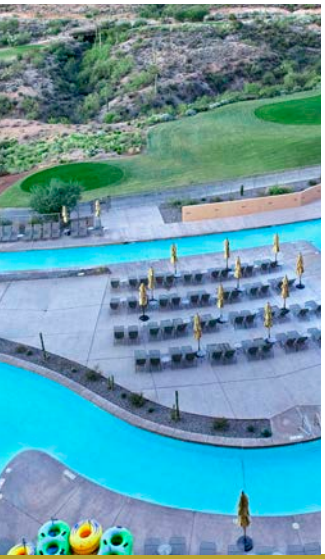
STSA

SOUTHERN THORACIC SURGICAL ASSOCIATION

61ST ANNUAL MEETING



TUCSON, ARIZONA

JW MARRIOTT STARR PASS RESORT & SPA

NOVEMBER 5–8, 2014

SPECIAL THANKS

SPECIAL THANKS TO STSA
61ST ANNUAL MEETING CORPORATE SUPPORTERS

GOLD

Ethicon Endo-Surgery, Inc.

Medtronic, Inc.

St. Jude Medical, Inc.

SILVER

Edwards Lifesciences

Terumo Cardiovascular Systems

Thoratec Corporation

FUTURE MEETINGS

November 4-7, 2015
Disney's Yacht & Beach Club Resort
Orlando, FL

November 9-12, 2016
Waldorf Astoria Naples
Naples, FL

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

TABLE OF CONTENTS

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THE ANNALS OF THORACIC SURGERY
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PROGRAM AT-A-GLANCE

WEDNESDAY, NOVEMBER 5, 2014

3:00 pm – 8:00 pm	**Registration** – *Arizona Ballroom Foyer*
7:45 pm – 10:00 pm	**Surgical Motion Pictures** – *Arizona Ballroom 6–7*

THURSDAY, NOVEMBER 6, 2014

6:30 am – 5:00 pm	**Registration** – *Arizona Ballroom Foyer*
6:30 am	**Continental Breakfast** – *Arizona Ballroom Foyer*
7:00 am – 9:00 am	**Postgraduate General Session** – *Arizona Ballroom 6–7*
9:00 am – 9:15 am	**Break**
9:15 am – 10:35 am	**Postgraduate Subspecialty Breakout Sessions** Adult Cardiac Breakout– *Arizona Ballroom 6–7* General Thoracic Breakout – *Arizona Ballroom 2–3* Congenital Breakout – *Arizona Ballroom 4–5*
10:35 am – 10:50 am	**Break**
10:50 am – 11:20 am	**Postgraduate Expert Panel Discussion** Education Our Future: I6 and Traditional Approaches *Arizona Ballroom 6–7*
11:20 am – 12:00 pm	**Postgraduate Special Session** William A. Baumgartner ABTS Update *Arizona Ballroom 6–7*
12:00 pm – 1:00 pm	**Break**
12:00 pm – 4:00 pm	**Exhibits Open** – *Tucson Ballroom A-E*
1:00 pm – 2:00 pm	**Ethics Debate** Should a Thoracic Surgeon Transfer a Complicated Case to a Competing Medical Center Against the Hospital's Order? *Arizona Ballroom 6–7*
2:00 pm – 2:30 pm	**Break & Visit Exhibits** – *Tucson Ballroom A-E*
2:30 pm – 5:00 pm	**First Scientific Session** – *Arizona Ballroom 6–7*

FRIDAY, NOVEMBER 7, 2014

6:30 am – 5:30 pm	**Registration** – *Arizona Ballroom Foyer*
6:45 am – 11:00 am	**Exhibits Open** – *Tucson Ballroom A-E*
6:45 am	**Continental Breakfast** – *Tucson Ballroom A-E*
7:00 am – 7:50 am	**Basic Science Forum** – *Arizona Ballroom 6–7*
8:00 am – 10:00 am	**Second Scientific Session** – *Arizona Ballroom 6–7*
10:00 am – 10:30 am	**Break & Visit Exhibits** – *Tucson Ballroom A-E*
10:30 am – 10:50 am	**Kent Trinkle Education Lectureship** Mark S. Slaughter, MD University of Louisville, Louisville, KY The University of Louisville and the Mason Dixon Line: Re-establishing Ties With the STSA *Arizona Ballroom 6–7*
10:50 am – 11:20 am	**President's Invited Lecturer** David M. Shahian, MD Codman's Legacy: Data, Reporting, and Professional Responsibility *Arizona Ballroom 6–7*

11:20 am – 12:00 pm	**Presidential Address** Richard L. Prager, MD Art and the Human Condition *Arizona Ballroom 6–7*
12:00 pm	**All Attendee Lunch** – *Ania Terrace*
12:00 pm – 4:00 pm	**Exhibits Open** – *Tucson Ballroom A-E*
1:00 pm – 2:00 pm	**Dessert Served in the Exhibit Hall** – *Tucson Ballroom A-E*
2:00 pm – 3:30 pm	**Third Scientific Session A**– **Simultaneous Subspecialty Breakout Sessions** Adult Cardiac Breakout– *Arizona Ballroom 6–7* General Thoracic Breakout – *Arizona Ballroom 2–3* Congenital Breakout – *Arizona Ballroom 4–5*
3:30 pm – 4:00 pm	**Break & Visit Exhibits** – *Tucson Ballroom A-E*
4:00 pm – 5:00 pm	**Third Scientific Session B** – **Simultaneous Subspecialty Breakout Sessions** Adult Cardiac Breakout– *Arizona Ballroom 6–7* General Thoracic Breakout – *Arizona Ballroom 2–3* Congenital Breakout – *Arizona Ballroom 4–5*
5:00 pm – 6:00 pm	**STSA Annual Business Meeting** STSA Members Only – *Arizona Ballroom 6–7*
6:00 pm – 7:00 pm	**Residents Reception –** *San Luis 1-2*
7:00 pm – 9:00 pm	**President's Mixer –** *Ania Terrace*

SATURDAY, NOVEMBER 8, 2014

6:45 am – 11:00 am	**Registration** – *Arizona Ballroom Foyer*
6:45 am	**Continental Breakfast** – *Arizona Ballroom Foyer*
7:00 am – 8:00 am	**Coding Update** Update on CPT and Physician Payment Issues for 2015 *Arizona Ballroom 6–7*
8:00 am – 9:00 am	**Fourth Scientific Session A** –
	Simultaneous Subspecialty Breakout Sessions Adult Cardiac Breakout– *Arizona Ballroom 6–7* General Thoracic Breakout – *Arizona Ballroom 2–3* Congenital Breakout – *Arizona Ballroom 4–5* Transplant Breakout– *Arizona 1*
9:00 am – 9:30 am	**Break**
9:30 am – 9:50 am	**Harold Urschel History Lectureship** Daniel L. Miller, MD Osler Almon Abbott: The Man, The Award, and His Legacy *Arizona Ballroom 6–7*
9:50 am – 11:50 am	**Fourth Scientific Session B** – *Arizona Ballroom 6–7*
11:50 am	**Program Adjourns**
12:00 pm – 6:00 pm	**Various Social & Sporting Events** See page 8 for details
7:00 pm – 11:00 pm	**Annual Awards Dinner & Dance** – *Arizona Ballroom 6–7*

SCHEDULE OF ACTIVITIES

THURSDAY, NOVEMBER 6
Spouse/Guest Hospitality Suite – *San Xavier*
Time: 8:00 am – 11:30 am
STSA is providing a complimentary hospitality room for spouses and guests to mingle and make plans for exploring Tucson.

FRIDAY, NOVEMBER 7
Spouse/Guest Hospitality Suite – *San Xavier*
Time: 8:30 am – 11:30 am
STSA is providing a complimentary hospitality room for spouses and guests to mingle and make plans for exploring Tucson.

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

Residents Reception – *San Luis 1-2*
Time: 6:00 pm – 7:00 pm
Residents and fellows attending the meeting are invited to join STSA leaders for this hour-long networking event. Spouses/guests are welcome.

President's Mixer – *Ania Terrace*
Time: 7:00 pm – 9:00 pm
Cost: Complimentary
Attendees receive two tickets with registration. Additional tickets may be purchased for $25. Visit the registration desk for details.

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

SATURDAY, NOVEMBER 8
Spouse/Guest Hospitality Suite – *San Xavier*
Time: 8:30 am – 11:30 am
STSA is providing a complimentary hospitality room for spouses and guests to mingle and make plans for exploring Tucson.

Sonoita Winery Tour
Time: 12:00 pm – approximately 5:00 pm
Cost: $200.00 (Includes boxed lunch, transportation, professional guide, winery admission, bottled water, souvenir wine glass, and gratuities.)

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.

Travel deep into the heart of Arizona's wine country to visit two of the area's most beautiful wineries. Wine tasting begins immediately upon departure from the resort, while the professional guide shares the history of Sonoita and its wineries. Explore both Dos Cabezas WineWorks and Arizona Hops and Vines vineyards, and learn about the craft of wine making while enjoying a memorable wine tasting experience. The tour begins and ends at Starr Circle, located in the resort's main lobby. A rain or shine event!

Arizona Guided Hike
Time: 2:00 pm – approximately 4:00 pm
Cost: $70.00 (Includes professional guide, bottled water, small snack, sunscreen and gratuities.)
Level of Difficulty: Easy to Moderate

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 beauty of the terrain and the ruggedness of the environment make a hike in the Tucson Mountains a unique and wonderful experience. This adventure will give you a real appreciation for the mesmerizing Arizona desert. The diversity of plants and wildlife that coexist in the Sonoran Desert, affirm the balance of nature. Your guide will share the flora and fauna and the incredible vistas. All plans are taken care of and we supply the necessary materials. Your only duty is to enjoy your visit with nature! The hike begins and ends at Starr Circle, located in the resort's main lobby.

Golf Tournament
Location: Starr Pass Golf Club
Time: 12:30 pm – 1:10 pm tee times available
Cost: $155.00 (Includes greens fees, baggage handling, shared golf cart, and boxed lunch.)

A limited number of tee times are available – be sure to register in advance!

The Starr Pass Golf Club legend began more than 120 years ago when Richard Starr crafted a trail through the rugged wilderness of the Tucson Mountains. Today, Coyote's sixth fairway marks this trail and has earned the honor of being the signature hole at Starr Pass.

A true desert course, natural elements are used as hazards while showcasing majestic vistas of the Catalina Mountains. Legends such as Arnold Palmer, Phil Mickelson, Payne Stewart and Nancy Lopez have carved their way through this historic golf course.

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

If you wish to rent clubs, please call the golf club at 520.670.0406 (club rentals fees are $49 plus tax and are not included in the above cost).

Annual Awards Dinner & Dance – Texas Tux in Arizona Theme
Reception: 7:00 pm – 8:00 pm – *Arizona Ballroom Foyer*
Dinner: 8:00 pm – 11:00 pm – *Arizona Ballroom 6–7*
Cost: $100.00 per person
$35.00 for children 12 years of age or younger (chicken finger dinner)

Conclude your 61st 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. Reduced ticket prices are available for children 12 and under.

