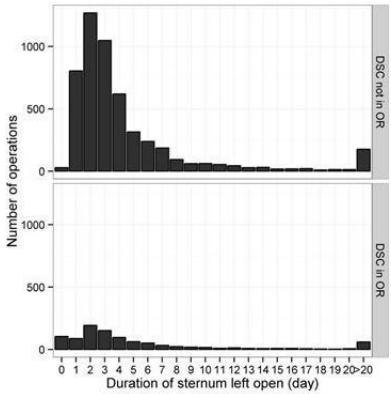
Conclusions: Longer duration of SLO is associated with increased risk of infectious complications. Location of DSC was not a determinant of infection risk.

Infectious complication rates and adjusted odds

	Any infectious complication Unadjusted %	Adjusted Odds Ratio (95% CI)
DSC procedure in OR	20%	REFERENCE
DSC procedure not in OR	18%	1.10 (0.86, 1.41)
Duration of SLO (days)		
0-1	14%	REFERENCE
2	15%	1.08 (0.83, 1.39)
3	17%	1.29 (1.00, 1.68)
4-6	16%	1.21 (0.94, 1.58)
7+	35%	3.87 (3.00, 4.99)

OR=Operating Room; CI=confidence interval; Wald test of overall effect of duration categories, $p<0.001$.

Figure. Number of Index Operations, by duration of sternum left open and location of last Delayed Sternal Closure procedure



DSC=delayed sternal closure; OR=Operating Room

NOTES:

48. Early Extubation Following Repair of Tetralogy of Fallot and the Fontan Procedure: An Analysis of The Society of Thoracic Surgeons Congenital Heart Surgery Database

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Authors: William T. Mahle[2,3], *Jeffrey P. Jacobs[1], *Marshall L. Jacobs[4], *Sunghee Kim[5], Susan Nicolson[6], *Paul M. Kirshbom[7], Sara K. Pasquali[8], *Erle H. Austin[9], *Kirk R. Kanter[3], *Kevin D. Hill[10,5]

Author Institution(s): [1]*Johns Hopkins All Children's Heart Institute, St. Petersburg, FL;* [2]*Children's Healthcare of Atlanta, Atlanta, GA;* [3]*Emory University, Atlanta, GA;* [4]*Johns Hopkins University, Baltimore, MD;* [5]*Duke Clinical Research Institute, Durham, NC;* [6]*Children's Hospital of Philadelphia, Philadelphia, PA;* [7]*Yale School of Medicine, New Haven, CT;* [8]*University of Michigan, Ann Arbor, MI;* [9]*University of Louisville, Louisville, KY;* [10]*Duke University, Durham, NC*

Discussant: Gil Wernovsky, *Nicklaus Children's Hospital , Miami Children's Health System, Miami, FL*

Objectives: To evaluate associations between institutional early extubation practices and post-operative length of stay (PLOS) following tetralogy of Fallot (TOF) repair and Fontan procedures.

Methods: Data from the Society of Thoracic Surgeons Congenital Heart Surgery Database (2010-2013) were analyzed to evaluate association of early extubation with post-operative length of stay (PLOS). Subjects extubated beyond 48 hrs were excluded. Centers were stratified into tertiles based on frequency of early extubation, defined as <6 hrs after leaving the operating room.

Results: Among 92 centers, early extubation was performed in 31.5% (N=478/1519) of patients undergoing TOF repair at age <45 days, and 69.8% (N=1153/1653) of patients undergoing Fontan procedures. There was substantial center-level variation in early extubation practices. Early extubation was undertaken for all TOF repair patients at 5 centers and all Fontan procedure patients at 20 centers. Early extubation after TOF repair was associated with greater weight at surgery (p<.001) and fewer pre-operative risk factors (P=.016). After adjustment for covariates, average PLOS after TOF repair was shorter for centers in the highest tertile of early extubation rate than for those in the lowest tertile (p=.04). There was no significant association between center early extubation rate and PLOS for Fontans (p=.08). Sensitivity analysis excluding the small volume centers, however, found no significant association between early extubation strategy of PLOS for TOF procedure (p=0.18) or Fontan procedure (p=0.30).

Conclusions: An early exubation strategy is employed by many centers after TOF repair and Fontan procedures. An institutional strategy of early extubation following TOF repair may be associated with shorter PLOS. Further analysis is needed to understand what impact early extubation may have on other outcome measures including resource use.

NOTES:

49. Intensive Glucose Management in Non-diabetics Improves Resource Utilization in Patients with Perioperative Hyperglycemia Undergoing CABG: A Prospective Randomized Trial

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Authors: Hanna A. Jensen, Guillermo Umpierrez, Jose Condado, *Michael Halkos, *Omar Lattouf, ***D***Robert Guyton, *William B. Keeling, *Vinod H. Thourani

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

Discussant: *Emmanuel Daon, *University of Kansas Medical Center, Kansas City, KS*

COMMERCIAL RELATIONSHIPS: Robert Guyton: Consultant/Advisory Board: Medtronic Inc.

Objectives: The optimal strategy of glycemic control in patients undergoing cardiac surgery is controversial. This prospective randomized trial compared the outcomes of patients with and without diabetes who experienced hyperglycemia during coronary artery bypass surgery (CABG).

Methods: A total of 302 consecutive patients noted to have hyperglycemia during CABG were prospectively randomized to conservative glucose management (n=151, BG target 141-180 mg/dL) or intensive insulin therapy (n=151, BG target 100-140 mg/dL) on arrival to the cardiac surgical ICU. An additional analysis was performed to study the outcomes between patients with (n=152, DM group) or without (n=150, non-DM group) diabetes for mortality and morbidity including wound infection, bacteremia, acute renal and respiratory failure, and major cardiovascular events.

Results: There were no differences in the overall rate of composite of hospital complications in patients with DM vs non-DM (49% vs. 45%, p=0.48). DM subjects, however, had a higher hospital mortality [7 deaths (5%) vs. 0 deaths 0%, p=0.02] and more episodes of acute renal failure (20% vs. 12%, p=0.05) than non-DM subjects. No differences were noted between the two overall treatment groups in terms of mortality, morbidity, length of stay, or readmission. However, in patients with non-DM hyperglycemia during CABG, intensive insulin therapy resulted in shorter intubation time (1.7+3.2 vs. 1.3+3.8 days, p=0.04) and shorter ICU stay (4.5+5.9 vs 3.1+4.6 days, p=0.02).

Conclusions: In the overall group, intensive glucose control did not significantly reduce morbidity or mortality compared to conservative BG management in hyperglycemic patients undergoing CABG. However, those patients with no history of preoperative diabetes (non-DM), intensive insulin therapy did result in shorter ventilation times and resource utilization.

NOTES:

50. Is There a Model to Predict Postoperative Pneumonia Following Isolated Coronary Artery Bypass Grafting?

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Authors: Raymond J. Strobel[1], Qixing Liang[1], Min Zhang[1], Mary A. Rogers[1], Patricia F. Theurer[1], Astrid B. Fishstrom[1], Steven D. Harrington[2], Alphonse DeLucia[3], Gaetano Paone[4], *Richard L. Prager[1], ***D***Donald S. Likosky[1], Michigan Society of Thoracic and Cardiovascular Surgeons Quality Collaborative[5]

Author Institution(s): [1]*University of Michigan, Ann Arbor, MI;* [2]*Henry Ford Macomb Hospitals, Clinton Township, MI;* [3]*Bronson Methodist Hospital, Kalamazoo, MI;* [4]*Henry Ford Hospital, Detroit, MI;* [5]*For the Michigan Society of Thoracic and Cardiovascular Surgeons Quality Collaborative, Ann Arbor, MI*

Discussant: *Vinay Badhwar, *University of Pittsburgh Medical Center, Pittsburgh, PA*

COMMERCIAL RELATIONSHIPS: Donald S. Likosky: PI/Research Grant: AHRQ, Consultant/Advisory Board: AmSECT

Objectives: Postoperative pneumonia, while infrequent, is the most prevalent of all hospital-acquired infections following isolated coronary artery bypass grafting (CAB). Efforts aimed at reducing the risk of pneumonia have been hampered by its low relative incidence, coupled with the lack of identified risk factors. In an effort to support clinical decision-making and quality improvement, we developed a preoperative prediction model for postoperative pneumonia following CAB.

Methods: We undertook an observational study of 16,084 patients undergoing CAB between Q3 2011- Q2 2014 across 33 institutions participating in the Michigan Society of Thoracic and Cardiovascular Surgeons - Quality Collaborative. Variables related to patient demographics, medical history, admission status, comorbid disease, cardiac anatomy and the institution performing the procedure were investigated. A $p < 0.05$ threshold in univariate analysis was employed for considering variables to be included in multivariable analysis. Logistic regression was utilized to estimate the occurrence of pneumonia, and the model's discrimination was assessed (i.e. c-statistic).

Results: Postoperative pneumonia occurred in 3.30% of patients. The final model was assembled via forwards stepwise selection, and included 6 preoperative variables after accounting for the hospital in which the procedure was performed (Table). The final model significantly predicted the occurrence of pneumonia, and performed well (c-statistic: 0.88).

Conclusions: In this new model, we identify 6 readily obtainable preoperative variables associated with postoperative pneumonia -- 5 of which exacerbate, and 1 which potentially mitigates risk. We believe this model may be useful for creating the opportunity to lower the incidence of postoperative pneumonia following CAB through informed clinical decision-making, quality improvement efforts and prehabilitation.

Prediction of Postoperative Pneumonia Following CAB

Variable	OR (CI 95%)
Preoperative Length of Stay	1.156 (1.144 - 1.168)
White Blood Count	1.029 (1.009 - 1.049)
Acuity: Urgent	0.625 (0.492 - 0.793)
Acuity: Emergent/Salvage	1.937 (1.281 - 2.929)
Home Oxygen Therapy	1.697 (1.024 - 2.810)
Current Cigarette Smoker	2.210 (1.795 - 2.719)
C-statistic: 0.88	

NOTES:

51. Close Follow-up and Early Office Evaluation Reduces the Most Common Causes of Readmission After Cardiac Surgery

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Authors: Ilia Gogichaishvili, Karen Rosa, *Nicolas A. Brozzi, *Edward B. Savage

Author Institution(s): *Cleveland Clinic Florida, Weston, FL*

Discussant: *Evelio Rodriguez, *St. Thomas Heart Hospital, Nashville, TN*

Objectives: CMS is reporting 30-day all-cause readmission rates (TDR) for cardiac surgery. Reported readmission rates for CABG in New York State (NYS) are 16.5% and from the Cardiothoracic Surgical Trial Network (CSTN) are 18.7%. Reducing TDR is part of the quality component of the ACA. In our practice post discharge care includes early phone calls by a medical assistant, home nurse visits and evaluation within 3-11 days after discharge by the surgeon. The aim of this study is to evaluate the impact of this approach on the most common reasons for readmission.

Methods: We retrospectively analyzed TDR for all 1066 patients who underwent cardiac surgery between 01/01/2009 and 11/25/2014. Data was obtained from our institutional STS data and chart review. The diagnoses and predictors of readmission were identified.

Results: The overall TDR was 102 (9.6%). Increasing age, female sex, African-American race, higher BMI, multiple comorbidities and complications, Medicare or Medicaid status, saphenous vein grafts, and longer lengths of stay were all associated with higher rates of TDR. The most common reasons for TDR were arrhythmia/heart block (10.8%), congestive heart failure (7.8%) and pneumonia/other respiratory complication (7.8%). 4.9% of TDR were due to postoperative infection. These data compare favorably with reported data (Table 1).

Conclusions: The highest impact to reduce TDR will be to reduce the most common causes: Arrhythmia, heart failure, and infection. We had observed that many postoperative complications treated by a third party resulted in readmission for problems treatable as an outpatient. With early follow-up, we routinely treat most wound infections, heart failure and uncomplicated atrial fibrillation with outpatient medications and frequent visits. Compared to published norms, this approach reduced the percentage of readmission for the most commons causes.