In honor of the JW Marriott Starr Pass desert landscape, the Awards Dinner & Dance will have a Texas Tux in Arizona theme this year. Gentlemen are invited to wear jeans with either a tuxedo shirt and jacket or a dark suit coat. Cowboy boots and a ten-gallon hat are not required, but are encouraged! Ladies, as always, can choose from the full spectrum of fancy attire, including cocktail dresses, pants suits, floor length skirts—or maybe even a denim skirt, silk blouse and cowboy boots. So feel free to wear black tie, Texas tux or any combination of the two. The important thing is to be comfortable and have fun. It will be the perfect finale to a great meeting.

Rising Starr Kids Club
Available daily

The Rising Starr Kids Club is a full-service children's recreation program offered for our guests ages 4 to 12, with three session options: morning, afternoon, and full-day. Days are fun-filled with interactive games and activities that take advantage of the Tucson Experience, including arts and crafts, hikes, swimming, and more.

The Rising Starr Kids Club requires that all participants be fully toilet-trained, and a parent or guardian be on property and reachable during child's participation. Pre-registration is necessary and can be done by contacting the resort at 520.792.3500. Please ask to speak to the concierge to set up your child's reservation.

Baby-sitting Services
Baby-sitting services are available through Choice Options at 520.638.6538 or Trusting Connections at 520.544.6611. Advanced reservations are required.

Other Resort Activities & Attractions
Explore a variety of desert adventures during your visit to the JW Marriott Tucson Starr Pass Resort & Spa. Highlights include on-property Hashani Spa & Fitness Center, Blur Teen Lounge, Starr Pass Golf Club, numerous dining options, tennis courts, swimming pool with waterslide and lazy river, and trails for hiking, biking, and jogging. Visit www.jwmarriottstarrpass.com or call the Resort Concierge at 520.792.3500 for more information.

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 8, 2014. 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 61st Annual Meeting evaluation and CME credit claim process is electronic. Registrants who wish to receive CME credit for sessions they attend will be required to complete the electronic evaluation for the session. This is the only way physicians can earn CME credit for their attendance. Using the electronic evaluation system, registrants can complete the meeting evaluation, claim CME credit, and print CME certificates. Certificates of Attendance are also available for non-physician attendees.

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

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

The electronic evaluation can be completed by meeting registrants onsite at computer kiosks located in the **Arizona 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 22, 2014.

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, Chairman, and CME Committee Chair for review and resolution. Any potential conflicts of interest must be resolved before presentation. If a conflict is deemed unresolvable, the paper cannot be presented at the Annual Meeting.

The STSA Disclosure Policy (as outlined on page 12) 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 360 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 **Arizona Ballroom 12**. 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.

WEDNESDAY, NOVEMBER 5, 2014

7:45 pm – 10:00 pm
Arizona Ballroom 6–7
(Presentations are limited to ten minutes, followed by five minutes of discussion.)
CME Credits Available: 2.25
Moderators: *Jeffrey P. Jacobs and *Stephen C. Yang

7:45 pm – 8:00 pm (page 42)
1V. Repair of Simple Bicuspid Valve Defects Using Geometric Ring Annuloplasty
DDomenico Mazzitelli[1], Steffen Pfeiffer[2], ***D****J. Scott Rankin[3], Christian Nöbauer[1], Christian Schreiber[1], Theodor Fischlein[2], Rüdiger Lange[1]
[1]Deutsches Herzzentrum Muenchen, Munich, Germany; [2]Klinikum Nürnberg, Nürnberg, Germany; [3]Vanderbilt University, Nashville, TN

8:00 pm – 8:15 pm (page 44)
2V. Endoluminal Suturing
*Shanda H. Blackmon
Mayo Clinic, Rochester, MN

8:15 pm – 8:30 pm (page 46)
3V. Minimally Invasive Transhiatal Esophagogastrectomy With Mediastinal Anatomosis: Technique and Avoidance of Pitfalls
Young Hong, Allison Linden, Lorenzo De Marchi, Nadime Haddad, *M. Blair Marshall
MedStar Georgetown University Hospital, Washington, DC

8:30 pm – 8:45 pm (page 48)
4V. Neonatal Surgical Repair of Aortico-Left Ventricular Tunnel
Vijay Sadasivam, Vijayakumar Raju, John N. Kheir, Gerald R. Marx, Sitaram M. Emani
Boston Children Hospital, Boston, MA

8:45 pm – 9:00 pm (page 50)
5V. SVC Resection for Germ Cell Tumor
*Shanda H. Blackmon[1], *Michael J. Reardon[2]
[1]Mayo Clinic, Rochester, MN; [2]Houston Methodist Hospital, Houston, TX

9:00 pm – 9:15 pm (page 52)
6V. Augmentation of Aorta in Repair of Hemitruncus
*Inder D. Mehta[1], Julie Park[1], Victor S. Lucas[1], *Ross M. Ungerleider[2]
*[1]Ochsner Clinic Foundation/Medical Center, New Orleans, LA; [2]Wake Forest Baptist Medical Center, Winston-Salem, N*C

9:15 pm – 9:30 pm (page 54)
7V. VATS Lobectomy in a Patient on Clopidogrel
D*Daniel L. Miller

9:30 pm – 9:45 pm (page 56)
8V. Ventricular Embolization of the Valve Prosthesis During Transapical Transcatheter Aortic Valve Implantation
Muhammad Aftab, Magdy M. El-Sayed Ahmed, Neil E. Strickman, *Ross M. Reul
Texas Heart Institute at Baylor St. Luke's Medical Center, Houston, TX

9:45 pm – 10:00 pm (page 58)
9V. Percutaneous Transfemoral Closure of a Pseudoaneurysm at the Left Ventricular Apical Access Site for Transcatheter Aortic Valve Implantation
Ashkan Karimi[1], James C. Fudge[1], Anthony A. Bavry[1], David Anderson[1], ***D****Charles T. Klodell[1], John W. Petersen[1], Marc Litt[2], Floyd W. Burke[1], ***D****Thomas M. Beaver[1]
[1]University of Florida, Gainesville, FL; [2]Jacksonville Heart Center, Jacksonville, FL

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

THURSDAY, NOVEMBER 6, 2014

POSTGRADUATE PROGRAM

7:00 am – 12:00 pm

The first portion of the Postgraduate Program is the General Session, which will feature case presentations and expert panels with audience response participation. Concurrent breakout sessions in adult cardiac, general thoracic, and congenital heart surgery will take place between 9:15 am and 10:35 am. The General Session will continue at 10:50 am with one Expert Panel Discussion. The Special Session will begin at 11:20 am and program will adjourn at 12:00 pm. Summaries of Postgraduate papers being presented will be posted to www.stsa.org following the meeting.

CME Credits Available: 4.5

GENERAL SESSION *Arizona Ballroom 6–7*

Case Presentations & Expert Panels with Audience Participation
Moderators: *Robert B. Lee and *Marcus G. Williams
Educational Objectives: Upon completion of this program participants will be able to:

- Identify current strategies for minimizing blood utilization during and after cardiac operations.
- Develop treatment plans for patients at high risk for bleeding due to coagulopathy.
- Explain the role of the team in cardiac surgery blood conservation.
- Define the indications for intervention on patients with anomalous aortic origin of the coronary arteries.
- Apply the most appropriate surgical procedure for the anatomic subtypes of anomalous aortic origin of the coronary arteries.
- Comprehend the scientific foundation of CT screening for lung cancer.
- Identify the currently accepted patient selection criteria for CT lung cancer screening.
- Have a working knowledge of evidence-based follow up for patients undergoing CT screening found to have an abnormality.
- Assess the need for Veno-Venous vs. Veno-Arterial ECMO.
- Discuss preferred and alternative cannulation sites and techniques.
- Discuss the components of an ECMO circuit.
- Discuss anticoagulant management of an ECMO patient.
- Discuss weaning techniques and criteria for separation from ECMO.

7:00 am – 7:30 am
Adult Cardiac Case Presentation & Expert Panel: Current Management and Blood Utilization in Adult Cardiac Surgery
Case Presenter: *Robert B. Lee
Vanderbilt University Medical Center, Franklin, TN
Expert Panelists: ***D****Victor A. Ferraris[1], ***D****Alan M. Speir[2]
[1]University of Kentucky, Lexington, KY; [2]Fairfax Hospital, Falls Church, VA

7:30 am – 8:00 am
Congenital Heart Surgery Case Presentation & Expert Panel: Anomalous Origin of a Coronary Artery
Case Presenter: *Paul Chai
Columbia University Medical Center, New York, NY
Expert Panelists: *James Jaggers[1], *Kirk R. Kanter[2]
[1]Childrens Hospital Colorado, Aurora, CO; [2]Emory University School of Medicine, Atlanta, GA

8:00 am – 8:30 am
General Thoracic Case Presentation & Expert Panel: Lung Cancer Screening at Academic and Non-academic Institutions

Case Presenter: *Robert B. Lee
Vanderbilt University Medical Center, Franklin, TN
Expert Panelists: ***D****Richard K. Freeman[1] and *John A. Howintgon[2]
[1]St. Vincent's Health and Hospital System/Indiana Heart Institute, Indianapolis, IN; [2]NorthShore University HealthSystem, Evanston, IL

8:30 am – 9:00 am
Critical Care Case Presentation & Expert Panel: ECMO & Your Hospital
Case Presenter: *Marcus G. Williams
Wellmont CVA Heart Institute, Bristol, TN
Expert Panelists: *Thomas C. Wozniak[1], ***D****Joseph B. Zwischenberger[2]
[1]Cardiovascular Surgical Services, P.C. – Methodist Professional Center, Indianapolis, IN; [2]University of Kentucky, Lexington, KY

9:00 am – 9:15 am
Break

ADULT CARDIAC BREAKOUT *Arizona Ballroom 6–7*

Moderators: *D**Scott A. LeMaire and *J. Michael DiMaio
Educational Objectives: Upon completion of this program participants will be able to:

- Identify appropriate candidates for TAVR based on the current accepted U.S. commercial indications.
- Integrate the potential for TAVR into their decision process for patients with symptomatic severe aortic stenosis.
- Recognize cannulation options for minimally invasive cardiac surgery.
- Discuss alternative mitral valve repair techniques.
- Describe right thoracotomy for aortic valve replacement.
- Summarize the current role of Thoracic Endovascular Repair in Acute Type B dissection.
- Discuss the current outcomes of total arch replacement in Acute Type A dissection.
- Describe the use of moderate hypothermic circulatory arrest in Acute Type A dissection.

9:15 am – 9:42 am
TAVR 2014 Update
D*Michael J. Reardon
Houston Methodist Hospital, Houston, TX

9:42 am – 10:09 am
Minimally Invasive Valve Surgery
*Donald D. Glower
Duke University Medical Center, Durham, NC

10:09 am – 10:35 am
Current Management of Type A and B Acute Dissection
D*Edward P. Chen
Emory University School of Medicine, Atlanta, GA

GENERAL THORACIC BREAKOUT *Arizona Ballroom 2–3*

Moderators: *D**Richard K. Freeman and *Stephen C. Yang
Educational Objectives: Upon completion of this program participants will be able to:

- Distinguish the factors that go in to determining the risk/benefit balance for surgical therapy vs. SBRT in the treatment of small tumors.
- Assess patient-related factors and technical factors that may contribute to the choice of operative vs. non-operative (SBRT) therapy for small tumors.

- Review current treatment paradigms and their results for stage IIIa NSCLC.
- Appreciate associated morbidities and outcomes associated with multi-modality therapies for stage IIIa NSCLC.
- Identify the important biomarkers for the common histologic forms of lung cancer.
- Interpret how biomarkers may influence the prognosis of lung cancer.
- Assess the influence of biomarkers and mutations on the selection of adjuvant therapy for lung cancer patients.

9:15 am – 9:42 am
SBT vs. Sublobar Resection for One-centimeter Lesions
D*Traves D. Crabtree
Washington University School of Medicine, St. Louis, MO

9:42 am – 10:09 am
Current Management of Stage III-A (P123N2M0) Lung Cancer
*David R. Jones
Memorial Sloan-Kettering Cancer Center, New York, NY

10:09 am – 10:35 am
Lung Cancer Biomarkers, Mutations and Genetic Signatures for the Thoracic Surgeon
*David H. Harpole, Jr.
Duke University Medical Center, Durham, NC

CONGENITAL BREAKOUT *Arizona Ballroom 4–5*

Moderators: *Paul J. Chai and *Jorge D. Salazar
Educational Objectives: Upon completion of this program participants will be able to:

- Determine the best surgical option for all patients with Ebstein's Anomaly.
- Formulate a treatment plan for neonates with Ebstein's Anomaly.
- Identify anatomic features of borderline left ventricle and correlate with imaging findings.
- Describe various strategies to achieve biventricular circulation and identify populations best suited for this approach.
- Describe how the STS Congenital Heart Surgery Database can be used for research, outcomes analysis, and quality improvement.
- List several recent examples of published research generated from the STS Congenital Heart Surgery Database.
- Summarize strategies to use the STS Congenital Heart Surgery Database to analyze outcomes and assess and improve quality.

9:15 am – 9:42 am
Surgical Treatment of Ebstein's Anomaly: From Neonate to Adult
*Christopher Knott-Craig
University of Tennessee Health Science Center/ Le Bonheur Children's Medical Center, Memphis, TN

9:42 am – 10:09 am
Biventricular Repair in Borderline Hearts
D*Sitaram Emani
Children's Hospital Boston, Boston, MA

10:09 am – 10:35 am
Use of STS Congenital National Database in Research Outcomes Quality Assurance
*Jeffery P. Jacobs
Johns Hopkins All Children's Hospital, St. Petersburg, FL

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

10:35 am – 10:50 am
Break

GENERAL SESSION *Arizona Ballroom 6–7*

Expert Panel Discussion with Audience Response System
Moderators: *D** Richard H. Feins
Educational Objectives: Upon completion of this program participants will be able to:

- Detect three positive characteristics and three negative characteristics of the Integrated-6 approach.
- Detect three positive characteristics and three negative characteristics of the traditional approach.

10:50 am – 11:20 am
Educating Our Future
I-6 Approach: Michael Argenziano
Columbia University, New York, NY
Traditional Approach: *Ara A. Vaporciyan
University of Texas, MD Anderson Cancer Center, Houston, TX

SPECIAL SESSION *Arizona Ballroom 6–7*

Introduction: *Richard L. Prager
Educational Objectives: Upon completion of this program participants will be able to:

- Describe the current ABTS Certification process.
- Better interpret Maintenance of Certification.
- Summarize the types and numbers of Thoracic Surgery Residency programs.

11:20 am – 12:00 pm
ABTS Update
*William A. Baumgartner
Executive Director, American Board of Thoracic Surgery,
Johns Hopkins University School of Medicine, Baltimore, MD

12:00 pm -1:00 pm
Break – Visit Exhibits
Tucson Ballroom A-E

12:00 pm – 4:00 pm
EXHIBITS OPEN
Tucson Ballroom A-E

ETHICS DEBATE *Arizona Ballroom 6–7*

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

- Determine whether to transfer a complicated case to a competing medical center against the hospital's order.
- Discuss relative responsibilities to the patient versus the hospital.

CME Credits Available: 1.0
Should a Thoracic Surgeon Transfer a Complicated Case to a Competing Medical Center Against the Hospital's Order?
Moderator: *Robert M. Sade,
Medical University of South Carolina, Charleston, SC
Pro: *Kathleen N. Fenton
International Children's Heart Foundation, Silver Spring, MD
Con: Jennifer L. Ellis
MedStar Heart Institute/Cleveland Clinic Heart and Vascular Institute, Washington, D.C.

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

THURSDAY, NOVEMBER 6, 2014

2:00 pm – 2:30 pm
Break – Visit Exhibits
Tucson Ballroom A-E

2:30 pm – 5:00 pm
Arizona Ballroom 6–7
(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: *David R. Jones and *Richard L. Prager

2:30 pm – 2:45 pm (page 60)
1. Fifteen-year Experience With Aortic Valve Sparing – Aortic Root Replacement With the Reimplantation Technique
Stefano Mastrobuoni[1], Laurent De Kerchove[1], Munir Boodhwani[2], Parla Astarci[1], Jean Rubay[1], Robert Verhelst[1], Philippe Noirhomme[1], Gebrine El Khoury[1]
[1]St. Luc's Hospital, Brussels, Belgium; [2]University of Ottawa Heart Institute, Ottawa ON, Canada
Discussant: *Duke E. Cameron, *Johns Hopkins University School of Medicine, Baltimore, MD*

2:45 pm – 3:00 pm (page 62)
2. Effects of Delayed Surgical Resection on Short- and Long-term Outcomes in Clinical Stage I Non-small Cell Lung Cancer
Pamela Samson, Aalok Patel, *Matthew Bott, *Traves Crabtree, *Daniel Kreisel, *Alexander S. Krupnick, *George A. Patterson, *Stephen Broderick, *Bryan Meyers, *Varun Puri
Washington University School of Medicine, St. Louis, MO
Discussant: *Melanie A. Edwards, *Saint Louis University School of Medicine, Saint Louis, MO*

3:00 pm – 3:15 pm (page 64)
3. Long-term Outcomes After the Ross Procedure in Children Vary by Age at Operation
Jennifer S. Nelson[1], Clayton N. Pratt[2], Sara K. Pasquali[2], Janet E. Donohue[2], Sunkyung Yu[2], Richard G. Ohye[2], Edward L. Bove[2], Jennifer C. Hirsch-Romano[2]
[1]University of North Carolina, Chapel Hill, NC; [2]University of Michigan, Ann Arbor, MI
Discussant: *Ross M. Ungerleider, *Wake Forest School of Medicine, Winston-Salem, NC*

3:15 pm – 3:30 pm (page 66)
4. When the Ross Is Not an Option: Systemic Semilunar Valve Replacement in the Pediatric/Young Adult Population Using a Porcine Full-root Bioprosthesis
*Jorge D. Salazar[2], Bhawna Gupta[2], *Charles D. Fraser, Jr.[1], *John H. Calhoon[3], *Makram R. Ebeid[2], *Mary B. Taylor[2], *Ali Dodge-Khatami[2]
[1]Baylor College of Medicine, Houston, TX; [2]The University of Mississippi Medical Center, Jackson, MS; [3]University of Texas Health Science Center San Antonio, San Antonio, TX
Discussant: *D**John W. Brown, *Indiana University School of Medicine, Indianapolis, IN*

3:30 pm – 3:45 pm (page 68)

5. The Impact of Video-assisted Thoracoscopic Surgery on Payment, Healthcare Utilization, and Workplace Absenteeism for Patients Undergoing Lung Resection

DThomas J. Watson[1], ***D***Jiejing Qiu[2]

[1]University of Rochester, Rochester, NY; [2]Covidien, Inc., Mansfield, MA

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

3:45 pm – 4:00 pm (page 70)

6. The Impact of Transcatheter Aortic Valve Replacement on Surgical AVR in Michigan

*Himanshu Patel[1], Morley A. Herbert[3], Patricia F. Theurer[2], Gail F. Bell[2], Jaelene Williams[2], *Richard Prager[1]

[1]University of Michigan, Ann Arbor, MI; [2]MSTCVS Quality Collaborative, Ann Arbor, MI; [3]Southwest Data Consultants, Dallas, TX

Discussant: *D**Michael J. Reardon, *Methodist DeBaket Heart & Vascular Center, Houston, TX*

4:00 pm – 4:15 pm (page 72)

7. Thoracoscopy vs. Thoracotomy for Diaphragm Plication: A Value Based Comparison

Onkar V. Khullar, Srini Tridandapani, *Felix G. Fernandez, *Seth D. Force, *Allan Pickens

Emory University School of Medicine, Atlanta, GA

Discussant: *Theolyn N. Price, *Cardiac & Thoracic Surgery Associates, Colorado Springs, CO*

4:15 pm – 4:30 pm (page 74)

8. Learning Habits of the Current Cardiothoracic Resident: Analysis of the In-training Examination Survey

David D. Odell[1], Damien La Par[12], Ryan A. Macke[4], Gabe Loor[3], Walter F. DeNino[11], Bill Stein[7], Jennifer S. Nelson[5], Kathleen Berfield[9], John Lazar[8], Vakhtang Tchantchaleishvili[10], Samuel Youssef[6], Tom C. Nguyen[2]

[1]University of Pittsburgh School of Medicine, Pittsburgh, PA; [2]University of Texas Houston, Houston, TX; [3]University of Minnesota, Minneapolis, MN; [4]University of Wisconsin, Madison, WI; [5]University of North Carolina, Chapel Hill, NC; [6]Swedish Medical Center, Seattle, WA; [7]Emory University School of Medicine, Atlanta, GA; [8]Lenox Hill Hospital, New York, NY; [9]University of Washington, Seattle, WA; [10]University of Rochester, Rochester, NY; [11]Medical University of South Carolina, Charleston, SC; [12]University of Virginia, Charlottesville, VA

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

4:30 pm – 4:45 pm (page 76)

9. Bilateral IMA Use for Coronary Artery Bypass Grafting Remains Underutilized: A Propensity Matched Multi-Institution Analysis

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

[1]University of Virginia, Charlottesville, VA; [2]Sentara Heart Hospital, Norfolk, VA; [3]Virginia Commonwealth University, Richmond, VA; [4]INOVA Heart and Vascular Center, Falls Church, VA

Discussant: *Michael R. Petracek, *Vanderbilt University, Nashville, TN*

4:45 pm – 5:00 pm (page 78)

10. Contemporary Results of Open Surgical Repair in Patients With Marfan Syndrome and Distal Aortic Dissection in the Endovascular Era

D* Joseph Coselli, Ourania Preventza, Kim I. de la Cruz, Susan Y. Green, Matt D. Price, *Scott A. LeMaire

Baylor College of Medicine/Texas Heart Institute, Houston, TX

Discussant: *D** G. Chad Hughes, *Duke University Medical Center, Durham, NC*

FRIDAY, NOVEMBER 7, 2014

6:45 am – 11:00 am
EXHIBITS OPEN
Tucson Ballroom A-E

7:00 am – 7:50 am
Arizona Ballroom 6–7
(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: *John S. Ikonomidis and *Christine L. Lau