Table 1

	% of Readmissions	NYS %	CSTN %
Arrhythmia/Heart Block	10.8	6.3	17.1
Congestive heart failure	7.8	12.8	13.5
Pneumonia/Other Respiratory Complications	7.8	6.5	8.0
Postoperative wound infection	4.9*	16.9	11.1
* - statistically significant p value<0.025, 95% CI			

NOTES:

52. Malperfusion Syndromes in Acute DeBakey I Aortic Dissection: Open Repair With Concomitant Antegrade Stent Grafting of the Descending Thoracic Aorta

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Authors: *Prashanth Vallabhajosyula[1], Jean Paul Gottret[1], Zara Abbas[1], Matthew Kramer[1], Rohan Menon[1], Aaron Pulsipher[1], *Alberto Pochettino[2], Kariana Milewski[1], *Wilson Y. Szeto[1], *Joseph E. Bavaria[1]

Author Institution(s): [1]*University of Pennsylvania, Philadelphia, PA;* [2]*Mayo Clinic, Rochester, MN*

Discussant: *Anthony L. Estrera, *University of Texas Houston Medical School, Houston, TX*

REGULATORY DISCLOSURE: This presentation describes the off-label use of Thoracic Endovascular Aortic Stent Grafts (TEVAR grafts) for the treatment of DeBakey I dissections with end organ malperfusion.

Objectives: In acute DeBakey I aortic dissection presenting with malperfusion syndromes, we assessed whether standard open repair with concomitant antegrade stent grafting (TEVAR) of the descending thoracic aorta (DTA) improves outcomes compared to standard repair alone

Methods: From 2005 to 2012, 277 patients with acute DeBakey I dissection underwent emergent surgery. Of these, 104 (37%) presenting with end organ malperfusion were divided into those undergoing standard distal repair, entailing transverse hemiarch replacement (Standard group, n=65), versus standard repair with concomitant DTA TEVAR during circulatory arrest (TEVAR group, n=39). Prospectively maintained aortic dissection database was retrospectively reviewed

Results: Demographics and preoperative comorbidites were similar (p=NS). Circulatory arrest (56+12 vs 34+14 minutes, p<0.001) and cross clamp (176 ± 43 vs. 119 ± 80, p= 0.001) times were longer in the TEVAR group, but cardiopulmonary bypass time (232 ± 42 vs. 235 ± 94 minutes, p= 0.6) was not significantly different. Proximal reconstructive strategies were similar (p=NS).

Overall, postoperative stroke rate was similar (5% (n=2) vs. 6% (n=4); p=1), but renal failure rate was decreased in the TEVAR group (11% (n=3) vs. 38% (n=9), p=0.04). In-hospital/30-day mortality was similar in both groups (18% (n=7) vs 34% (n=22), p=0.1). In patients presenting with malperfusion in greater than one end organ system, mortality was significantly improved in the TEVAR group (22% (n=6) vs 58% (n=14), p=0.01) (Table 1)

Conclusions: Standard repair with antegrade TEVAR of the DTA for acute DeBakey I aortic dissection presenting with malperfusion syndromes can be safely performed. Further true lumen stabilization achieved through DTA TEVAR may provide pronounced survival benefit in DeBakey I dissection with multiorgan malperfusion

Table 1. Postoperative outcomes DeBakey I dissection patients with end organ malperfusion

	TEVAR group	Standard group	
	No. (%)	No. (%)	p value
Overall (N=104)	N=39	N=65	
Permanent stroke	2(5%)	4(6%)	1
Postoperative paraplegia	2(5%)	3(5%)	1
Spinal cord ischemia	2(5%)	1(2%)	0.5
New onset renal failure	4(10%)	14(22%)	0.2
Prolonged ventilation >24 hours	12(30%)	16(25%)	0.5
Reoperation for bleeding	6(15%)	6(9%)	0.3
In-hospital/30 day mortality	7(18%)	22(34%)	0.1
Multiple End Organ Malperfusion (n=51)	N=27	N=24	
Permanent stroke	1(4%)	2(8%)	0.6
Postoperative paraplegia	1(4%)	2(8%)	0.6
Spinal cord ischemia	2(7%)	0	0.5
New onset renal failure	3(11%)	9(38%)	0.04
Prolonged ventilation >24 hours	9(33%)	13(54%)	0.1
Reoperation for bleeding	5(19%)	4(17%)	1
In-hospital/30 day mortality	6(22%)	14(58%)	0.01

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

NOTES:

53. A Propensity Matched Assessment of Factors Predicting Improvement in Dyspnea in Adults Following Diaphragm Plication

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Authors: *Richard K. Freeman, *Anthony J. Ascioti, Megan Dake, Raja S. Mahidhara

Author Institution(s): *St. Vincent Hospital and Health System, Indianapolis, IN*

Objectives: A significant percentage of patients with lifestyle-limiting dyspnea attributable to unilateral diaphragm paralysis experience an improvement in their symptoms and spirometry following diaphragm plication. However, not all patients improve following surgery. The purpose of this investigation was to identify criteria which could differentiate patients who would benefit from plication from those that may not.

Methods: Adult patients undergoing plication of the hemidiaphragm for lifestyle-limiting dyspnea and unilateral diaphragm paralysis were identified. Patients who realized improvement using the Medical Research Council dyspnea score, pulmonary spirometry and activities of daily living questionnaire were propensity matched and then compared to patients who did not improve following plication.

Results: From 117 patients, 23 whose dyspnea and pulmonary spirometry did not improve following diaphragm plication were identified and propensity matched to patients whose symptoms did improve. Multiple logistic regression analysis identified four factors that predicted an improvement following plication; bodymass index > 35 kg/m2, FEV1 > 75% predicted, lack of paradoxical diaphragm motion and paralysis 6 years (table 1).

Conclusions: Plication of the hemidiaphragm produces significant improvements in dyspnea and pulmonary spirometry in the majority of patients with unilateral diaphragm paralysis. The four factors identified in this review can be used to identify patients that are more likely not to realize a significant improvement in their symptoms following plication surgery

Table - Diaphragm plication

	Improvement	No Improvement	p
N	23	23	
Age (mean yrs)	53	56	0.3
BMI > 35 kg/m2	4 (17%)	16 (70%)	0.0008
FEV1 >75% predicted	3 (13%)	15 (65%)	0.0007
Paradoxical diaphragm motion	17 (78%)	5 (26%)	0.0009
> 6 years of paralysis	6 (26%)	14 (61%)	0.04

NOTES:

54. Thymic Rotational Flap: An Anastomotic Buttress Technique for Minimally Invasive Ivor-Lewis Esophagectomy

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Authors: Jennifer L. Wilson, John Tillou, Sidhu P. Gangadharan, Jorind Beqari, Richard I. Whyte, Michael Kent

Author Institution(s): *Beth Israel Deaconess Medical Center, Boston, MA*

Objectives: To describe the use of a vascularized thymic rotational flap during minimally invasive Ivor-Lewis esophagectomy to buttress the esophagogastric anastomosis.

Methods: A prospectively maintained database of patients who underwent laparoscopic Ivor-Lewis esophagectomy for esophageal cancer between April 2008 and August 2014 was retrospectively reviewed. Cases in which a stapled, intrathoracic anastomosis was buttressed circumferentially using a rotational thymic flap were included. Anastomotic leak was defined as any extraluminal extravasation of contrast on a swallow study or CT, and/or upper endoscopy indicative of anastomotic disruption. Complication severities were graded using the Expanded Accordion Classification System.

Results: Sixty-three patients with esophageal cancer underwent minimally invasive Ivor Lewis esophagectomy with a thymic buttress during the review period. Anastomotic leak occurred in 7 (11.1%) of patients. Initial barium swallow failed to detect 42.9% of leaks. Two (28.6%) were subclinical and 3 (42.9%) were contained. Four leaks were graded as ≥ 4 (57.1%) using the Expanded Accordion Classification System. Three patients (42.9%) required revision of their anastomosis during the perioperative period at a mean of 8.7 days post operatively. Two patients (3.2%) in the cohort died during the perioperative period.

Conclusions: Although anastomotic leak after esophagectomy remains highly morbid, we observed that death due to anastomotic leak was rare in patients that had a laparoscopic Ivor Lewis esophagectomy with buttressing of the anastomosis using a rotational flap of the thymus. While modern day perioperative care remains an important factor in decreasing morbidity and mortality after leak, thymic buttress may also be a relatively simple way to provide an additional level of protection.

Patients with leak after minimally invasive Ivor Lewis esophagectomy and anastomotic buttress using a thymic rotational flap

Overall leak rate (%)	7/63 (11.1%)
Leak characteristics, n (%)	
- Clinically evident	5 (71.4%)
-Subclinical	2 (28.7%)
-Contained	3 (42.9%)
-Noncontained	4 (57.1%)
Initial barium swallow with no leak	3 (42.9%)
Post operative day leak diagnosed, mean (range)	9 (6-15)
Diagnostic technique demonstrating leak, n (%)	
-Barium swallow	3 (42.9%)
-Endoscopy	3 (42.9%)
-CT	1 (14%)
Management, n (%)	
-NPO and antibiotics	3 (42.9%)
-Reoperation with anastomotic revision	3 (42.9%)
-Esophageal stent after reoperation	1 (14%)
-Airway stent	1 (14%)
Resumed oral intake during the follow up period, n (%)	5 (71.4%)
Developed stricture requiring dilation, n (%)	3 (42.9%)
Developed metastatic esophageal cancer during the follow up period	1 (14%)

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55. Implications of Early Foley Removal in Thoracic Surgical Oncology Patients Utilizing Epidural Analgesia

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Authors: Natalie Sanchez, Jitesh B. Shewale, Carla Baker, Sonia A. Wilks, Arlene M. Correa, Boris Sepesi, *Reza Mehran, *David C. Rice, Jack A. Roth, *Garrett L. Walsh, *Swisher G. Stephen, *Ara Vaporciyan, *Wayne Hofstetter

Author Institution(s): *University of Texas MD Anderson Cancer Center, Houston, TX*

Objectives: Historically, it was presumed that the use of indwelling urinary catheters was required to prevent urinary retention in patients with thoracic epidural analgesia and prior studies have not clearly established the practicality of early catheter removal in this patient population. The Centers for Disease Control recommends removal of urinary catheters as soon as possible postoperatively. The objective of this study was to evaluate the feasibility of early Foley removal (EFR) in thoracic surgical patients receiving epidural analgesia.

Methods: We reviewed 99 thoracic surgery patients who participated in the EFR initiative from May 2012 to February 2013, who had their indwelling urinary catheters removed 12-72 hours postoperatively. Patients with a history of prostatism were excluded. We compared 70 lung resection patients from this group to propensity-matched patients who had surgery between April 2008 and April 2012. Study variables included incidence of recatheterization, urinary tract infection rates, difficulty voiding within 8 hours, and length of stay.

Results: In the EFR group (N=99), the median duration of Foley catheterization was 40 hours. Sixteen patients (19%) had difficulty voiding within 8 hours, but only 8 required catheterization (8%). Recatheterization did not affect the length of hospital stay (p=0.8086) in this group. Propensity matching showed no difference in the rate of urinary tract infection (1.4% vs. 1.4%, p=1.000) between the EFR group and non-EFR group. Although we observed a small decrease in the length of stay (0.5 day) in the EFR group, this difference was not statistically significant (p=0.342).

Conclusions: EFR was associated with low recatheterization rates, similar UTI rates, and slightly shorter LOS, supporting the CDC's recommendation to remove catheters early in thoracic surgical patients, despite epidural analgesia. EFR may promote patient comfort and mobility without compromising other quality of care metrics.

Demographic and Surgical Characteristics of EFR Patients

Variable	Result (N=99)
Mean age, years (range)	56 (13-85)
Male sex, n (%)	53 (53)
Type of surgery, n (%)	
Major lung *	40 (40)
Minor lung †	35 (35)
Esophagectomy	10 (10)
Other ‡	14 (14)
Type of procedure, n (%)	
Thoracotomy	83 (84)
Video assisted	14 (14)
Other	2 (2)

Note: Data are no. of patients (%)
Unless otherwise indicated.
* Pneumonectomy or lobectomy
† Segmentectomy or wedge resection
‡ Chest wall/mediastinal mass/lymph node resection

NOTES:

56. Establishing a General Thoracic Surgery Subspecialty Program Improves Early and Long-term Outcomes in Patients Undergoing Lobectomy for Lung Cancer

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Authors: *Mitchell Magee[1], Lynn Tumey[1], *Syma L. Prince[2], Morley A. Herbert[1]

Author Institution(s): [1]*Medical City Dallas Hospital, Dallas, TX;* [2]*CRSTI, Dallas, TX*

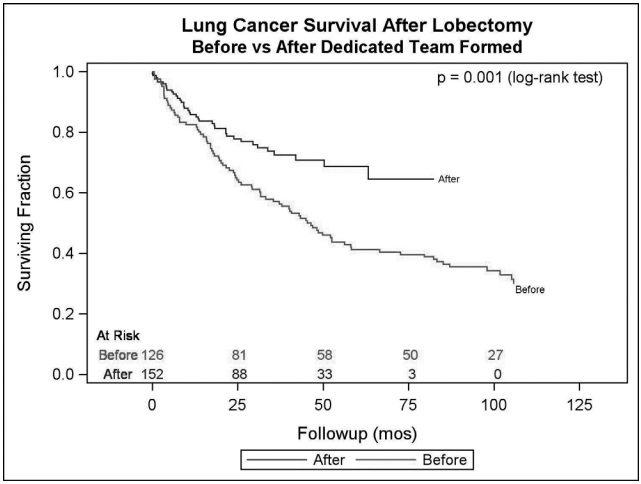
Objectives: Dissparate factors impact outcomes after lobectomy for lung cancer. Improved early outcomes may be achieved at the expense of long-term survival due to inadequate staging. A dedicated general thoracic surgery program with a focus on minimally invasive surgery and thoracic oncology was established in 2008. We hypothesized that a focused thoracic surgery program would improve short-term outcomes without sacrificing long-term survival.

Methods: Patients entered into the hospital Cancer Registry have survival status updated annually through correspondence with patients, physicians, and searches of the Social Security Death Index and obituaries. The registry was queried for all patients undergoing lobectomy for lung cancer, 2002-2013, and divided into 2 treatment groups, "Before" and "After," based on surgery date relative to 2008. Chi-squared statistics were used for proportions, t-tests for continuous variables and a non-parametric test for length of stay. Kaplan-Meier survival curves were constructed using time between surgery and death or last follow-up.

Results: 280 patients (126 "Before," 152 "After,") who had lobectomy for lung cancer were identified in the registry. Data included surgical approach (% VATS), pathologic stage, number of lymph nodes and stations sampled, length of stay (LOS) following surgery, and survival. Patients having lobectomy "After" had significantly more VATS procedures, decreased LOS, greater mean total lymph nodes and nodal stations sampled, similar 1 year survival, and improved 3 year (Table 1) and overall survival (Figure 1).

Conclusions: Establishing a focused general thoracic surgery subspecialty program, with emphasis on MIS and thoracic oncology, improved short-term outcomes with increased VATS utilization and decreased LOS. Long-term survival was also improved, likely attributed to better lymph node assessment, more accurate pathologic staging, and more appropriate stage-based therapy.

	Before	After	p-Value
Lobectomy Patients	126	152	
Missing Path Stage	19 (15.1%)	1 (0.7%)	< 0.001
Path Stage 1	75 (59.5%)	98 (64.5%)	0.397
Stage 2	15 (11.9%)	30 (19.7%)	0.078
Stage 3 / Stage 4	14 (11.1%) / 3 (2.4%)	20 (13.2%) / 3 (2.0%)	0.604 / 0.816
% VATS	9.5%	53.9%	<0.001
Mean LOS (days)	9.5 ± 10.2	5.2 ± 7.1	<0.001
Median LOS	7	3	<0.001
Mean # Nodes/Patient	6.3 ± 5.6	9.0 ± 6.8	<0.001
Mean # Stations/Patient	2.7 ± 1.4	4.2 ± 1.5	<0.001
1 Year Survival	82.5%	86.2%	0.403
3 Year Survival	57.1%	70.4%	0.036
Overall Survival	32.5%	74.3%	<0.001
Mean Follow-up (mos)	56.9 ± 44.1	31.9 ± 21.1	<0.001
Median Follow-up	46	29	0.116


Lung Cancer Survival After Lobectomy
Before vs After Dedicated Team Formed
p = 0.001 (log-rank test)
Surviving Fraction
1.0
0.8
0.6
0.4
0.2
0.0
After
Before
At Risk
Before 126 81 58 50 27
After 152 88 33 3 0
0 25 50 75 100 125
Followup (mos)
After Before

NOTES:

57. Current Outcomes of Surgical Management of Aorto-pulmonary Window and Associated Cardiac Anomalies

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Authors: *Bahaaldin Alsoufi, Ritu Sachdeva, Brian Schlosser, *Brian E. Kogon, *Kirk R. Kanter

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

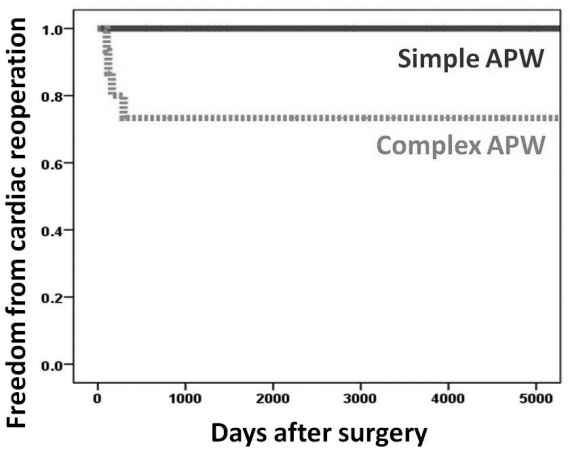
Discussant: *Carl L. Backer, *Ann and Robert H. Lurie Children's Hospital of Chicago, Chicago, IL*

Objectives: Aorto-pulmonary window (APW) is a rare congenital heart defect that is often associated with other cardiac anomalies. Prior reports showed that while early repair of isolated APW was associated with low risk, repair of complex APW was associated with higher mortality and reoperation risks. We report current results of surgical repair of APW, including those with associated cardiac anomalies.

Methods: Forty children underwent APW repair at our institution (1994-2013). Early and late outcomes were examined and the effect of anatomic and patient variables on survival and reoperation were explored.

Results: Median age at time of repair was 22 days (IQR 8-61) and median weight was 3.2 Kg (IQR 2.8-3.8). Eleven patients (28%) were premature ≤ 36 weeks and 10 (25%) had associated genetic/extra-cardiac malformations. Mean APW size was 0.8±0.3cm and the type per Mori classification was I (n=17, 43%), II (n=18, 45%) or III (n=5, 13%). Twenty-five patients (63%) had simple APW with no associated cardiac anomalies other than ASD or PDA while 15 (38%) had complex APW. There was no hospital mortality and 10-year survival was 100%. Ten-year freedom from cardiac reoperation was 100% for simple APW vs. 73% for complex APW (p=0.008) with the majority of reoperations related to aortic obstruction (75%) followed by pulmonary artery stenosis (25%). Reoperation was not associated with age, weight, prematurity, genetic/extra-cardiac anomalies, APW size or type (p=NS for each).

Conclusions: Current outcomes of early surgical repair of APW are excellent, including complex APW associated with other cardiac anomalies. Compared to historical reports, those favorable contemporary outcomes, especially in infants with complex APW, support early and complete repair of all children with APW. Cardiac reoperation risk following simple APW repair is minimal however it continues to be required in complex APW and is related to aortic or pulmonary artery obstruction.



NOTES:

58. Repair of a Large Aortopulmonary Window in a 13-month Old

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Authors: K C. Jones, Graham D. Ungerleider, *Yoshio Otaki, Michael Walsh, *Ross M. Ungerleider

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

Objectives: This video demonstrates repair of a large aortopulmonary window (APW) that extends far enough distally onto the ascending aorta that it makes cannulation for CPB challenging.

Methods: A shunt is placed onto the innominate artery and used for arterial perfusion.
We demonstrate a technique that helps limit troublesome bleeding during CPB from this anastomosis. The very limited ascending aorta between the top of the APW and the head vessels can be appreciated but still provides adequate space for aortic crossclamping. Arterial perfusion through a shunt facilitates CPB. The APW is closed with a single patch and the anatomy is nicely visualized.

Results: The patient had a successful outcome, although her age at the time of surgery resulted in several days of postoperative pulmonary hypertension requiring nitric oxide. Her subsequent course has been uncomplicated and she is doing well post hospital discharge.

Conclusion: The use of a side graft to the innominate artery for arterial perfusion, as is common in aortic arch reconstruction for hypoplastic left heart syndrome or interrupted aortic arch, can also be used in children to facilitate procedures where aortic cannulation space is limited.

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59. Repair of Partial Atrioventricular Septal Defect: Age and Outcomes

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Authors: Paul J. Devlin, *Carl L. Backer, Osama Eltayeb, Michael C. Monge, Amanda Hauck, John M. Costello

Author Institution(s): *Ann & Robert H. Lurie Children's Hospital of Chicago, Chicago, IL*

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

Objectives: The ideal age for partial atrioventricular septal defect (PAVSD) repair remains controversial. We analyzed the effect of age on outcomes in children having PAVSD repair.

Methods: Between 1990 and 2014, 88 children underwent PAVSD repair by pericardial ASD patch with routine left atrioventricular valve (LAVV) zone of apposition closure. We divided the patients into 4 age quartiles of 22 patients each: (I=0-0.75 years, II=0.75-1.5 years, III=1.5-3.5 years, and IV>3.5 years). These quartiles were evaluated univariately for their association with the following time-to-event outcomes: survival, freedom from LAVV regurgitation, and freedom from reoperation using log-rank analysis.

Results: Median age at surgery was 1.6 years. There were no operative deaths. There were 11 reoperations with no statistically significant difference in frequency of reoperation between the four age quartiles (p=0.094). The most common reoperation was repair of left ventricular outflow tract obstruction (6 patients [I=4, II=2]). LAVV regurgitation repair was required in 3 patients (I=1, II=1, III=0, IV=1). Two patients required pacemaker placement, one each in quartiles II and IV. Median time to latest available echocardiogram was 1.3 years (IQR: 0.01-7.7 years); 74 patients (65%) had ≤ mild LAVV regurgitation, 8(7%) mild-to-moderate, 5(4%) moderate, and 1(0.8%) severe. Age at repair had no significant association with long-term AV valve insufficiency.

Conclusions: Results of PAVSD repair at a median age of 1.6 years are excellent. Operating at this earlier age is not statistically associated with increased mortality, reoperation, or LAVV regurgitation.

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60. Intentional Delay versus Usual Management for Low Birth Weight Newborns With Congenital Heart Disease

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Authors: Joanne W. Ho, Aaron Lemieux, Daniel Sisti, Florin Vaida, John Lamberti, *Daniel J. DiBardino

Author Institution(s): *University of California, San Diego, San Diego, CA*

Discussant: Gil Wernovsky, *Nicklaus Children's Hospital , Miami Children's Health System, Miami, FL*

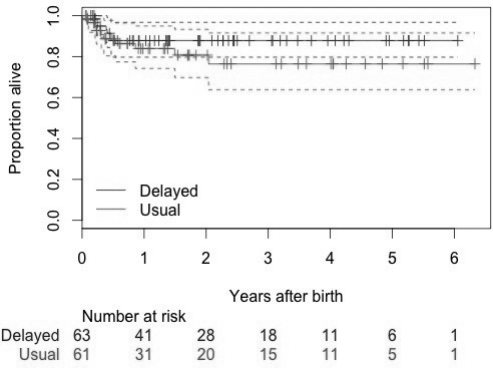
Objectives: There is controversy regarding the resultant outcome for low birth weight (LBW)/ premature newborns subjected to intentional delay of cardiac surgical correction. The purpose of this study is to quantitate the effects of intentional delay.

Methods: All neonates over a 6-year period were reviewed, long-term survival determined and risk factors identified. For LBW patients (≤ 2.5 kg), long-term survival was compared for those subjected to intentional delay versus usual management and risk factors determined. Intentional delay was defined as lesion-specific definitive palliation/correction intentionally performed outside our standard pathways, regardless of the use of temporary palliations.