7:00 am – 7:08 am (page 80)
1B. Pulsatile Flow Does Not Improve Function During Prolonged Ex Vivo Lung Perfusion
Erin Schumer, Keith Zoeller, Paul Linsky, Gretel Monreal, Michael Sobieski, Steven Koenig, *Mark Slaughter, Victor van Berkel
University of Louisville, Louisville, KY
Discussant: ***D***Michael J. Weyant, *University of Colorado, Aurora, CO*

7:08 am – 7:16 am (page 82)
2B. Circulating Tumor Cells From 4D Model Has Increased Activator Protein-1 Expression Compared to Primary Tumor
D*Min P. Kim[3], Dhruva K. Mishra[1], Chad Creighton[2], Fengju Chen[2], Michael J. Thrall[3], Jonathan M. Kurie[4]
[1]Houston Methodist Research Institute, Houston, TX; [2]Baylor College of Medicine, Houston, TX; [3]Houston Methodist Hospital, Houston, TX; [4]University of Texas MD Anderson Cancer Center, Houston, TX
Discussant: *Chadrick E. Denlinger, *Medical University of South Carolina, Charleston, SC*

7:16 am – 7:24 am (page 84)
3B. Are Histologic Abnormalities More Severe in Bicuspid Aortopathy?
Elbert Heng, James Stone, Thomas MacGillivray, Jennifer Walker, Joshua Baker, Gus Vlahakes, Hang Lee, *Thoralf Sundt
Massachusetts General Hospital, Boston, MA
Discussant: *Jorge D. Salazar, *University of Mississippi School of Medicine, Jackson, MS*

7:24 am – 7:32 am (page 86)
4B. Pediatric End-stage Failing Hearts Demonstrate Increased Cardiac Stem Cells
Brody Wehman, Sudhish Sharma, Rachana Mishra, David L. Simpson, Savitha Deshmukh, *Sunjay Kaushal
University of Maryland Medical Center, Baltimore, MD
Discussant: ***D****John E. Mayer, *Boston Children's Hospital, Boston, MA*

7:32 am – 7:40 am (page 88)
5B. Timing of Adding Blood to Prime Affects Inflammatory Response to Neonatal Cardiopulmonary Bypass
DBenjamin S. Schmidt, ***D***Magan R. Lane, ***D***Vanessa M. DiPasquale, ***D***Lori P. Graf, ***D****Yoshio Ootaki, ***D***James E. Jordan, ***D****Ross M. Ungerleider
Wake Forest Baptist Health, Winston Salem, NC
Discussant: E. Dean McKenzie, *Texas Children's Hospital, Houston, TX*

7:40 am - 7:48 am (page 90)
6B. Spinal Cord Ischemia Reperfusion Injury Induces Erythropoietin Receptor Expression
Lisa S. Foley, Daine T. Bennett, Kirsten A. Freeman, Marshall Bell, Joshua Mares, Xiangzhong Meng, *David A. Fullerton, *Thomas B. Reece
University of Colorado, Aurora, CO
Discussant: *John W. Hammon, Wake Forest University Medical Center, Winston-Salem, NC

SECOND SCIENTIFIC SESSION

FRIDAY, NOVEMBER 7, 2014
8:00 am – 10:00 am
Arizona Ballroom 6–7
(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: *Melanie A. Edwards and *Jorge D. Salazar

8:00 am – 8:15 am (page 92)
11. Surgical Therapy Is an Important Multimodality Component in Patients With Distal Esophageal Adenocarcinoma Independent of Regional Lymph Node Location
Boris Sepesi[1], Henner M. Schmidt[2], Michal Lada[3], *Garrett L. Walsh[1], *Reza J. Mehran[1], *David C. Rice[1], *Jack A. Roth[1], *Ara A. Vaporciyan[1], Jaffer A. Ajani[1], Thomas J. Watson[3], *Stephen G. Swisher[1], Donald E. Low[2], *Wayne L. Hofstetter[1]
[1]University of Texas MD Anderson Cancer Center, Houston, TX; [2]Virginia Mason Medical Center, Seattle, WA; [3]University of Rochester Medical Center, Rochester, NY
Discussant: *Mark J. Krasna, J*ersey Shore University Medical Center, Neptune, NJ*

8:15 am – 8:30 am (page 94)
12. The STS Adult Cardiac Surgery Database Version 2.73: More is better!
Terry Shih[1], Gaetano Paone[2], Patricia F. Theurer[3], Donna McDonald[5], Gail F. Bell[3], Jaelene K. Williams[3], *David M. Shahian[4], *Richard Prager[1]
[1]University of Michigan, Ann Arbor, MI; [2]Henry Ford Hospital, Detroit, MI; [3]MSTCVS Quality Collaborative, Ann Arbor, MI; [4]Massachusetts General Hospital, Boston, MA; [5]The Society of Thoracic Surgery, Chicago, IL
Discussant: David M. Shahian, *Massachusetts General Hospital, Boston, MA*

8:30 am – 8:45 am (page 96)
13. A Community-based Multi-disciplinary CT Screening Program Improves Lung Cancer Survival
William D. Mayfield, ***D****Daniel L. Miller, Theresa D. Luu, Gerald A. Helms, Allan R. Muster, Vickie J. Beckler, Aaron Caan
WellStar Healthcare, Marietta, GA
Discussant: *John A. Howington, *NorthShore University HealthSystem, Evanston, IL*

8:45 am – 9:00 am (page 98)
14. Moderate vs. Deep Hypothermia With Antegrade Cerebral Perfusion for Acute Type A Aortic Dissection
Bradley G. Leshnower, *Vinoud Thourani, *Michael Halkos, Eric Sarin, William B. Keeling, *Robert A. Guyton, *Edward P. Chen
Emory University School of Medicine, Atlanta, GA
Discussant: *Anthony L. Estrera, *University of Texas Houston Medical School, Houston, TX*

9:00 am – 9:15 am (page 100)
15. Establishing Contemporary Benchmarks for Surgical Pulmonary Valve Replacement: Analysis of The Society of Thoracic Surgeons Congenital Heart Surgery Database
Amber D. Khanna[1], Kevin Hill[2], Sara K. Pasquali[6], Amelia S. Wallace[2], Joseph D. Kay[1], Frederick A. Masoudi[1], Marshall L. Jacobs[3], *Jeffrey P. Jacobs[4], Tara Karamlou[5]

[1]*University of Colorado Anschutz Medical Campus, Aurora, CO;* [2]*Duke University School of Medicine, Durham, NC;* [3]*Johns Hopkins University School of Medicine, Baltimore, MD;* [4] *Johns Hopkins All Children's Hospital, St. Petersburg, FL;* [5]*University of California, San Francisco,* San *Francisco, CA;* [6]*University of Michigan, Ann Arbor, MI*
Discussant: *Brian E. Kogon, *Emory University, Children's Hospital at Egleston, Atlanta, GA*

9:15 am – 9:30 am (page 102)

16. Longitudinal Trends in Morbidity and Mortality With Introduction of Robotic Assisted Thoracic Surgical Procedures at a Major Academic Cancer Center
Inderpal Sarkaria, Amanda A. Ghanie, Joe Dycoco, Rachel Grosser, David J. Finley, Nabil P. Rizk, James Huang, Prasad Adusumilli, Robert J. Downey, Manjit S. Bains, Valerie W. Rusch, *David R. Jones
Memorial Sloan-Kettering Cancer Center, New York, NY
Discussant: ***D****Mark W. Onaitis, *Duke University Medical Center, Durham, NC*

9:30 am – 9:45 am (page 104)

17. Variation in Outcomes for Risk-adjusted Pediatric and Congenital Cardiac Operations: An Analysis of the Society of Thoracic Surgeons (STS) Congenital Heart Surgery Database
*Jeffrey P. Jacobs[1], Sean M. O'Brien[2], Sara K. Pasquali[3], *J. William Gaynor[4], Tara Karamlou[7], Karl F. Welke[5], Giovanni Filardo[6], Jane M. Han[8], Sunghee Kim[2], David M. Shahian[9], Marshall L. Jacobs[10]
[1]*Johns Hopkins All Children's Heart Institute, St. Petersburg, FL;* [2]*Duke University School of Medicine, Durham, NC;* [3]*University of Michigan, Ann Arbor, MI;* [4]*Children's Hospital of Philadelphia, Philadelphia, PA;* [5]*Children's Hospital of Illinois, Peoria, IL;* [6]*Institute for Health Care Research and Improvement, Dallas, TX;* [7]*University of California San Francisco, San Francisco, CA;* [8]*The Society of Thoracic Surgeons, Chicago, IL;* [9]*Massachusetts General Hospital, Harvard Medical School, Boston, MA;* [10]*Johns Hopkins University, Baltimore, MD*
Discussant: ***D****Frederick L. Grover, *University of Colorado Denver, Aurora, CO*

9:45 am – 10:00 am (page 106)

18. Residents' Perceptions of Two- vs. Three-year Training Programs (2013 and 2014 TSRA/TSDA In-training Exam Survey
Tom C. Nguyen[1], David Odell[2], Elizabeth H. Stephens[3], Gabriel Loor[4], Damien J. LaPar[5], Walter F. DeNino[6], Benjamin Wei[7],Muhammad Aftab[8], Ryan A. Macke[9], Jennifer S. Nelson[10], Kathleen Berfield[11], John Lazar[12], William Stein[14], Samuel J. Youssef[15], Vakhtang Tchantchaleishvili[13] [1]*University of Texas-Houston, Houston, TX;* [2]*University of Pittsburgh Medical Center, Pittsburgh, PA;* [3]*Columbia University, New York City, NY;*[4]*University of Minnesota, Minneapolis, MN;* [5]*University of Virginia, Charlottesville, VA;* [6]*Medical University of South Carolina, Charleston, SC;* [7]*University of Alabama, Birmingham, AL;* [8]*Texas Heart Institute/Baylor, Houston, TX;* [9]*University of Wisconsin, Madison, WI;* [10]*University of North Carolina, Chapel Hill, NC;* [11]*University of Washington, Seattle, WA;* [12]*Lenox Hill, New York City, NY;* [13]*University of Rochester, Rochester, NY;* [14]*Emory University, Atlanta, GA;* [15]*Swedish Hospital, Seattle, WA*
Discussant: *William A. Baumgartner, *Johns Hopkins University School of Medicine, Baltimore, MD*

10:00 am – 10:30 am
Break – Visit Exhibits
Tucson Ballroom A-E

GENERAL SESSION (All attendees and guests welcome)

FRIDAY, NOVEMBER 7, 2014

10:30 am – 12:00 pm
Arizona Ballroom 6–7
CME Credits Available: 1.5

10:30 am – 10:50 am
Kent Trinkle Education Lectureship: The University of Louisville and the Mason Dixon Line: Re-establishing Ties With the STSA
DMark S. Slaughter
University of Louisville, Louisville, KY

10:50 am – 11:20 am
President's Invited Lecturer: Codman's Legacy: Data, Reporting, and Professional Responsibility
David M. Shahian
Massachusetts General Hospital, Boston, MA

11:20 am – 12:00 pm
Presidential Address: Art and the Human Condition
*Richard L. Prager
University of Michigan, Ann Arbor, MI

12:00 pm
All Attendee Lunch
Ania Terrace

12:00 pm – 4:00 pm
EXHIBITS OPEN
Dessert served in the Exhibit Hall at 1:00 pm
Tucson Ballroom A-E