Results: There were 582 newborns; hypoplastic left heart syndrome (HLHS; HR=4.29, p<0.001), total anomalous venous return (HR=3.75, p=0.005), and surgical weight (HR=0.69, p=0.014) were significant predictors of longer-term mortality. For those with LBW (n=124, 21%), gestational age (HR=1.39, p=0.007), HLHS (HR=16.29, p<0.001), surgical weight (HR=0.55, p=0.029), and pulmonary co-morbidity (HR=22.31, p=0.020) were significant predictors of long-term mortality. LBW patients subjected to intentional delay (n=63/124) had lower mean birth weight (1.81 ± 0.53 kg, p=0.042) and achieved higher mean surgical weight (4.42 ± 1.56 kg, p<0.001) than those not intentionally delayed (n=61/124). Usual management had 76.4% versus intentional delay 87.8% survival at 5 years (p=0.256, Figure 1). Surgical complication rate was comparable between groups (33% usual, 29% delayed, p=0.753).

Conclusions: While LBW was not an independent mortality risk factor overall, lower surgical weight and HLHS were consistent factors. The smallest patients were more likely to be subjected to delay, achieving higher surgical weight with equivalent 5-year outcomes and complication rates.

Figure 1



Differential Kaplan Meier curves demonstrating no significant difference in survival up to 5 years for LBW newborns subjected to intentional delay versus those treated in the usual pathway (87.8 vs 76.4%, p=0.256)

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

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61. Utilization of Marginal Donors for Orthotropic Heart Transplantation Over Fifteen Years: Analysis of the United National Organ Database 2000-2014

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Authors: Salil V. Deo[1], Dipesh Shah[2], Shannon Dunlay[3], Sachin Kumar[1], Salah Altarabsheh[4], Basar Sarreyupoglu[1], Benjamin Medalion[1], Jon Kobashigawa[5], Biswajit Kar[6], Robert Kormos[2], Soon J. Park[1]

Author Institution(s): [1]*University Hospitals, Cleveland, OH;* [2]*University of Pittsburgh Medical Center, Pittsburgh, PA;* [3]*Mayo Clinic, Rochester, MN;* [4]*Queen Alia Heart Institute, Amman, Jordan;* [5]*Cedars Sinai Heart Institute, Los Angeles, CA;* [6]*Memorial Hermann Health System, Houston, TX*

Discussant: *Umraan S. Ahmad, St. Anthony's Heart and Vascular Institute, St. Louis, MO

Objectives: Given the finite donor pool, extended donor selection has led to increased utilization of so-called "marginal donors". We report trends in use of these donors for orthotropic heart transplant (OHT) over a fifteen-year period from a national database.

Methods: Retrospective analysis of the United Network Organ Sharing database (2000-2014) was conducted to identify marginal donors as per a well-validated donor risk score. We studied variation in marginal donor allocation over time as well as results of marginal donor use in the contemporary era (2010-2014).

Results: Between 2000-2014, 6236/32989 (19%) received marginal donors (60% male, mean age 42+12yrs). Increasing age [OR 1.01(1.01-1.02); $p<0.01$], female gender [OR 1.16(1.07-1.25); $p<0.01$], ECMO support [OR 1.53(1.14-2.04); $p<0.01$] and longer wait-time ($p=0.05$) increased the odds of receiving a marginal heart. Early mortality with marginal donors declined significantly between early and contemporary time periods (8.4% vs 5%; $p<0.01$). Marginal donor use was associated with longer post-operative stay (15 vs 14 median days; $p<0.01$) and higher incidence of pacemaker implant (4.1% vs 2.8%; $p<0.01$) and dialysis (12% vs 9%; $p<0.01$) during follow-up. Median survival with marginal donors is 10.5 yrs. Mid-term actuarial survival for recipients with these donors improved from 64+2% (2000-2004) to 73+4% (2010-2014) ($p<0.01$).

Conclusions: Marginal donor use has increased over the last fifteen years with improved early and mid-term survival. Increasing recipient age, female gender, support on ECMO and longer wait time increased likelihood of receiving a marginal donor heart at transplant.

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62. Timing and Frequency of Unplanned Readmissions After Lung Transplant Impacts Long-term Survival

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Authors: Entela B. Lushaj, Walker Julliard, *Shahab Akhter, Satoru Osaki, James Maloney, Keith Meyer, Nilto DeOliveira

Author Institution(s): *University of Wisconsin, Madison, WI*

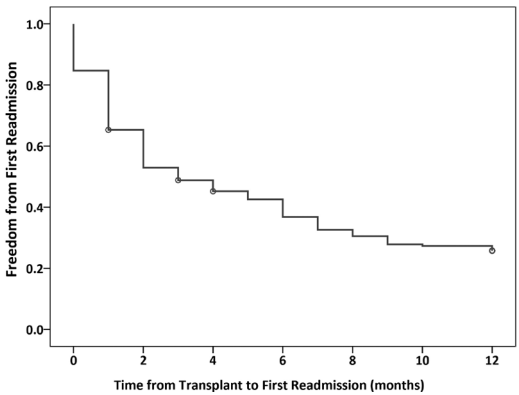
Discussant: *Christine L. Lau, *University of Virginia, Charlottesville, VA*

Objectives: Complications often occur long after lung transplantation (LT), requiring hospital readmission. Our goal was to identify the rate and etiology of unplanned readmissions following LT. We also analyzed the impact of unplanned readmissions on post-transplant survival.

Methods: We retrospectively reviewed 327 patients undergoing LT from 06/2005 to 05/2014. Of those, 143 patients from the Veterans Affairs hospital and 10 patients who expired during index hospitalization were excluded from the analysis. The median follow-up period was 3.3 (IQR: 1.4-6.5) years.

Results: Of the sample (n=174), 160 (92%) patients were readmitted 854 times (5.3 times/patient) as of end of follow-up. Median time to first readmission was 71 (inter quartile range (IQR): 28-240) days. Median hospital length of stay at readmission was 3 (IQR: 2, 6) days. Freedom from first readmission was observed for 65% of patients at 1 month, 48% at 3 months, 43% at 6 months and 26% at 12 months (Figure). Of the readmitted patients, 90 (56%) had bilateral LT. The main pre-transplant diagnoses of readmitted patients were interstitial lung disease (39%), chronic obstructive pulmonary disease (26%), bronchiectasis (14%), cystic fibrosis (11%) and other (10%). Pre-transplant diagnosis did not impact the frequency of readmissions (p=0.30). Causes for readmission were infections (33%), respiratory complications (22%), rejection (14%), gastrointestinal (14%), renal (5%), cardiac (3%) and other (9%). Readmissions for respiratory infections comprised 92% of infection-related readmissions. Patients who expired were found to have early (p=0.033) and more frequent readmissions (p=0.008).

Conclusions: The first year after LT remains a high risk period for unplanned readmissions regardless of pre-transplant diagnosis. Readmissions soon after discharge and multiple readmissions increase the risk of mortality.



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

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63. Unconventional Institutional Volume-outcome Associations in Adult Extracorporeal Membrane Oxygenation in the U.S.

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Authors: Fenton H. McCarthy, Katherine M. McDermott, Ashley C. Hoedt, Vinay U. Kini, Pavan Atluri, Ann C. Gaffey, Wilson Y. Szeto, Michael Acker, Nimesh D. Desai

Author Institution(s): *University of Pennsylvania, Philadelphia, PA*

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

REGULATORY DISCLOSURE: DISCUSSANT: Joseph B. Zwischenberger: Licensed Patent/Royalties: Avalon Laboratories (Maquet); Advisory Board: CytoSorbents Corp.

Objectives: To evaluate institutional volume-outcome relationships in extracorporeal membrane oxygenation (ECMO).

Methods: All institutions with adult ECMO discharges in the Nationwide Inpatient Sample from 2002-2011 were evaluated. ICD-9 codes were used to identify ECMO patients, indications for ECMO, and concurrent procedures. Post-cardiotomy ECMO patients were excluded. Annual institutional and national volume of ECMO hospitalizations varied widely, so the number of ECMO cases performed at an institution was calculated for each year independently. Institutions were grouped into high, middle, and low volume terciles by year. Statistical analysis included Pearson's chi square and Fisher's exact tests.

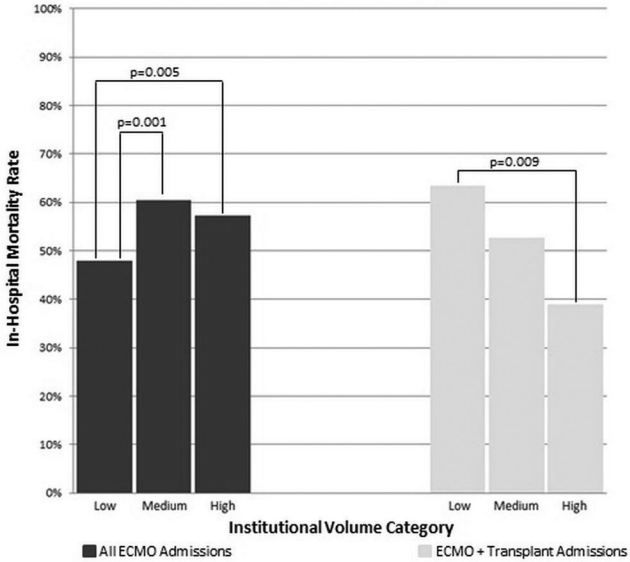
Results: In-hospital mortality rates for ECMO admissions at low, medium, and high volume ECMO centers were 48% (n=467), 60% (n=285), and 57% (n=445), respectively (p=0.001). In post-hoc pairwise comparisons, patients at low volume hospitals were more likely to survive to discharge compared to mid (p=0.001) and high volume (p=0.005) hospitals. There was no significant difference in survival between mid and high volume hospitals (p=0.81). In a sub-analysis of respiratory failure patients, low volume centers maintained the lowest rates of in-hospital mortality at 47% vs 61% in mid volume institutions (p=0.045) and 56% in highvolume institutions (p=0.15). Examining case-mix by institutional volume revealed that the relative percentages of lung transplant, respiratory failure, and cardiogenic shock patients selected for ECMO differed significantly between groups (Table 1).

Conclusions: ECMO outcomes do not follow a traditional volume-outcome relationship, and these results suggest ECMO can be performed with acceptable results in U.S. centers that do not perform a high volume of ECMO. Variance in case-mix between volume groups may indicate systemic differences in the ECMO patient population at low, mid, and high-volume centers that may contribute to disparate outcomes.

ECMO Patient Case-Mix by Primary Indication in Low, Mid, and High Volume Centers

	Institutional Volume Category				
Primary Indication for ECMO	All	Low Volume	Mid Volume	High Volume	p (Pearson's chi-square)
Heart Transplant	6%	4%	8%	6%	0.019
Lung Transplant	11%	5%	11%	18%	<0.001
Cardiogenic Shock	53%	59%	55%	47%	0.039
Respiratory Failure	29%	31%	25%	29%	0.027
Trauma/Drowning	1%	1.3%	0.7%	0.7%	0.358

Figure 1. In-Hospital Mortality vs. Institutional ECMO Volume for All ECMO Admissions and for ECMO Admissions Involving a Transplant



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64. Does Donor Cardiopulmonary Resuscitation Time Affect Heart Transplantation Outcomes and Survival?

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Authors: Allen Cheng, Jaimin Trivedi, *Mark Slaughter

Author Institution(s): *University of Louisville, Louisville, KY*

Discussant: *Ahmet Kilic, *The Ohio State University Medical Center, Columbus, OH*

Objectives: Donor heart availability has limited the number of heart transplantation in the US while the number of wait list patients for transplant continues to increase. It is important to optimize the utilization of all available donor heart in order to reduce the wait list mortality. Donor cardiopulmonary resuscitation time (CPR) has been proposed to be a selection criteria to consider in donor selection. In this study, we aim to examine whether the duration of donor CPR will affect recipient post-transplantation outcomes and survival utilizing the UNOS database.

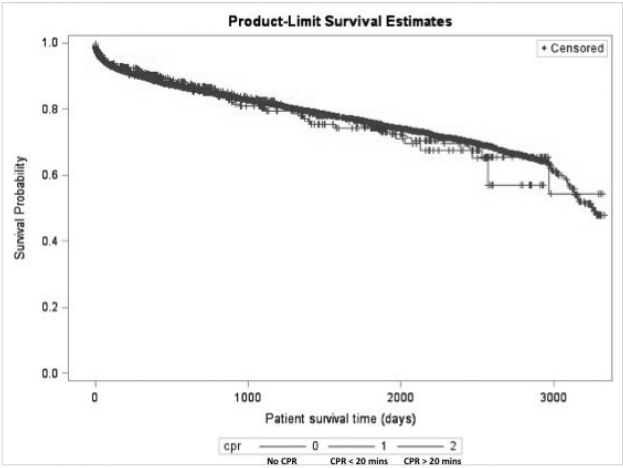
Methods: The United Network of Organ Sharing database was retrospectively queried from January 2005 to December 2013 to identify adult patients who underwent heart transplantation. This population was divided into 3 groups: Donor with no CPR, with CPR < 20 minutes and CPR > 20 minutes. Kaplan-Meier analysis was used to compare the recipient post-transplant survival between groups, and the post-transplantation outcomes were examined.

Results: A total of 17,022 patients received heart transplantation during this time period. Of those, 16,042 patients received hearts from donor with no CPR, 639 patients from donor with CPR < 20 minutes and 341 patients from donor with CPR > 20 minutes. The donor characteristics are listed in Table 1. The post-transplant survival at 1 (89% vs. 90% vs. 89%) and 5 (75% vs. 74% vs. 73%) years were not significantly different between the groups (Figure 1). The recipient primary graft failure and rejection rate were similar between groups (Table 1).

Conclusions: The duration of donor cardiopulmonary resuscitation does not affect post-transplant outcomes and survival. In an effort to optimize available donor heart utilization, donor CPR time can be considered as a less relevant factor for donor selection.

Variables	No CPR (n=16042)	CPR<20min (n=639)	CPR>20min (n=341)
Donor			
Age	31.6+11.8	30.4+10.9	31.9+11.1
Gender-Male	72%	69%	65%
History of Cocaine Use	14.1%	14.5%	23%
Inotrope	1.3%	2.1%	1.7%
Vasopressin	61%	61%	55%
Ejection Fraction (%)	61.6±7.1	61.6±7.9	60.7±7.4
CPR time (minutes)	N/A	10.3±6.1	37.9±15.1
Ischemia Time (Hours)	3.2±1.0	3.1±1.0	3.1±0.9
Recipient			
Acute Rejection	16%	18%	16%
Graft Failure at most recent follow-up*	7%	6%	7%

*mean follow-up of 5.5 years


Product-Limit Survival Estimates
+ Censored
Survival Probability
1.0
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0.6
0.4
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0.0
0
1000
2000
3000
Patient survival time (days)
cpr
0
1
2
No CPR
CPR < 20 mins
CPR > 20 mins

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HAROLD URSCHEL HISTORY LECTURESHIP

65. C. Walton Lillehei – His Trials, His Triumphs, and the 200% Solution

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Authors: *Erle H. Austin[1,2]

Author Institution(s): [1]*University of Louisville, Louisville, KY;* [2]*Kosair Children's Hospital, Louisville, KY*

This presentation will provide a view into the remarkable life and times of one of the most controversial pioneers in the field of open heart surgery. As indicated in the title, C. Walton Lillehei experienced significant trials, both personal and professional, as well as remarkable triumphs. His genius and rebellious character were fundamental to a daring approach that would begin the exciting era of direct vision intracardiac surgery. His ability to challenge existing wisdom made him both revered and reviled. Despite notable acclaim early in his career he would later experience disappointments and setbacks. The fall from grace as well as a subsequent rebirth in the eyes of his colleagues will be recounted.

NOTES:

RECOGNITION & MANAGEMENT OF CARDIOTHORACIC SURGICAL MISADVENTURES

66. Atrial-esophageal Fistula Repair After Transvenous Radiofrequency Ablation for Atrial Fibrillation

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Authors: Erik A. Beyer, James Jowers, Erin Gautney

Author Institution(s): *Baptist Health Little Rock, Little Rock, AR*

REGULATORY DISCLOSURE: This presentation describes the off-label use of Flex HD to cover an esophageal fistula connecting with the pericardium.

Objectives: A 49 year-old male presents with severe retrosternal chest pain two weeks following a transvenous radiofrequency ablation for recurrent atrial fibrillation. He has no fever, hemoptysis or hematochezia. He denies any nausea or vomiting. The patient is on a full dose of rivaroxaban. A CT scan of the chest was performed which revealed pneumopericardium. The CT Scan showed no pulmonary pathology.

Methods: A right minimal access thoracotomy was performed and a pericardial window was created. 500 cc of purulent fluid was drained and no blood or thrombus was noted within the pericardium. An EGD showed a 1.5 cm thermal injury to the mid esophagus. A covered stent was placed and the patient recovered in the hospital. On POD 6 the patient had an episode of hematemesis and a CT revealed a left atrial disruption. A median sternotomy was performed and the pericardium entered. An atrial-esophageal fistula was identified. The esophagus was covered with acellular hydrated dermis. The left atrium and right inferior pulmonary vein were reconstructed with native pericardium.

Results: A barium swallow study showed no esophageal leak on postoperative day 9. The NGT was removed and the patient was started on a diet. He was discharged from the hospital on the 16th postoperative day. The esophageal stent was removed on the 32nd day after surgery and he was continued on a regular diet. At 2 month follow-up the patient is progressing well.

Conclusion: Atrial-esophageal fistula after atrial fibrillation ablation is a rare complication. The mortality rate is high when this complication is diagnosed. This is one of very few cases reported and treated with a covered esophageal stent and acellular hydrated dermis.

NOTES:

RECOGNITION & MANAGEMENT OF CARDIOTHORACIC SURGICAL MISADVENTURES

67. Overcoming Obstacles in Robotic Lobectomy: Calcified Lymph Nodes

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Authors: *Linda W. Martin[1], ***D****Robert J. Cerfolio[2]

Author Institution(s): [1]*University of Maryland, Baltimore, MD;* [2]*University of Alabama, Birmingham, AL*

COMMERICAL RELATIONSHIPS: Robert J. Cerfolio: Consultant/Advisory Board: Community Health Systems; Proctor, Teacher, Lecturer: Intuitive Surgical; Speaker, Teacher: Ethicon

Objectives: Calcified nodes from granulomatous disease represent a frequent reason for converting from a minimally invasive approach to thoracotomy during lobectomy. We demonstrate a challenging case and the strategy used to overcome this obstacle and complete the resection robotically.

Methods: A 78 year-old nonsmoking woman with history of chronic lymphocytic lymphoma was diagnosed with a 3 cm left lower lobe adenocarcinoma, cT1bN0M0. Preoperative imaging was unremarkable and nodes looked essentially normal. Completely portal robotic left lower lobectomy using four arms and an assisting port was planned. Despite complete fissures, the procedure was much more difficult than expected due to granulomatous hilar nodes. Persistent dissection around the nodes, in front and back of the hilum, and eventually piecemeal debulking of nodes allowed for adequate access to staple basilar and superior segmental pulmonary arteries, without the need for conversion to thoracotomy.

Results: Blood loss was 20 cc and procedure time was 120 minutes, about 30 minutes longer than our average robotic lobectomy. The postoperative course was uncomplicated; chest tube removal and patient discharge occurred on postoperative day 3. Six of 16 harvested nodes demonstrated non-necrotizing granulomas, and silver stain on the lobectomy confirmed histoplasmosis in addition to the 3 cm adenocarcinoma.

Conclusion: This video demonstrates useful maneuvers to facilitate robotic lobectomy complicated by granulomatous disease in hilar nodes.

NOTES:

RECOGNITION & MANAGEMENT OF CARDIOTHORACIC SURGICAL MISADVENTURES

68. Management of Pulmonary Artery Bleeding During Minimally Invasive Pulmonary Surgery

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Authors: Kyle M. Bess, ***D****Robert J. Cerfolio

Author Institution(s): *University of Alabama, Birmingham, AL*

COMMERICAL RELATIONSHIPS: Robert J. Cerfolio: Consultant/Advisory Board: Community Health Systems; Proctor, Teacher, Lecturer: Intuitive Surgical; Speaker, Teacher: Ethicon

Objectives: The objective of this video is to show our intra-operative management and general protocol to handle major vascular injury during minimally invasive surgery.

Methods: This is an edited video of a right upper lobe sleeve lobectomy that forced us to attempt distal dissection of the pulmonary artery truncus.

Results: As shown in the video our response to the video was immediate and a protocol is presented.

Conclusion: A well-practiced and rehearsed response to major intraoperative bleeding will lead to good outcomes when this serious but unpreventable complication occurs.

NOTES:

RECOGNITION & MANAGEMENT OF CARDIOTHORACIC SURGICAL MISADVENTURES

69. Disruptive Behavior in the Hospital

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Authors: *Lynn H. Harrison, Jr., Natalie Pino

Author Institution(s): *Baptist Hospital of Miami, Miami, FL*

Discussant: *John H. Calhoon, *University of Texas Health Science Center San Antonio, San Antonio, TX*

Objectives: Physicians lead stressful lives. Occasionally, this stress is manifested as disruptive behavior, the impact of which is debilitating to team morale and contributes to premature burn-out, diminished job satisfaction and occasional tort suits by those who bear its brunt. Data on the costs of this behavior is plentiful; published data on its professional demography is scarce, although conventional wisdom suggests surgeons are frequent perpetrators. The purpose of this investigation is to document the scope of the problem and the role played by cardiothoracic surgeons in a large community hospital.

Methods: Using blinded risk management data from a large private hospital, we have reviewed the sources and nature of disruptive behavior complaints filed over the most recent ten and five year periods by specialty.

Results: Between January 1, 2006 and December 31, 2015, 487 complaints of disruptive behavior were filed at a 700-bed general hospital with active staff of more than 1000 physicians. Within the past five years, 81/302 complaints were isolated events, but 221 complaints were instigated by repeat offenders. 93% (281/302) of complaints were submitted by non-physician employees alleging publically demeaning criticism by physicians. Over ten years, 86% of complaints were levelled against non-surgeons.

Conclusions: It has long been thought that surgeons in general, and cardiothoracic surgeons in particular, are responsible for the lion's share of disruptive behavior in the hospital. Review of events by specialty demonstrates that surgeons were responsible for only 14% (66/487) of complaints despite representing 21% of hospital staff (203/1007), and cardiothoracic surgeons for 5% (27/487) despite comprising only 0.8% of staff (8/1007). Disruptive behavior is crippling to the morale of the team who must work together to ensure patient safety. Surgeons must lead in the effort to control this behavior from within, or we will surely be controlled from without.

NOTES:

RECOGNITION & MANAGEMENT OF CARDIOTHORACIC SURGICAL MISADVENTURES

70. Digital Drainage System Reduces Hospitalization After VATS Lung Resection

*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: ***D****Daniel L. Miller, ***D****William Mayfield, *Theresa Luu, *Gerald Helms

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

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

COMMERICAL RELATIONSHIPS: Daniel L. Miller: Advisory Board: Ethicon, Inc., Bard-Davol, Inc.; **William Mayfield:** Speaker Bureau/Honoraria: Medtronic, Inc.

Objectives: The purpose of this study was to assess the impact of digital versus traditional drainage systems on hospitalization of patients undergoing VATS anatomical lung resection.

Methods: Consecutive patients who underwent VATS anatomical lung resection (7/2014 through 1/2015) for lung cancer were analyzed. Patients were managed with overnight suction (-20 cm) followed by gravity drainage (water seal). The digital system (Thopaz) allowed continuous monitoring of the air leaks. Chest tubes were removed when an air leak was not present and pleural drainage was less than 300 mL/24hrs. The outcomes of patients selected by propensity score matching were compared.

Results: 108 patients underwent VATS lung resection (lobectomy or segmentectomy) over the seven month study period. The pleural cavity was drained with the traditional system in 75 patients and digital system in 33 patients. By propensity score matching at 2:1 ratio, 40 patients were selected into traditional group and 20 patients in the digital group. Demographics, % FEV1, tumor size, stage and type of resection were similar between the groups. The majority of patients (87%) underwent a lobectomy. There were no operative mortalities. Overall complications were less in digital system patients (22%) compared to the traditional system patients (39%). (p=0.01) Table - hospitalization variables analyzed.

Conclusions: Patients undergoing VATS lung resections managed with a digital drainage system experienced decreased duration of air leaks, chest tube placement, and hospital stay. Digital drainage system appears to be a safe alternative to traditional chest drainage systems.