FRIDAY, NOVEMBER 7, 2014

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 *Arizona Ballroom 6–7*

(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**Gorav Ailawadi and ***D****Himanshu J. Patel

2:00 pm – 2:15 pm (page 108)
19. Retrograde Ascending Aortic Dissection After TEVAR for Distal Aortic Dissection and Zone 0 Landing: Association, Risk Factors, and True Incidence
Andrea Garcia[2], ***D****Ourania Preventza[1], *Denton Cooley[1], Lorena Gonzales[2], ***D****Joseph Coselli[1]
[1]Texas Heart Institute at Baylor St. Luke's Medical Center, Houston, TX; [2]Baylor College of Medicine, Houston, TX
Discussant: *Edward P. Chen, *Emory University School of Medicine, Atlanta, GA*

2:15 pm – 2:30 pm (page 110)
20. Short- and Mid-term Outcomes in Transcatheter Aortic Valve Replacement in Ninety-five Nonagenarians: Comparison of Transfemoral and Alternative Access Procedures
Michael O. Kayatta, Vasilis Babaliaros, Eric Sarin, Patrick Kilgo, Chun Li, Chandan Devireddy, Bradley G. Leshnower, Kreton Mavromatis, Amanda Maas, Robert A. Guyton, James Stewart, Peter Block, Stam Lerakis, ***D****Vinod Thourani
Emory University School of Medicine, Atlanta, GA
Discussant: *Thomas M. Beaver, *University of Florida, Gainesville, FL*

2:30 pm – 2:45 pm (page 112)
21. Early and Late Outcomes After Complete Aortic Replacement
*Anthony L. Estrera, Harleen Sandhu, Tom C. Nguyen, Ali Azizzadeh, Kristofer Charlton-Ouw, Charles C. Miller, *Hazim J. Safi
University of Texas Medical School at Houston, Memorial Hermann Heart and Vascular Institute, Houston, TX
Discussant: *John A. Kern, *University of Virginia Health System, Charlottesville, VA*

THIRD SCIENTIFIC SESSION A

2:45 pm – 3:00 pm (page 114)

22.Long-term Survival Following Bovine Pericardial Versus Porcine Stented Bioprosthetic Aortic Valve Replacement: Does Valve Choice Matter?
Asvin M. Ganapathi, Brian R. Englum, Jeffrey Keenan, *Hanghang Wang, Matthew A. Schechter, *Donald D. Glower, *G. Chad Hughes
Duke University Medical Center, Durham, NC
Discussant: *D** William H. Ryan, *Cardiac Surgery Specialists, Plano, TX*

3:00 pm – 3:15 pm (page 116)

23. Red Blood Cells and Mortality After Coronary Artery Bypass Surgery: Are We Really Transfusing Patients to Death?
Gaetano Paone[1], Morley A. Herbert[4], Patricia F. Theurer[3], Gail F. Bell[3], Jaelene K. Williams[3], Donald S. Likosky[2], *Richard Prager[2]
[1]Henry Ford Hospital, Detroit, MI; [2]University of Michigan, Ann Arbor, MI; [3]MSTCVS Quality Collaborative, Ann Arbor, MI; [4]Southwest Data Consultants, Dallas, TX
Discussant: *D** Alan M. Speir, *INOVA Heart and Vascular Institute, Falls Church, VA*

3:15 pm – 3:30 pm (page 118)

24. Transcatheter Aortic Valve Replacement (TAVR) vs. Off Pump Aortic Valve Bypass (AVB) With an Apico-Aortic Conduit: A Comparison of Outcomes and Hospital Economics
*John Brown, Jack H. Boyd, Parth Patel, Amjad Syed, Joe Ladowski, Joel Corvera
Indiana University, Indianapolis, IN
Discussant: *D** Faisal G. Bakaeen, *Texas Heart Institute/Baylor College of Medicine, Houston, TX*

GENERAL THORACIC BREAKOUT *Arizona Ballroom 2–3*

(Presentations are limited to seven minutes, followed by eight minutes of discussion.)
Moderators: *D** Traves D. Crabtree and *Mitchell J. Magee

2:00 pm – 2:15 pm (page 120)

25. An Assessment of the Optimal Time for Removal of Esophageal Stents Used in the Treatment of an Esophageal Anastomotic Leak or Perforation
*Richard K. Freeman, *Anthony J. Ascioti, Megan Dake, Raja S. Mahidhara
St. Vincent Hospital, Indianapolis, IN

2:15 pm – 2:30 pm (page 122)

26. Electromagnetic Navigation Bronchoscopy Guided Methylene Blue Pleural Dye Marking for the Thoracoscopic Localization and Resection of Small Pulmonary Nodules
Omar Awais[1], Michael Reidy[1], *Arjun Pennathur[1], Valentino J. Bianco[1], William E. Gooding[2], James D. Luketich[1]
[1]University of Pittsburgh Medical Center, Pittsburgh, PA; [2]University of Pittsburgh Cancer Institute, Pittsburgh, PA

2:30 pm – 2:45 pm (page 124)

27. Efficacy of Portable Ultrasound to Detect Pneumothorax Post Lung Resection

Farah Mohammad, Arielle Hodari, Ilan Rubinfeld, Karen Byers, Keith Killu, *Zane Hammoud

Henry Ford Hospital, Detroit, MI

2:45 pm – 3:00 pm (page 126)

28. Resection for Primary and Metastatic Tumors of the Sternum: An Analysis of Prognostic Variables

Usman Ahmad[1], Haoxian Yang[1], Daniel H. Buitrago[1], Manjit S. Bains[1], Nabil P. Rizk[1], James Huang[1], Prasad Adusumilli[1], Gaetano Rocco[2], *David R. Jones[1]

[1]Memorial Sloan-Kettering Cancer Center, New York, NY; [2]National Cancer Institute, Naples, Italy

3:00 pm – 3:15 pm (page 128)

29. Lung Function Predicts Pulmonary Complications After Minimally Invasive Lobectomy

Mark K. Ferguson, Ruoyu Zhang, Sang Mee Lee, Chris Wigfield, Wickii T. Vigneswaran

University of Chicago, Chicago, IL

3:15 pm – 3:30 pm (page 130)

30. Survival After Sublobar Resection vs. Lobectomy for Clinical Stage IA Lung Cancer: An Analysis of Over 5,000 Patients from the National Cancer Database

Onkar V. Khullar, Theresa Gillespie, Dana Nickleach, Yuan Liu, Kristin Higgins, Suresh Ramalingam, Joseph Lipscomb, *Felix G. Fernandez

Emory University School of Medicine, Atlanta, GA

CONGENITAL BREAKOUT *Arizona Ballroom 4–5*

(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: *Lauren C. Kane and *Jorge D. Salazar

2:00 pm – 2:15 pm (page 132)

31. Results of Palliation With an Initial Modified Blalock-Taussig Shunt in Infants With Single Ventricle Associated With Restrictive Pulmonary Blood Flow

Bahaaldin Alsoufi, *Brian Kogon, Ritu Sachdeva, Brian Schlosser, Martha Clabby, William Mahle, Dennis Kim, *Kirk Kanter

Emory University School of Medicine, Atlanta, GA

Discussant: *Pirooz Eghtesady, *St. Louis Children's Hospital, St. Louis, MO*

2:15 pm – 2:30 pm (page 134)

32. Arterioplasty for Right Ventricular Outflow Tract Obstruction Following Arterial Switch Is a Durable Procedure

Luke M. Wiggins, S. Ram Kumar, *Vaughn A. Starnes, *Winfield J. Wells

Children's Hospital Los Angeles, Los Angeles, CA

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

THIRD SCIENTIFIC SESSION A

2:30 pm – 2:45 pm (page 136)

33. Outcomes of ECMO in Children With Single Ventricle Physiology
S. Ram Kumar, Antonio J. Escobar, *Vaughn A. Starnes, *Winfield J. Wells
Children's Hospital Los Angeles, Los Angeles, CA
Discussant: Gordon A. Cohen, *University of California, San Francisco, CA*

2:45 pm – 3:00 pm (page 138)

34. Intermediate Results of Hybrid vs. Primary Norwood Operation in Risk Stratified Cohorts
Daniel J. Dibardino, Juliana Gomez-Arostegui, Aaron Kemp, Raveen Raviendran, Sanjeet Hegde, Eric Devaney, John Lamberti, Howaida El-Said
University of California San Diego/Rady Children's Heart Institute, San Diego, CA
Discussant: Christian Pizarro, *Nemours Cardiac Center, Alfred I. duPont Hospital for Children, Wilmington, DE*

3:00 pm – 3:15 pm (page 140)

35. Contemporary Outcomes of Surgical Repair of Total Anomalous Pulmonary Venous Connection in Patients With Heterotaxy Syndrome: An Analysis of The Society of Thoracic Surgeons (STS) Congenital Heart Surgery Database
Roosevelt Bryant[1], Muhammad S. Khan[1], Sunghee Kim[2], Kevin D. Hill[2], Jeffrey P. Jacobs[2], Marshall L. Jacobs[2], Sara K. Pasquali[2], David L. Morales[1]
[1]Cincinnati Children's Hospital Medical Center, Cincinnati, OH; [2]Duke Clinical Research Institute, Durham, NC
Discussant: *Robert D.B. Jaquiss, *Duke Children's Hospital, Durham, NC*

3:15 pm – 3:30 pm (page 142)

36. Long-term Outcome of Aortic Implantation for Patients With Anomalous Origin of the Left Coronary Artery From the Pulmonary Artery
Michael C. Monge, Osama Eltayeb, John M. Costello, Anne E. Sarwark, Michael R. Carr, *Carl L. Backer
Ann & Robert H. Lurie Children's Hospital of Chicago, Chicago, IL
Discussant: *James Jaggers, C*hildren's Hospital Colorado, Aurora, CO*

3:30 pm – 4:00 pm
Break – Visit Exhibits
Tucson Ballroom A-E

FRIDAY, NOVEMBER 7, 2014

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 *Arizona Ballroom 6–7*

(Presentations are limited to seven minutes, followed by two minutes of discussion from a selected discussant and an additional six minutes of discussion open to the audience.)
Moderators: *D**Faisal G. Bakaeen and *Jennifer S. Lawton

4:00 pm – 4:15 pm (page 144)
37. Nadir Hematocrit on Bypass and Rates of Acute Kidney Injury: Does Gender Matter?
Michelle C. Ellis[3], Theron A. Paugh[3], Timothy A. Dickinson[4], John Fuller[2], Jeffrey Chores[2], *Gaetano Paone[5], *Himanshu J. Patel[3], *Richard Prager[3], Donald S. Likosky[3], on behalf of the Michigan Society of Thoracic and Cardiovascular Surgeons Perfusion Measures and Outcomes (PERForm) Registry[1]
[1]Michigan Society of Thoracic and Cardiovascular Surgeons Perfusion Measures and Outcomes (PERForm) Registry, Ann Arbor, MI; [2]St. John Providence Health System, Detroit, MI; [3]University of Michigan, Ann Arbor, MI; [4]Specialty Care, Nashville, TN; [5]Henry Ford Hospital, Detroit, MI
Discussant: *D**Gorav Ailawadi, *University of Virginia, Charlottesville, VA*