Hospitalization Variables

Drainage System	Traditional	Digital	p valve
Air Leak (days)	3.9	2.7	p=0.05
Chest Tube (days)	5.4	3.5	p=0.01
Hospital Stay (days)	6.9	4,1	p<0.01
Discharged Home CT (%)	4 (10%)	2 (10%)	NS

Data - Mean

NOTES:

71. A Systematic Approach to Prolonged Air Leak Reduction Following Pulmonary Resection

*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: Nicholas Drahush, *James R. Headrick, Anna Royer, *Jeremy Smith, Ashley D. Miller, Marlana Spiva

Author Institution(s): *University of Tennessee College of Medicine, Chattanooga, TN*

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

COMMERICAL RELATIONSHIPS: DISCUSSANT: Daniel L. Miller: Advisory Board: Ethicon, Inc.; Speakers Bureau: Bard Davol, Inc., Medtronic/Covidien, Inc.

Objectives: Prolonged air leaks following pulmonary resection lead to extended need for chest tubes, increased hospital length of stay (LOS), greater healthcare costs and are the leading cause of post-operative pulmonary morbidity. A systematic approach to air leak reduction (STAR) following lung resection was developed.

Methods: A retrospective review was conducted of a prospective database from one surgeon who had adopted STAR as standard of care. STAR incorporates three factors independently identified as decreasing air leaks; fissureless operative technique, staple line buttressing and protocol-driven chest tube management. All patients who underwent STAR for pulmonary resection were included in this study. Demographics, comorbidities, hospital LOS, post-operative events, prolonged air leak (> 5 days) and 30 day mortality were compared against a national benchmark database from the Society of Thoracic Surgeons (STS).

Results: From June 2010 through December 2014, 462 patients underwent STAR for pulmonary resection. 13 patients had multiple resections giving a total of 475 lung resections: 262 (55.2%) lobectomies, 167 (35.2%) wedge resections and 46 (9.7%) segmentectomies. Mean LOS was 3.4 ± 3.3 days and mean time to chest tube removal was 3.2 ± 3.7 days. Notably, on post-operative day one, 41.1% of patients (190/462) had their chest tube removed and 26.8% (124/462) were discharged home. Additionally, no patients were re-admitted due to air leak related events. 11% of patients (51/462) were sent home with chest tubes still in place. 30 day mortality was 2.8% (13/462).

Conclusions: STAR for pulmonary resection, significantly for lobectomies, shows decreased post-operative prolonged air leaks when compared to the STS national database. This approach did not lead to air leak related hospital re-admissions nor compromise post-operative mortality. STAR is an innovative strategy that has the potential to improve post-operative pulmonary resection outcomes.

		Prolonged Air Leak (>5 days)	
Type of Pulmonary Resection	STAR Jun 10-Dec 14	STS General Database Jul 11-Jun 14	Two-Tailed P-Value
Segmentectomy	1/46 (2.2%)	191/2,584 (7.4%)	0.2536*
Wedge Resection	2/167 (1.2%)	688/16,787 (4.1%)	0.0908^
Lobectomy	12/262 (4.6%)	2,947/27,542 (10.7%)	0.0020^

(* Fisher's Exact Test)
(^ Chi-square with Yate's Correction)

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	ohn 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

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

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

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
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

AWARDS

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

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, GA
2014–Stephen C. Yang	Baltimore, Maryland

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

AWARDS

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

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

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

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

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

EXHIBITORS*

CONFIRMED AS OF SEPTEMBER 16, 2015

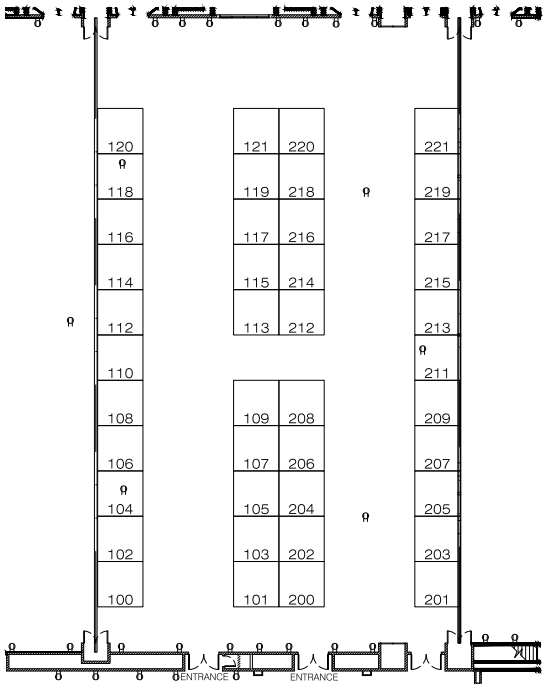
EXHIBIT HOURS AND FLOOR PLAN

EXHIBIT HOURS

THURSDAY, NOVEMBER 5
EXHIBITS OPEN 12:00 pm – 4:00 pm

FRIDAY, NOVEMBER 6
EXHIBITS OPEN 6:45 am – 11:30 am
1:00 pm – 4:00 pm

- Exhibit Hall is located in Grand Harbor Ballroom South
- All coffee breaks scheduled during show hours are in the exhibit area
- Complimentary coffee and pastries will be served



EXHIBITORS

Acelity Booth: 217
12930 W Interstate 10
San Antonio, TX 78249
Acelity provides a trusted and complementary portfolio of advanced wound therapeutics and regenerative medicine from KCI, LifeCell and Systagenix. To learn more, please visit Acelity.com.

Admedus Booth: 207
8400 Normandale Lake Blvd, Ste 920
Minneapolis, MN 55437
Admedus is working with renowned medical leaders to bring new medical technologies to market. CardioCel® is the first of our ADAPT® tissue engineered bio-implants and is being used to repair simple and complex cardiac defects.

AtriCure, Inc. Booth: 108
6217 Centre Park Drive
West Chester, OH 45069
AtriCure is intent on reducing the Afib epidemic through clinical science, education and innovation. We are a leading Afib solutions partner with the only FDA-approved surgical treatment for Afib and most widely implanted occlusion device for left atrial appendage management.

CardiacAssist, Inc Booth: 107
240 Alpha Drive
Pittsburgh, PA 15084
CardiacAssist, inventor of the TandemHeart® Extracorporeal Circulatory Support System, offers versatile MCS treatment options. While we're best known for our Left Ventricular Support platform, we recently launched a line of Arterial Cannulae, and the PROTEK Duo™ Veno-Venous dual lumen cannula. Stop by our booth to learn more

CorMatrix Booth: 214
1100 Old Ellis Rd
Roswell, GA 30076
CorMatrix® Cardiovascular markets its ECM® Bioscaffold devices for vascular repair, pericardial repair and reconstruction, cardiac tissue repair, and CanGaroo ECM Envelope and is currently conducting preclinical studies to evaluate future applications in other cardio and vascular applications.

CryoLife Booth: 203
1655 Roberts Blvd NW
Kennesaw, GA 30144
CryoLife® is a leader in allograft cryopreservation technologies. CryoLife also offers Transmyocardial Revascularization (TMR) for patients with Refractory Angina. CryoLife now distributes PhotoFix™, a proven, clinically effective tissue substitute that is biocompatible without glutaraldehyde.

Davol Inc., A BARD Company Booth: 202
100 Crossings Blvd
Warwick, RI 02886
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.

Edwards Lifesciences Booth: 100
One Edwards Way
Irvine, CA 92614
Edwards Lifesciences is the global leader in the science of heart valves and hemodynamic monitoring. Driven by a passion to help patients, the company partners with clinicians to develop innovative technologies in the areas of structural heart disease and critical care monitoring, enabling them to save and enhance lives.

Elsevier Booth: 121
1600 John F Kennedy Blvd
Ste 1800
Philadelphia, PA 19103
ELSEVIER is a leading publisher of health science publications, advancing medicine by delivering superior reference information and decision support tools to doctors, nurses, health practitioners and students. With an extensive media spectrum – print, online and handheld, we are able to supply the information you need in the most convenient format.

ETHICON Booth: 113
4545 Creek Rd
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: 205
509 Broadstone Lane
Acworth, GA 30101
FEHLING SURGICAL INSTRUMENTS features Minimally Invasive Valve Sets including NEW Retractor designs. Take our new MICS MVR Simulator for a spin to refine your manual / tactile skills on a "Dummy"!

Heartware, Inc. Booth: 115
500 Old Connecticut Path
Framingham, MA 01701

Intuitive Surgical Booth: 106
1020 Kifer Road
Sunnyvale, CA 94086
Intuitive Surgical, Inc. designs, manufactures and distributes the da Vinci® Surgical System - technology designed to allow surgeons to perform many complex procedures minimally invasively.

Karl Storz Booth: 114
2151 E Grand Ave
El Segundo, CA 90245
KARL STORZ Endoscopy-America, Inc. is a leader in endoscopic equipment and OR Room Integration. KARL STORZ offers a broad range of high quality products for Thoracoscopic surgery, including telescopes, High-definition video, and instruments for basic and advanced procedures.

KLS-Martin Booth: 209
PO Box 16369
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.

LSI Solutions Booth: 105
7796 Victor-Mendon Rd
Victor, NY 14564
COR-KNOT® provides superior titanium suture fastening technology worldwide.COR-KNOT® reduces CPB and cross clamp time, reducing overall OR time. Learn more on how COR-KNOT® can benefit your OR by visiting the LSI SOLUTIONS® booth. Booth number 105.

EXHIBITORS

Medistim Booth: 213
14000 25th Ave N - Ste 108
Plymouth, MN 55447
Medistim offers technologies proven to reduce post-CABG MACCE. The VeriQ C™ combines transit time flow measurements and a 15 MHz ultrasound probe, specifically designed for epiaortic and epicardial imaging.

Medtronic, Inc. Booth: 212
710 Medtronic Pkwy
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.

Memorial Healthcare System Booth: 116
3501 Johnson Street
Hollywood, FL 33021
Memorial Healthcare System is the third-largest public healthcare system in the United States. A national leader in quality care and patient satisfaction, Memorial has ranked 11 times since 2008 on nationally recognized lists of great places to work.

Myriad Genetics Booth: 206
320 Wakara Way
Salt Lake City, UT 84108
Myriad myPlan® Lung Cancer is a molecular diagnostic test that measures the expression levels of cell cycle progression genes to provide an accurate assessment of cancer aggressiveness in early-stage non-small cell lung cancer.

On-X Life Technologies Booth: 103
1300 E Anderson Lane, Bldg A
Austin, TX 78752
On-X Life Technologies is proud to announce FDA Approval to reduce INR to 1.5–2.0 for On-X® Aortic Heart Valve patients starting 3 months after surgery. Chord-X® ePTFE suture for mitral repair is now available in an innovative Pre-Measured Loops system.

rEVO Biological Booth: 208
175 Crossing Blvd
Framingham, MA 01702
rEVO Biologics lead product, ATryn, is the first and only plasma-free antithrombin concentrate. ATryn received FDA approval in 2009 for the prevention of peri-operative and peri-partum thromboembolic events in hereditary antithrombin deficient patients.

RTI Surgical Booth: 104
11621 Research Circle
Alachua, FL 32615
RTI Surgical™ is a leading global surgical implant company providing surgeons with safe biologic, metal and synthetic implants. Committed to delivering a higher standard, RTI's implants are used in cardiothoracic, sports medicine, general surgery, spine, orthopedic and trauma procedures and are distributed in nearly 50 countries.

Scanlan International, Inc. Booth: 200
One Scanlan Plaza
St. Paul, MN 55107
Highest quality surgical products designed and manufactured by the Scanlan family since 1921. Over 3,000 stainless steel and titanium precision instrumentation designs. New VATS/MIS instruments including the SCANLAN® Gonzalez-Rivas Lung Grasper and Dissector; SCANLAN® D'Amico Biopsy Forceps & SCANLAN® Chitwood DeBakey Clamp; Single-Use & Instrument Care Products.

Sorin Group Booth: 215
14401 W 65th Way
Arvada, CO 80004
Sorin Group is a world leader in treatment of cardiovascular disease. Our products include aortic and mitral valve replacement/repair, perfusion equipment, cannulae and MICS instruments. Please visit us at www.sorin.com.

Spiration, Inc. Booth: 110
6675 185 Ave NE
Redmond, WA 98052
The Spiration® Valve System has a humanitarian device approval in the U.S. to control specific post-operative air leaks of the lung and has CE mark approval for the treatment of diseased lung in emphysematous patients and for damaged lung resulting in air leaks by limiting air flow to selected areas.

St. Jude Medical, Inc. Booth: 112
One St Jude Medical Dr
St. Paul, MN 55117
St. Jude Medical is dedicated to transforming the treatment of some of the world's most expensive epidemic diseases by creating cost-effective medical technologies that save and improve lives of patients around the world.

SynCardia Systems, Inc. Booth: 204
1992 E Silverlake Rd
Tucson, AZ 85713
The SynCardia temporary Total Artificial Heart (TAH-t) is the world's only FDA, Health Canada and CE approved Total Artificial Heart. It is approved as a bridge to transplant for patients dying from end-stage biventricular failure. Visit our booth for updates on the Freedom® portable driver, 50cc TAH-t, and destination therapy.

Terumo Cardiovascular Booth: 102
6200 Jackson Rd
Ann Arbor, MI 48103
Terumo Cardiovascular Group contributes to society by manufacturing and marketing world class medical devices for cardiac and vascular surgery. With an emphasis on cardiopulmonary bypass, intraoperative monitoring, and vascular grafting, Terumo provides vital products to the healthcare market. Additional company information can be found at www.terumo-cvgroup.com.

Thoratec Booth: 201
6035 Stoneridge Dr
Pleasanton, CA 94588
Thoratec is a world leader in therapies to address advanced-stage heart failure with more than 20,000 devices implanted in patients suffering from heart failure.

Vitalcor, Inc. Booth: 109
100 E. Chestnut Ave
Westmont, IL 60559
Coronary Artery Perfusion Canulae with self-inflating Balloon (Latex Free). New LED light source (20,000+ hours) & Gemini Plus headlight. Axiom Wound Drains with specialized Clot Stop. Reusable Bulldog Clamp. Titanium and stainless steel specialty instruments. Reusable stabilizer for Beating Heart Surgery, Mitral Valve Retractor, and IMA Retractor.

Wexler Surgical Booth: 101
11333 Chimney Rock Rd - #110
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

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 VIII: 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 XIII: 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 XVIII: 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 62nd Annual Meeting. Unless otherwise noted, these STSA leaders have no relevant commercial relationships to disclose.

John H. Calhoon: *President, Program Committee, Postgraduate Committee*
COMMERCIAL RELATIONSHIPS: Volunteer Leader: TSFRE, JCTSE

Paul J. Chai: *Postgraduate Committee*

Robert J. Dabal: *Postgraduate Committee*

Melanie A. Edwards: *Postgraduate Committee*

Richard K. Freeman: *CME Director, Program Committee, Postgraduate Committee, CME Committee*

John A. Howington: *Postgraduate Committee Chair, CME Committee*

Charles B. Huddleston: *Vice President, Program Committee*

S. Adil Husain: *Program Committee*

Jeffrey P. Jacobs: *Program Committee Chair, CME Committee*

Richard L. Lee: *Program Committee*

Scott A. LeMaire: *Postgraduate Committee*
COMMERCIAL RELATIONSHIPS: Clinical Trial Investigator: Medtronic, Inc., GlaxoSmithKline, W.L. Gore & Associates; Advisory Board: Baxter; Consultant: Medtronic, Inc.

Daniel L. Miller: *Secretary/Treasurer, Program Committee, Postgraduate Committee*
COMMERCIAL RELATIONSHIPS: Advisory Board: Ethicon, Inc.; Speakers Bureau: Bard Davol, Inc., Medtronic/Covidien, Inc.

Himanshu J. Patel: *Program Committee*
COMMERCIAL RELATIONSHIPS: Consultant & Patent Holder: WL Gore; Consultant: Edwards Lifesciences, Terumo Cardiovascular Systems

Richard L. Prager: *Council Chair, Program Committee, Postgraduate Committee*

Thomas Wozniak: *Postgraduate Committee Chair, CME Committee*

Stephen C. Yang: *Councilor, Program Committee Chair, CME 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 62nd Annual Meeting. Unless otherwise noted, the abstract reviewers have no relevant commercial relationships.

Vinay Badhwar

Traves D. Crabtree
COMMERCIAL RELATIONSHIPS: Consultant: Ethicon Endo-Surgery

Elizabeth A. David

Pierre E. de Delva

COMMERCIAL RELATIONSHIPS OF ABSTRACT REVIEWERS (CONT.)

Chadrick E. Denlinger

Daniel J. DiBardino

Jeffrey D. McNeil

Daniela Molena
COMMERCIAL RELATIONSHIPS: Speaker Bureau/Honoraria: Novadaq Technologies

Tom C. Nguyen

V. Seenu Reddy
COMMERCIAL RELATIONSHIPS: Speaker: Astra Zeneca, Mallinkrodt; Advisory Board: Acelity, Medtronic, Inc.

T. Brett Reece

James D. St. Louis

Chad N. Stasik

Vinod H. Thourani
COMMERCIAL RELATIONSHIPS: Research Grant/PI: Boston Scientific, Claret Medical, St. Jude Medical, Inc., Medtronic, Inc., Abbott Medical; Ownership Interest: Apica Cardiovascular

COMMERCIAL RELATIONSHIPS OF STSA STAFF

Unless otherwise noted, staff members have no relevant commercial relationships.

Megan Drumm: *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 4, 2015

SURGICAL MOTION PICTURES

Moderator Commercial Relationships
Charles B. Huddleston, Nothing to Disclose
Himanshu J. Patel, Consultant & Patent Holder: WL Gore; Consultant: Edwards Lifesciences, Terumo Cardiovascular Systems

7V. *Aortic Valve Reconstruction for Endocarditis Using Tissue-Engineered Bovine Pericardium*
COMMERCIAL RELATIONSHIPS: Domenico Mazzitelli: Consultant: Admedus Inc.; **J. Scott Rankin:** Consultant: Admedus Inc., CMO: BioStable Science and Engineering; **Christian Schreiber:** Consultant: Admedus Inc.

THURSDAY, NOVEMBER 5, 2015
POSTGRADUATE PROGRAM

GENERAL SESSION
Moderator Commercial Relationships
Kevin Accola, Consultant: Edwards Lifesciences, CorMatrix; Speaker: Edwards Lifesciences, CryoLife
Joseph B. Putnam, Nothing to Disclose

Aortic Case Presentation: Lessons learned from Total Aortic Replacement
COMMERCIAL RELATIONSHIPS: Anthony Estrera: Consultant and DSMB: Gore; Speakers Bureau/ Honoraria: Maquet

How to See i to i: Starting Your Own Company
COMMERCIAL RELATIONSHIPS: J. Michael DiMaio: Ownership Interest: SpectralMD

ADULT CARDIAC BREAKOUT
Moderator Commercial Relationships
Faisal G. Bakaeen, Scientific Advisor: JACE Medical
Thomas M. Beaver, Nothing to Disclose

Current Management of Type A and B Acute Dissection
COMMERCIAL RELATIONSHIPS: Himanshu J. Patel: Consultant & Patent Holder: WL Gore; Consultant: Edwards Lifesciences, Terumo Cardiovascular Systems

GENERAL THORACIC BREAKOUT
Moderator Commercial Relationships
Melanie A. Edwards, Nothing to Disclose
John A. Howington, Nothing to Disclose

CONGENITAL BREAKOUT
Moderator Commercial Relationships
Carl L. Backer, Nothing to Disclose
Robert J. Dabal, Nothing to Disclose

GENERAL SESSION
Moderator Commercial Relationships
Daniel L. Miller, Advisory Board: Ethicon, Inc.; Speakers Bureau: Bard Davol, Inc., Medtronic/Covidien, Inc.
Thomas C. Wozniak, Nothing to Disclose

ECMO – Past, Present, and Future
REGULATORY DISCLOSURE: Robert H. Bartlett: This presentation addresses the off-label use of all drugs and devices for ECMO.

SPECIAL SESSION
Moderator Commercial Relationships
Richard L. Prager, Nothing to Disclose

ETHICS DEBATE & PUBLIC REPORTING UPDATE
Moderator Commercial Relationships
Robert M. Sade, Nothing to Disclose

RELATIONSHIP DISCLOSURE INDEX

THURSDAY NOVEMBER 5, 2015
FIRST SCIENTIFIC SESSION

Moderator Commercial Relationships
John H. Calhoon, Nothing to Disclose
Daniel L. Miller, Advisory Board: Ethicon, Inc.; Speakers Bureau: Bard Davol, Inc., Medtronic/Covidien, Inc.

1. *Use of Del Nido Cardioplegia in Adults Undergoing Coronary Artery Bypass Surgery*
COMMERCIAL RELATIONSHIPS: DISCUSSANT: Pedro del Nido: Consultant: Nido Surgical

8. *Predictors of Major Morbidity or Mortality After Resection for Esophageal Cancer:* A Society of *Thoracic Surgeons General Thoracic Surgery Database Risk Adjustment Model*
COMMERCIAL RELATIONSHIPS: Andrew Chang: Travel support: Ethicon, Speaker Bureau/ Honoraria

9. *The Influence of Pulmonary Hypertension on Outcomes After Conventional and Transcatheter Aortic Valve Replacement in a Population Based Analysis*
COMMERCIAL RELATIONSHIPS: DISCUSSANT: Gorav Ailawadi: Consultant: Abbott, Edwards Lifesciences, St. Jude Medical, Inc.; Proctor: Atricure

10. *A Decade of Transapical Aortic Valve Implantation: Lessons Learned and First Data on Valve Behavior Beyond Eight Years*
COMMERCIAL RELATIONSHIPS: Stephan Fichtlscherer: Consultant: Edwards, Consultant/ Advisory Board; **DISCUSSANT: John V. Conte:** Research Grant (Corevalve Study): Medtronic, Inc.; Employment (Lotus Study): Boston Scientific; Surgical Advisory Board: Medtronic, Inc., Sorin

FRIDAY, NOVEMBER 6, 2015
BASIC SCIENCE FORUM

Moderator Commercial Relationships
Chadrick E. Denlinger, Nothing to Disclose
Jennifer S. Lawton, Nothing to Disclose

4B. *Partial False Lumen Thrombosis Results in an Increase in False Lumen Blood Pressure in an Ex Vivo Porcine Model of Type B Aortic Dissection*
COMMERCIAL RELATIONSHIPS: DISCUSSANT: Eric S. Weiss: Consultant: Medtronic, Inc.

5B. *Characterization of Indeterminate Pulmonary Nodules Using a Novel Algorithm Incorporating Clinical, Radiographic and Serum Biomarker Profiles*
COMMERCIAL RELATIONSHIPS: Christopher W. Seder: Consultant/Advisory Board: Covidien, **Michael J. Liptay:** Consultant/Advisory Board: Covidien, **Jeffrey A. Borgia:** PI on patent application pertaining to panel utilized in this manuscript: Principle Investigator in patent, Research Grant

6B. *Understanding Pulmonary Valve Architecture and Variation: Implications for the Ross Procedure*
COMMERCIAL RELATIONSHIPS: William Northrup: Provided the valve allografts: Cryolife, Other Research Support

SECOND SCIENTIFIC SESSION

Moderator Commercial Relationships
Jeffrey P. Jacobs, Nothing to Disclose
Stephen C. Yang, Nothing to Disclose

11. *Minimally Invasive Mitral Valve Surgery Has Superior Outcomes to Conventional Sternotomy Without Increased Costs*
COMMERICAL RELATIONSHIPS: Alan M. Speir: Consultan/Advisory Board: Medtronic; **Gorav Ailawadi:** Consultant/Advisory Board: Mitralign, Abbott, Edwards, Consultant/Speaker Bureau/ Honoraria: St. Jude

12. *One Hundred Planned Robotic Segmentectomies: Early Results, Technical Details and Preferred Port Placement*
COMMERICAL RELATIONSHIPS: Robert J. Cerfolio: Speaker Bureau/Honoraria: Intuitive Surgical, Ethicon; Consultant/Advisory Board: Covidien, Community Health Systems

14. *Impact of Sublobar Resection on Pulmonary Function: Long-term Results From ACOSOG Z4032 Alliance), A Randomized Phase III Trial*
COMMERICAL RELATIONSHIPS: DISCUSSANT: Daniel L. Miller: Advisory Board: Ethicon, Inc.; Speakers Bureau: Bard Davol, Inc., Medtronic/Covidien, Inc.