4:15 pm – 4:30 pm (page 146)
38. Severe Aortic Valve Stenosis in Rural Community Practice: Under Treated and Under Referred for Definitive Management
Michael Kayatta[2], Julio C. Vasquez[1], *Jacob DeLaRosa[1]
[1]Idaho State University, Pocatello, ID; [2]Emory University, Atlanta, GA
Discussant: *D**Himanshu J. Patel, *University of Michigan, Ann Arbor, MI*

4:30 pm – 4:45 pm (page 148)
39. Cardiac Myxomas: A 50-year Experience With Resection and Recurrence
Ishan Shah, *Joseph Dearani, *Richard Daly, *Rakesh Suri, *Soon Park, *Lyle Joyce, Zhuo Li, *Hartzell Schaff
Mayo Clinic, Rochester, MN
Discussant: *Curtis G. Tribble, *University of Virginia, Charlottesville, VA*

THIRD SCIENTIFIC SESSION B

4:45 pm – 5:00 pm (page 150)

40. A New Surgical Approach to Exclude the Left Atrial Appendage Through Right Minithoracotomy and the Transverse Sinus During a Minimally Invasive CryoCox-Maze Procedure
DNiv Ad, Paul S. Massimiano, Graciela Pritchard, Sari D. Holmes
INOVA Heart and Vascular Institute, Falls Church, VA
Discussant: *James S. Gammie, *University of Maryland Medical Center, Maryland, MD*

GENERAL THORACIC BREAKOUT *Arizona Ballroom 2–3*

(Presentations are limited to seven minutes, followed by eight minutes of discussion.)
Moderators: *Mark J. Krasna and *Theresa D. Luu

4:00 pm – 4:15 pm (page 152)

41. Modifications to the Robotic Esophageal to Gastric Anastomosis
*Benjamin Wei, *Douglas J. Minnich, Ayesha S. Bryant, *Robert Cerfolio
University of Alabama, Birmingham, AL

4:15 pm – 4:30 pm (page 154)

42. Timely Discharge and Outpatient Management of Prolonged Air Leaks Following Lobectomy: Utilization and Cost Containment
Ryan K. Schmocker, Ryan A. Macke, *Shahab A. Akhter, James D. Maloney, Justin D. Blasberg
University of Wisconsin School of Medicine and Public Health, Madison, WI

4:30 pm – 4:45 pm (page 156)

43. Surgery for Benign Esophageal Disease: Does Surgeon Specialty Matter?
Michael Kent, Thomas Wang, Thomas Curran, Sidhu Gangadharan, Richard Whyte
Beth Israel Deaconess Medical Center, Boston, MA

4:45 pm – 5:00 pm (page 158)

44. Endobronchial Valves in the Treatment of Persistent Air Leaks
John M. Hance, *Jeremiah Martin, *Timothy W. Mullett
University of Kentucky, Lexington, KY

CONGENITAL BREAKOUT *Arizona Ballroom 4–5*

(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: Jennifer C. Hirsch-Romano and *Jeffrey P. Jacobs

4:00 pm – 4:15 pm (page 160)

45. Concomitant Procedures Performed During Adult Congenital Heart Surgery: An Unclear Risk/Benefit Ratio?
*Brian E. Kogon[2], Bahaaldin Alsoufi[2], Wendy Book[2], Matthew Oster[1], Alexandra Ehrlich[1]
[1]Children's Healthcare of Atlanta, Atlanta, GA; [2]Emory University School of Medicine, Atlanta, GA
Discussant: Harold M. Burkhart, *Mayo Clinic, Rochester, MN*

4:15 pm – 4:30 pm (page 162)

46. The Outcome of Right Ventricle to Pulmonary Artery Conduit for Biventricular Repair

Takeshi Shinkawa, Carl Chipman, Tom Bozzay, Xinyu Tang, Jeffery Gossett, Michiaki Imamura

Arkansas Children's Hospital, Little Rock, AR

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

4:30 pm – 4:45 pm (page 164)

47. Early Outcomes of Pulmonary Valve Replacement With the Mitroflow Bovine Pericardial Bioprosthesis

Sarah A. Schubert, *Joseph B. Clark, John L. Myers

Penn State College of Medicine, Hershey, PA

Discussant: George M. Alfieris, *University Surgical Associates, L.L.P., SUNY Health Science Center, Syracuse, NY*

4:45 pm – 5:00 pm (page 166)

48. Moderate Tricuspid Valve Regurgitation at the Time of Pulmonary Valve Replacement: Annuloplasty or Not?

*Brian E. Kogon[1], Makoto Mori[1], Bahaaldin Alsoufi[1], *Kirk Kanter[1], Wendy Book[1], Matthew Oster[2]

[1]Emory University School of Medicine, Atlanta, GA; [2]Children's Healthcare of Atlanta, Atlanta, GA

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

5:00 pm – 6:00 pm

STSA ANNUAL BUSINESS MEETING *(Members Only)*

Arizona Ballroom 6–7

6:00 pm – 7:00 pm

Residents Reception

San Luis 1-2

7:00 pm – 9:00 pm

President's Mixer

Ania Terrace

CODING UPDATE

SATURDAY, NOVEMBER 8, 2014

CODING UPDATE *Arizona Ballroom 6–7*

7:00 am – 8:00 am
Educational Objective: Upon completion of this program participants will be able to understand typical and challenging issues in coding and reimbursement of cardiothoracic surgery procedures.
CME Credits Available: 1.0
Update on CPT and Physician Payment Issues for 2015
Moderator: *Peter K. Smith, *Duke University Medical Center, Durham, NC*

SATURDAY, NOVEMBER 8, 2014

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 *Arizona Ballroom 6–7*

(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: *Anthony L. Estrera and *Charles Patrick Murrah

8:00 am – 8:15 am (page 168)
49. Institutional Variation in Mortality After Stroke Following Cardiac Surgery: An Opportunity for Improvement
*Damien J. LaPar[1], *Mohammed A. Quader[2], *Jeffrey B. Rich[3], *Irving L. Kron[1], *Ivan K. Crosby[1], *John A. Kern[1], *Alan M. Speir[4], *Gorav Ailawadi[1]
[1]University of Virginia, Charlottesville, VA; [2]Virginia Commonwealth University, Richmond, VA; [3]Sentara Heart Hospital, Norfolk, VA; [4]INOVA Heart and Vascular Center, Falls Church, VA
Discussant: *Andrea J. Carpenter, *University of Texas, Health Science Center at San Antonio, San Antonio, TX*

8:15 am – 8:30 am (page 170)
50. Cost Analysis of Physician Assistant Home Visit Program to Reduce Hospital Readmission
John Nabagiez, Masood A. Shariff, Robert Carlucci, Joseph DiNatale, William Molloy, ***D***Joseph T. McGinn
Staten Island University Hospital, Staten Island, NY
Discussant: ***D****Kevin D. Accola, *Cardiovascular Surgical PA, Orlando, FL*

8:30 am – 8:45 am (page 172)
51. On-pump Versus Off-pump Coronary Artery Bypass Graft Surgery Among Patients With Type 2 Diabetes
*Edward Sako[4], Ashima Singh[1], *Hartzell Schaff[2], Maria M. Brooks[1], Mark Hlatky[3], Robert Frye[2]
[1]University of Pittsburgh, Pittsburgh, PA; [2]Mayo Clinic, Rochester, MN; [3]Stanford University, Palo Alto, CA; [4]University of Texas Health Science Center at San Antonio, San Antonio, TX
Discussant: *Jennifer S. Lawton, *Washington University School of Medicine, St. Louis, MO*

8:45 am – 9:00 am (page 174)
52. Surgical Embolectomy for Acute Massive and Submassive Pulmonary Embolism in a Series of 115 Patients
Robert C. Neely, *John G. Byrne, Igor Gosev, *Lawrence H. Cohn, Quratulain Javed, James D. Rawn, *Sary F. Aranki, Samuel Z. Goldhaber, Gregory Piazza, Marzia Leacche
Brigham and Women's Hospital, Boston, MA
Discussant: ***D****Neal D. Kon, *Wake Forest University School of Medicine, Winston-Salem, NC*

FOURTH SCIENTIFIC SESSION A

GENERAL THORACIC BREAKOUT *Arizona Ballroom 2–3*

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

Moderators: *D** Min P. Kim and ***D**** Daniel L. Miller

8:00 am – 8:15 am (page 176)

53. Re-evaluation of the Modified Ravitch Repair for Pectus Defects: Forgotten Advantages?
*Michael H. Hines
University of Texas Medical School at Houston, Houston, TX

8:15 am – 8:30 am (page 178)

54. Does Thoracoscopic Surgery Decrease the Morbidity of Combined Lung and Chest Wall Resection?
Mark Hennon, Elisabeth Dexter, Miriam Huang, John Kane, Chukwumere Nwogu, Anthony Picone, Sai Yendamuri, *Todd Demmy
Roswell Park Cancer Institute, Buffalo, NY

8:30 am – 8:45 am (page 180)

55. A Prospective Clinical Trial of Telecytopathology for Rapid Interpretation of Specimens Obtained During Endobronchial Ultrasound (EBUS)
Matthew Bott, Bryce James, Brian Collins, *Varun Puri, *Daniel Kreisel, *Alexander S. Krupnick, *George A. Patterson, *Stephen R. Broderick, *Bryan F. Meyers, *Traves Crabtree
Washington University School of Medicine, St. Louis, MO

8:45 am – 9:00 am (page 182)

56. Does Surgical Upstaging in Resected Lung Cancer Depend on the Surgical Approach?
*Jeremiah Martin, Eric B. Durbin, Li Chen, Tamas Gal, Angela Mahan, *Victor Ferraris, *Joseph B. Zwischenberger
University of Kentucky, Lexington, KY

TRANSPLANT BREAKOUT *Arizona Ballroom 1*

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

Moderators: *Shahab A. Akhter and *Allan Pickens

8:00 am – 8:15 am (page 184)

57. Should Single Lung Transplantation Continue to be Performed in Patients With Chronic Obstructive Pulmonary Disease (COPD)?
Daine T. Bennett, Martin R. Zamora, *Thomas B. Reece, John D. Mitchell, Joseph C. Cleveland, *Frederick L. Grover, David A. Fullerton, Ashok Babu, Robert A. Meguid, Michael J. Weyant
University of Colorado Denver School of Medicine, Aurora, CO

8:15 am – 8:30 am (page 186)

58. Prior Sterntomy and Ventricular Assist Device Implant Do Not Adversely Impact Survival or Allograft Function Following Heart Transplant
Ann C. Gaffey, Emily Phillips, Jessica Howard, Robert Emery, Dale Korbin, Lee Goldberg, Micheal Acker, *Y. Joseph Woo, *Pavan Atluri
Hospital of the University of Pennsylvania, Philadelphia, PA

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

8:30 am – 8:45 am (page 188)

59. Stroke After Left Ventricular Assist Device Implantation: Outcomes in the Continuous Flow Era

Laura Harvey, Christopher Holley, Samit Roy, Peter Eckman, Monica Colvin-Adams, Kenneth Liao, Ranjit John

University of Minnesota, Minneapolis, MN

8:45 am – 9:00 am (page 190)

60. Is There an Age Limit to Lung Transplantation?

Sreeja Biswas Roy[1], Diana Alarcon[2], Rajat Walia[2], Kristina M. Chapple[2], Ross Bremner[2], Michael A. Smith[2]

[1]Providence Hospital and Medical Center, Southfield, MI; [2]St. Joseph's Hospital and Medical Center, Phoenix, AZ

CONGENITAL BREAKOUT *Arizona Ballroom 4–5*

(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: *Paul J. Chai and *Charles B. Huddleston

8:00 am – 8:15 am (page 192)

61. Left Ventricular Re-training and Late Arterial Switch for D-transposition of the Great Arteries

Naruhito Watanabe, *Richard D. Mainwaring, Sergio Carrillo, V. Mohan Reddy, Frank Hanley

Stanford University School of Medicine, Stanford, CA

Discussant: Jennifer Hirsch-Romano, *University of Michigan, Ann Arbor, MI*

8:15 am – 8:30 am (page 194)

62. Equivalent Outcomes for Early and Late Complete Atrioventricular Canal Repair in the Modern Era

Elizabeth H. Stephens, Ali N. Ibrahimiye, Halit Yerebakan, Tuba Gencol, Matthew Lippel, Betul Yilmaz, Wyman Lai, Anjali Chelliah, Amee Shah, Stephanie Levasseur, *Paul Chai, Jan Quaegebeur, Emile Bacha

Columbia University Medical Center, New York, NY

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

8:30 am – 8:45 am (page 196)

63. Aortic Valve Leaflet Morphology Is Associated With the Patterns of Aortic Dilation and Valve Dysfunction in Young Patients With Bicuspid Aortic Valves

Mark Ruzmetov, Jitendra J. Shah, *Randall S. Fortuna, *Karl F. Welke

Children's Hospital of Illinois, Peoria, IL

Discussant: *Luca A. Vricella, J*ohns Hopkins University School of Medicine, Baltimore, MD*

8:45 am – 9:00 am (page 198)

64. The Supported (Ross Ungerleider) Modified Ross Operation: Early Outcomes and Intermediate Follow Up

Roni Jacobsen, Michael Earing, Garrick Hill, Michael Barnes, *James Tweddell

Medical College of Wisconsin/Children's Hospital of Wisconsin, Milwaukee, WI

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

FOURTH SCIENTIFIC SESSION A

9:00 am – 9:30 am
Break

HAROLD URSCHEL HISTORY LECTURESHIP *Arizona Ballroom 6–7*

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

9:30 am – 9:50 am (page 200)
65. Osler Almon Abbott: The Man, The Award and His Legacy
D* Daniel L. Miller, *Joseph I. Miller, Jr., *Kamal A. Mansour
Emory University School of Medicine, Atlanta, GA

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

FOURTH SCIENTIFIC SESSION B *Arizona Ballroom 6–7*

SATURDAY, NOVEMBER 8, 2014

9:50 am – 11:50 am
CME Credits Available: 2.0
Moderators: *John H. Calhoon and ***D****Robert J. Cerfolio

9:50 am – 10:05 am (page 202)
66. One Hundred Safe Transports on Extracorporeal Life Support to a Regional Extracorporeal Membrane Oxygenation Center
Mauer Biscotti[1], Darryl Abrams[1], Cara Agerstrand[1], *Joshua Sonett[1], Linda Mongero[2], *Hiroo Takayama[1], ***D***Daniel Brodie[1], *Matthew Bacchetta[1]
[1]Columbia University Medical Center, New York, NY; [2]New York Presbyterian Hospital, New York, NY
Discussant: ***D****Joseph B. Zwischenberger, *University of Kentucky, Lexington, KY*

10:05 am – 10:20 am (page 204)
67. Survival in Patients With Continuous-flow Left Ventricular Assist Devices on the Waiting List and Marginal Donor Heart Transplantation Recipients: A UNOS Database Analysis
Erin Schumer, Mickey Ising, Jaimin Trivedi, *Mark Slaughter, Allen Cheng
University of Louisville, Louisville, KY
Discussant: *James K. Kirklin, *University of Alabama, Birmingham, AL*

10:20 am – 10:35 am (page 206)
68. Modified Single Patch: Are We Still Worried About Subaortic Stenosis?
*Carl L. Backer, Osama Eltayeb, Michael C. Monge, Katherine Wurlitzer, Lindsay H. Boles, Anne E. Sarwark, Joshua D. Robinson
Ann & Robert H. Lurie Children's Hospital of Chicago, Chicago, IL
Discussant: *Jorge D. Salazar, *University of Mississippi School of Medicine, Jackson, MS*

10:35 am – 10:50 am (page 208)
69. Outcomes of Heart Transplantation in Children With Congenital Heart Disease
Bahaaldin Alsoufi, Shriprasad Deshpande, *Brian Kogon, William Mahle, Robert Vincent, *Kirk Kanter
Emory University School of Medicine, Atlanta, GA
Discussant: *Kristine J. Guleserian, *Children's Medical Center/UT Southwestern Medical Center, Dallas, TX*

10:50 am – 11:05 am (page 210)
70. Is Interest in a Cardiothoracic Surgical Career Maintained After Scholarship Awards to Medical Students? Long-term Results From a Single Institution
Kanika Trehan, Xun Zhou, *Stephen C. Yang
Johns Hopkins Medical Institutions, Baltimore, MD
Discussant: *Curtis G. Tribble, *University of Virginia, Charlottesville, VA*

11:05 am – 11:20 am (page 212)

71. Functional Tricuspid Regurgitation Repair Solved: Undersized Rigid Annuloplasty Insertion Assures Effective and Durable Repair
Mehrdad Ghoreishi, Faisal H. Cheema, Mary Laschinger, Murtaza Y. Dawood, Charlie Evans, Nathaniel Foster, Xiayang Diao, Bradley S. Taylor, *Bartley P. Griffith, *James S. Gammie
University of Maryland School of Medicine, Baltimore, MD
Discussant: *John M. Stulak, *Mayo Clinic, Rochester, MN*

11:20 am – 11:35 am (page 214)

72. Super-charged Pedicled Jejunal Interposition Performance Compares Favorably to a Gastric Conduit After Esophagectomy
Elizabeth Stephens[1], Puja Gaur[3], Kathleen Hotze[3], Arlene Correa[4], Min Kim[3], Shanda Blackmon[2]
[1]*Columbia University, New York, NY;* [2]*Mayo Clinic, Rochester, MN;* [3]*The Methodist Hospital, Houston, TX;* [4]*MD Anderson Cancer Center, Houston, TX*
Discussant: *Stephen C. Yang, *Johns Hopkins University School of Medicine, Baltimore, MD*

11:35 am – 11:50 am (page 216)

73. Age-related Outcomes of the Ross Procedure over Twenty Years
Neeraj Bansal[1], S. Ram Kumar[1], Craig J. Baker[1], Ruth Lemus[2], *Winfield J. Wells[1], *Vaughn A. Starnes[1]
[1]*University of Southern California, Los Angeles, CA;* [2]*Children's Hospital Los Angeles, Los Angeles, CA*
Discussant: *Edward L. Bove, *University of Michigan, Ann Arbor, MI*

11:50 am

PROGRAM ADJOURNS

SCIENTIFIC PAPERS

1V. Repair of Simple Bicuspid Valve Defects Using Geometric Ring Annuloplasty

*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***Domenico Mazzitelli[1], Steffen Pfeiffer[2], ***D****J. Scott Rankin[3], Christian Nöbauer[1], Christian Schreiber[1], Theodor Fischlein[2], Rüdiger Lange[1]

Author Institution(s): [1]Deutsches Herzzentrum Muenchen, Munich, Germany; [2]Klinikum Nürnberg, Nürnberg, Germany; [3]Vanderbilt University, Nashville, TN

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

REGULATORY DISCLOSURE: This presentation describes the HAART 200 Bicuspid Aortic Annuloplasty Ring, which has an FDA approval status of Investigational

Objectives: Repair of bicuspid valves with aortic insufficiency has become routine, and leaflet reconstruction techniques are now standardized. Long-term results are good, but some patients experience late repair failure due to progressive annular dilatation. This video illustrates bicuspid annular stabilization during repair, using a geometric annuloplasty ring.

Methods: An internal bicuspid annuloplasty ring was developed with circular base geometry, and two 10-degree outwardly flaring subcommissural posts, positioned 180 degrees opposite on the circumference. This video shows the technique of surgical ring placement into the valve annulus, and bicuspid leaflet repair, in two patients with simple bicuspid defects. The first patient had a Sievers Type 0 valve with R-L fusion, no cleft, and only moderate aortic insufficiency. The valve was repaired during grafting of an ascending aortic aneurysm. The second patient had a Sievers Type I valve with R-L fusion, a moderate cleft, and severe aortic insufficiency. Both were repaired with #23 ring annuloplasties and standard leaflet reconstruction techniques.

Results: In both patients, ring annuloplasty was performed initially, which moved the sinus-to-sinus dimension toward the midline, and facilitated leaflet coaptation. Patient 1 required only minor leaflet plication, and patient 2 had closure of a moderate fused leaflet cleft, in addition to leaflet plication. Both patients achieved complete competence after repair and exhibited low trans-valvular gradients.

Conclusion: Bicuspid ring annuloplasty is a simple and expeditious method of annular stabilization during valve repair and does not require deep aortic root dissection. Major annular remodeling converts the valve to 50%-50% annular geometry and contributes to improved leaflet coaptation. Geometric ring annuloplasty could improve the early and late results of simple bicuspid valve repair associated with aortic insufficiency.

NOTES:

2V. Endoluminal Suturing

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Authors: *Shanda H. Blackmon

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

Objectives: The objectives of this video are to review indications, equipment, and training for endoluminal suturing. Outcomes after an individual case will also be reviewed.

Methods: A 76 year-old man with end-stage renal disease, diabetes, congestive heart failure, anemia, hypertension, an aortic aneurysm, benign prostatic hypertrophy, with a history of rheumatic heart disease and left ventricular thrombus, who previously underwent an aortic valve replacement, presented to an outside hospital for trans-esophageal echocardiography in December of 2013 resulting in an esophageal tear. He immediately underwent surgical repair with a left thoracotomy and intercostal muscle flap. He developed persistent leaking from the esophagus after the repair, which was drained by a chest tube. Surgical side diversion was performed. With continued leakage, he was transferred for a persistent leaking intrathoracic esophagus.

Results: A partially covered self-expanding metal stent was placed initially, but endoscopic evaluation upon stent removal revealed persistent drainage from the intrathoracic esophagus. Using an Olympus 190 dual-lumen endoscope with through an overtube, the fistula was easily identified endoscopically and fluroscopically with contrast injection. After coagulating the surface of the fistula, endoscopic suturing using the Apollo Endostitch device was used to close the hole with a figure-eight suture technique. Endoscopic and fluroscopic confirmation of closure was achieved. The patient was discharged on post-procedure day 30. His contrast swallow performed one month after closure confirmed complete healing without stricture or narrowing. The patient is scheduled to have the side diversion closed electively.

Conclusion: Endoscopic closure of complex esophageal perforations in poor surgical candidates can be performed safely.