THIRD SCIENTIFIC SESSION A
ADULT CARDIAC BREAKOUT

Moderator Commercial Relationships
Richard L. Lee, Nothing to Disclose
Tom C. Nguyen, Nothing to Disclose

20. *Long-term Results Following Pericardial Patch Augmentation for Incompetent Bicuspid Aortic Valves: A Single Center Experience*
COMMERCIAL RELATIONSHIPS: DISCUSSANT: James S. Tweddell: Scientific Advisory Committee: CorMatrix

21. *Learning Alternative Access Approaches for TAVR: Implications for New TAVR Centers*
COMMERICAL RELATIONSHIPS: Alan Zajarias: Consultant/Advisory Board: Edwards Lifesciences; **Brian R. Lindman:** Consultant/Advisory Board: Roche, Research Grant: Roche; **John M. Lasala:** Consultant/Advisory Board: St Jude Medical, Direct Flow, Boston Scientific; **DISCUSSANT: Eric L. Sarin:** Speakers Bureau/Honoraria: Abbott Vascular

23. *Alternative Access TAVR Is Safe at Higher Society of Thoracic Surgeons Predicted Risk of Mortality Scores*
COMMERICAL RELATIONSHIPS: Amy Simone: Consultant/Advisory Board: Edwards Lifesciences; **Robert Guyton:** Consultant/Advisory Board: Medtronic Inc; **Peter Block:** Equity/Ownership Interest: Direct Flow Medical; **DISCUSSANT: Joshua Rovin:** Proctor: Edwards Lifesciences, Medtronic, Inc.

THIRD SCIENTIFIC SESSION A
GENERAL THORACIC BREAKOUT

Moderator Commercial Relationships
Traves B. Crabtree, Consultant: Ethicon Endo-Surgery
Richard K. Freeman, Nothing to Disclose

25. Outcomes of Major Lung Resection After Induction Therapy for Non-small Cell Lung Cancer in Elderly Patients
COMMERICAL RELATIONSHIPS: Thomas A. D'Amico: Consultant/Advisory Board: Scanlan

29. Robotic versus Thoracoscopic Resection for Lung Cancer: Early Results of a New Robotic Program
COMMERICAL RELATIONSHIPS: Daniela Molena: Speaker Bureau/Honoraria: Novadaq Technologies

THIRD SCIENTIFIC SESSION A
CONGENITAL BREAKOUT

Moderator Commercial Relationship
James A. Quintessenza, Ownership Interest/Partnership: Genesee Biomedical
James D. St. Louis, Nothing to Disclose

32. *Pulmonary Valve Repair for Patients With Acquired Pulmonary Valve Insufficiency*
COMMERCIAL RELATIONSHIPS: DISCUSSANT: James A. Quintessenza: License Agreement/ Consultant: Genesse Biomedical

33. *Polytetrafluoroethylene Bicuspid Pulmonary Valve Replacement: A 5-Year Experience in 119 Patients With Congenital Heart Disease*
REGULATORY DISCLOSURE: This presentation describes the off-label use of 0.1 mm-thickness polytetrafluoroethylene membrane as a pulmonary valve substitute.
COMMERCIAL RELATIONSHIPS: DISCUSSANT: James A. Quintessenza: License Agreement/ Consultant: Genesse Biomedical

34. *The Trifecta Bioprosthetic Valve Is Associated With A Reduced Transvalvular Gradient Following Pulmonary Valve Replacement*
REGULATORY DISCLOSURE: This presentation describes the off-label use of the Trifecta Aortic Valve for Pulmonary Valve Replacement.

THIRD SCIENTIFIC SESSION B
ADULT CARDIAC BREAKOUT

Moderator Commercial Relationships
Anthony L. Estrera, Consultant and DSMB: Gore; Speakers Bureau/Honoraria: Maquet
T. Brett Reece, Nothing to Disclose

39. *Risk of Mortality After Resolution of Spinal Malperfusion in Acute Dissection*
COMMERICAL RELATIONSHIPS: Ali Azizzadeh: Consultant/Advisory Board: W.L Gore, Medtronic

40. *Contemporary Results of Elective Primary Aortic Root Replacement With and Without Hemiarch Repair*
COMMERICAL RELATIONSHIPS: Joseph S. Coselli: Consultant/Advisory Board: Vascutek Terumo, Research Grant: Vascutek Terumo; **Ourania Preventza:** Research Grant: Vascutek Terumo; **Kim I. de la Cruz:** Research Grant: Vascutek Terumo; **Scott A. LeMaire:** Research Grant: Vascutek Terumo

THIRD SCIENTIFIC SESSION B
GENERAL THORACIC BREAKOUT

Moderator Commercial Relationships
Shanda H. Blackmon, Nothing to Disclose
Pierre E. de Delva, Nothing to Disclose

43. *Palliation of Concomitant Tracheo-bronchial and Esophageal Disease Using a Combined Airway and Esophageal Approach*
COMMERICAL RELATIONSHIPS: Vicki Tiffault: Research Grant: Boston Scientific, Educational and Research Grant: Ethicon Endosurgery; **Moishe Liberman:** Research Grant: Boston Scientific, Educational and Research Grant: Ethicon Endosurgery

THIRD SCIENTIFIC SESSION B
CONGENITAL BREAKOUT

Moderator Commercial Relationships
Daniel J. DiBardino, Nothing to Disclose
Jeffrey P. Jacobs, Nothing to Disclose

45. *Use of Extracellular Matrix for Repair of Congenital Defects in Pediatric Patients*
COMMERICAL RELATIONSHIPS: Eric E. Roselli: Investigator/ Research Support: CorMatrix
REGULATORY DISCLOSURE: This presentation describes the off-label use of extracellular matrix.

SATURDAY, NOVEMBER 7, 2015

CODING, RUC & SGR UPDATE

Moderator Commercial Relationships
Jeffrey P. Jacobs, Nothing to Disclose

FOURTH SCIENTIFIC SESSION
ADULT CARDIAC BREAKOUT

Moderator Commercial Relationships
Bradley G. Leshnower, Nothing to Disclose
John M. Stulak, Nothing to Disclose

49. *Intensive Glucose Management in Non-Diabetics Improves Resource Utilization in Patients with Perioperative Hyperglycemia Undergoing CABG: A Prospective Randomized Trial*
COMMERCIAL RELATIONSHIPS: Robert Guyton: Consultant/Advisory Board: Medtronic Inc.

50. *Is There a Model to Predict Postoperative Pneumonia following Isolated Coronary Artery Bypass Grafting?*
COMMERCIAL RELATIONSHIPS: Donald S. Likosky: PI/Research Grant: AHRQ, Consultant Advisory Board: AmSECT

52. *Malperfusion Syndromes in Acute DeBakey I Aortic Dissection: Open Repair with Concomitant Antegrade Stent Grafting of the Descending Thoracic Aorta*
REGULATORY DISCLOSURE: This presentation describes the off-label use of Thoracic Endovascular Aortic Stent Grafts (TEVAR grafts) for the treatment of DeBakey I dissections with end organ malperfusion.

FOURTH SCIENTIFIC SESSION
GENERAL THORACIC BREAKOUT

Moderator Commercial Relationships
Elizabeth A. David, Nothing to Disclose
Daniela Molena, Speaker: Novadaq, Inc.

FOURTH SCIENTIFIC SESSION
CONGENITAL BREAKOUT

Moderator Commercial Relationships
Charles B. Huddleston, Nothing to Disclose
Kristine J. Guleserian, Nothing to Disclose

FOURTH SCIENTIFIC SESSION
TRANSPLANT BREAKOUT

Moderator Commercial Relationships
Scott B. Johnson, Nothing to Disclose
Mark S. Slaughter, Research Grants - Principal Investigator: HeartWare; Consultant: Carmet Scientific Advisory Board, Sunshine Heart

63. *Unconventional Institutional Volume-outcome Associations in Adult Extracorporeal Membrane Oxygenation in the U.S.*
COMMERCIAL RELATIONSHIPS: DISCUSSANT: Joseph B. Zwischenberger: Licensed Patent Royalties: Avalon Laboratories (Maquet); Advisory Board: CytoSorbents Corp.

RELATIONSHIP DISCLOSURE INDEX

HAROLD URSCHEL HISTORY LECTURESHIP

Moderator Commercial Relationships
John W. Hammon, Nothing to Disclose

RECOGNITION & MANAGEMENT OF CARDIOTHORACIC SURGICAL MISADVENTURES

Moderator Commercial Relationships
Andrea J. Carpenter, Nothing to Disclose
Richard L. Prager, Nothing to Disclose

66. *Atrial-esophageal Fistula Repair After Transvenous Radiofrequency Ablation for Atrial Fibrillation*
REGULATORY DISCLOSURE: This presentation describes the off-label use of Flex HD to cover an esophageal fistula connecting with the pericardium.

67. *Overcoming Obstacles in Robotic Lobectomy: Calcified Lymph Nodes*
COMMERICAL RELATIONSHIPS: Robert J. Cerfolio: Consultant/Advisory Board: Community Health Systems; Proctor, Teacher, Lecturer: Intuitive Surgical; Speaker, Teacher: Ethicon

68. *Management of Pulmonary Artery Bleeding During Minimally Invasive Pulmonary Surgery*
COMMERICAL RELATIONSHIPS: Robert J. Cerfolio: Consultant/Advisory Board: Community Health Systems; Proctor, Teacher, Lecturer: Intuitive Surgical; Speaker, Teacher: Ethicon

Techniques to Control Major Vascular Thoracic Injuries During Minimally Invasive Surgery
COMMERICAL RELATIONSHIPS: Robert J. Cerfolio: Consultant/Advisory Board: Community Health Systems; Proctor, Teacher, Lecturer: Intuitive Surgical; Speaker, Teacher: Ethicon

70. *Digital Drainage System Reduces Hospitalization after VATS Lung Resection*
COMMERICAL RELATIONSHIPS: Daniel L. Miller: Advisory Board: Ethicon, Inc., Bard-Davol, Inc.; **William Mayfield:** Speaker Bureau/Honoraria: Medtronic, Inc.

71. *A Systematic Approach to Prolonged Air Leak Reduction Following Pulmonary Resection*
COMMERICAL RELATIONSHIPS: **DISCUSSANT: Daniel L. Miller:** Advisory Board: Ethicon, Inc.; Speakers Bureau: Bard Davol, Inc., Medtronic/Covidien, Inc.

PROGRAM PARTICIPANTS

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Memorial
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Memorial Healthcare System is seeking an accredited ACGME residency-trained, BE/BC thoracic surgeon to join two established general thoracic surgeons in its Division of Thoracic Surgery. The Division is the sole provider of thoracic surgical services for a large and diverse population and practices all aspects of thoracic surgery, including interventional endoscopy, with the exception of lung transplantation. Desirable candidates will possess expertise in minimally invasive surgery, including thoracoscopic, laparoscopic and robotic surgical techniques, and the ability to treat the full spectrum of pulmonary and esophageal diseases. A particular interest in esophageal surgery is desired and expertise in POEM and EMR is ideal. Qualified candidates will also possess exceptional communication skills that will help expand the referral base, strengthen community ties and grow the esophageal surgery program. The Office of Human Research provides support for translational science research, including clinical trials, for those interested. This is a full-time, employed position with the multispecialty Memorial Physician Group. The position offers competitive benefits and a compensation package commensurate with training and experience. Professional malpractice and medical liability are covered under sovereign immunity.

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Memorial's work environment has been rated by employees and physicians alike as an open-door, inclusive culture that is committed to safety, transparency and, above all, outstanding service to patients and families.

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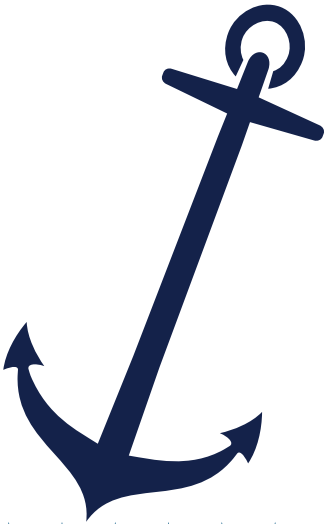

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