NOTES:

3V. Minimally Invasive Transhiatal Esophagogastrectomy With Mediastinal Anatomosis: Technique and Avoidance of Pitfalls

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Authors: Allison Linden, Young Hong, Lorenzo De Marchi, Nadime Haddad, *M. Blair Marshall

Author Institution(s): MedStar Georgetown University Hospital, Washington, DC

Objectives: This video demonstrates the technical aspects of an esophagogastrectomy through the hiatus with the creation of a mediastinal anastomosis using the trans-oral stapler. We have found the technique useful in the management of patients with end-staged benign obstruction at the gastroesophageal junction as well as specific malignant pathologies, including very early stages esophageal cancer or cardia cancers suited to a limited resection. However there are particular pitfalls associated with the use of this device. Technical aspects and avoidance of pitfalls will be highlighted.

Methods: Indications, patient positioning, and port placement are reviewed. The technique for intra-abdominal and mediastinal dissection is demonstrated. Methods for placement of the trans-oral device by the anesthesia team, specific challenges and techniques to overcome these challenges are highlighted. The technique for mating of the stapler, pitfalls and means of avoidance are as well demonstrated.

Results: The trans-oral end-to-end stapler is a useful tool for the creation of mediastinal esophagogastric anastomosis and avoids the need for repositioning or additional incisions, common to esophagectomy surgery. However, thoracic lymphadenectomy is limited with this approach.

Conclusion: The successful use of this instrument is dependent upon placement of the anvil through the esophageal staple line as well as the correct mating of the stapling device when performing the anastomosis. Critical steps and technique facilitate the successful use of this device.

NOTES:

4V. Neonatal Surgical Repair of Aortico-Left Ventricular Tunnel

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Authors: Vijay Sadasivam, Vijayakumar Raju, John N. Kheir, Gerald R. Marx, Sitaram M. Emani

Author Institution(s): Boston Children Hospital, Boston, MA

Objectives: Aortico-left ventricular tunnel is an extremely rare congenital heart lesion. It represents a paravalvar communication between the aorta and left ventricle (LV). The continuous run off of blood into the LV through the tunnel leads to volume overload with congestive heart failure. Early surgical closure is essential for survival.

Methods: A full term, newborn baby was diagnosed to have aortic regurgitation of unclear etiology on prenatal echocardiogram, developed increased work of breathing shortly after birth. Postnatal echo confirmed the diagnosis of large aortico–LV tunnel through with continuous regurgitation and severe LV dilatation. Right coronary artery (RCA) was arising directly from the tunnel. Echo also demonstrated a dysplastic aortic valve with mild central aortic regurgitation and holodiastolic flow reversal in the abdominal aorta.

Results: Surgical repair was performed on the fourth day of life via midline sternotomy. Cardiopulmonary bypass was established with aortic and bicaval cannulation. An LV vent was placed through the right superior pulmonary vein. Cardiac arrest was achieved with antegrade cardioplegia delivered through the root. The aorta was transected just above the tunnel. The tunnel was opened longitudinally throughout its length, terminating in the left ventricular cavity just below the aortic valve. The RCA was harvested as button from the roof of the tunnel. The LV aspect of the tunnel was closed with a Dacron patch. The RCA was reimplanted directly onto the margins of the aortic aspect of the tunnel. Post-operative echocardiogram showed complete repair of the tunnel with good flow in the RCA. Patient was weaned from cardiopulmonary bypass successfully. The patient had an uneventful postoperative course, and has normal growth and development at six month follow-up.

Conclusion: Neonatal surgical closure can be achieved with low surgical risk and it is recommended to prevent worsening of heart failure.

NOTES:

5V. SVC Resection for Germ Cell Tumor

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Authors: *Shanda H. Blackmon[1], *Michael J. Reardon[2]

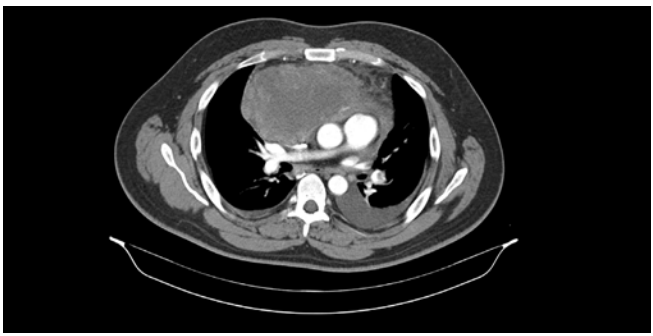
Author Institution(s): [1]Mayo Clinic, Rochester, MN; [2]Houston Methodist Hospital, Houston, TX

Objectives: The objective of this video is to describe a successful case of off-pump superior vena cava (SVC) resection and reconstruction for a germ cell tumor.

Methods: A 33 year-old man presented with chest pain, head swelling, and shortness of breath. He was diagnosed with SVC syndrome. He had no prior medical history. His CT scan of the chest revealed SVC obstruction, a pericardial effusion, a 16-centimeter anterior mediastinal mass, and a left-sided pulmonary embolus. His alpha fetoprotein (AFP) level was 1800, but the hCG level was less than one. He had a core needle biopsy diagnosis of yolk sac differentiated germ cell tumor. He had a surgical pericardial window created. He underwent emergent radiation therapy followed by neoadjuvant chemotherapy. His AFP was reduced to 13. He had a residual mass on CT scan. Six months after initial presentation, he underwent surgical resection of the mass and reconstruction of the SVC.

Results: The patient underwent off-pump SVC resection and reconstruction with bovine pericardium through a median sternotomy. The clamp time for the reconstruction was 28 minutes. An endoscopic stapler was used to seal the folded bovine pericardium into a tube for reconstruction. The innominate vein was also reconstructed with bovine pericardium and connected to the SVC reconstruction. Estimated blood loss was less than 100ml. The patient stayed in the intensive care unit for one night, and his chest tube was removed one day after surgery. He was discharged to home six days after surgery. The tumor was entirely necrotic.

Conclusion: Venous reconstruction of large great vessels can be successfully performed off-pump. The novel use of a folded bovine pericardium stapled into a tube allows the surgeon to tailor and taper the graft to fit veins of differing caliber. Resection of a residual germ cell tumor after normalization of tumor markers is indicated to determine if viable tumor is present and to reconstitute great vessel patency.



CT scan of anterior mediastinal mass and PE on presentation

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6V. Augmentation of Aorta in Repair of Hemitruncus

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Authors: *Inder D. Mehta[1], Julie Park[1], Victor S. Lucas[1], *Ross M. Ungerleider[2]

Author Institution(s): [1]Ochsner Clinic Foundation/Medical Center, New Orleans, LA; [2]Wake Forest Baptist Medical Center, Winston-Salem, NC

Objectives: Anomalous origin of right pulmonary artery from ascending aorta (AOPA), often referred to as hemitruncus, is a rare congenital heart defect that requires repair in early infancy. Compression and stenosis of the right pulmonary artery (RPA) following anastomosis to the main pulmonary artery (MPA) is a commonly reported occurrence following repair. In order to prevent this, previous authors have suggested techniques for creating a tensionless RPA to MPA anastomosis. Our video displays demonstrates a new technique to prevent RPA compression using homograft augmentation of the ascending aorta.

Methods: Patient is a five week-old female infant who presented with failure to thrive, tachypnea, and murmur. Echocardiogram confirmed diagnosis of AOPA. Surgical repair was performed using cardiopulmonary bypass with moderate hypothermia and a single dose of antegrade cardioplegia. The aorta was transected and the RPA was harvested as a large button resulting in a sizeable deficiency of the posterior aortic wall. The RPA was anastomosed to the MPA using previously described flap techniques. The posterior aorta was augmented with a large patch of homograft and then repaired, which effectively reduced tension and compression on the posterior RPA.

Results: Post-operative echo showed a large, non-compressed RPA anastomosis.

Conclusion: We describe a new technique for repair of AOPA (hemitruncus) that focuses on augmentation of the aorta posteriorly (similar to techniques of neo-pulmonary artery repair in arterial switch) to prevent compression of the posterior vessels.

NOTES:

7V. VATS Lobectomy in a Patient on Clopidogrel

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Authors: ***D****Daniel L. Miller

Author Institution(s): WellStar Healthcare, Marietta, GA

COMMERCIAL RELATIONSHIPS: Daniel L. Miller: Consultant/Advisory Board: Ethicon Endo-Surgery, Inc., Davol-Bard, Inc.

Objectives: Increasing number of patients are referred for lung resection that are on clopidogrel, an oral antiplatelet agent. Lung resections have been reported on clopidogrel via a thoracotomy with acceptable morbidity and mortality. Today a significant number of patients are undergoing VATS lung resections. We report the first case of a patient who underwent a VATS lobectomy, while on full dose clopidogrel for prevention of cerebrovascular ischemic events.

Methods: A 74 year-old woman, former smoker, was found to have an asymptomatic indeterminate pulmonary nodule (IPN). CT scan showed a 1.9-centimeter nodule in the right lower lobe without lymphadenopathy. Integrated CT/PET scan showed a maxSUV of 9.5 of the IPN and no metastasis. Past medical history included cerebrovascular disease with multiple TIAs. Prior surgery included a carotid endartectomy. Patient developed recurrent TIAs and underwent a carotid stent with resolution of TIAs. Medication included clopidogrel and ASA. CT-guided biopsy of the IPN was performed after cessation of the clopidogrel. The patient experienced a TIA the night of the biopsy, but resolved with restarting the clopidogrel. Tissue biopsy was positive for small cell lung cancer. Further testing included a FEV1 – 1.9 L (68%), DLCO – 58%, a negative DSE with EF – 55%, and a negative EBUS for N1 or N2 disease.

Results: Patient underwent a VATS right lower lobectomy and energy-assisted complete lymph node dissection on full dose clopidogrel, but no ASA. Operative blood loss was 195 cc; operative time was 95 minutes. Pain management included oral narcotics and local injectable liposome bupivacaine. The patient was discharged on the fourth postoperative day. Final stage was a stage IA (T1N0M0) small cell lung cancer.

Conclusion: VATS lobectomy with complete lymph node dissection can be performed safely in patients on full dose clopidogrel with no increase in intra- or post-operative complications; potential ischemic events were prevented.

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8V. Ventricular Embolization of the Valve Prosthesis During Transapical Transcatheter Aortic Valve Implantation

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Authors: Muhammad Aftab, Magdy M. El-Sayed Ahmed, Neil E. Strickman, *Ross M. Reul

Author Institution(s): Texas Heart Institute at Baylor St. Luke's Medical Center, Houston, TX

Objectives: We describe a technique for the management of ventricular embolization of the valve prosthesis following Transapical Transcatheter Aortic Valve Implantation (TA-TAVI), a life threatening complication requiring immediate intervention.

Methods: A 64 year-old female with diabetes mellitus, coronary artery disease, prior CABG, and morbid obesity (BMI 43.2) presented with profound dyspnea, angina and New York Heart Association class IV heart failure. Transthoracic echocardiogram demonstrated severe aortic stenosis (0.9cm2 valve area, mean transvalvular gradient 42.5mmHg), calcified trileaflet aortic valve, annulus diameter 24mm and left ventricular (LV) ejection fraction 50%. Cardiac catheterization revealed patent bypass grafts. Severe deconditioning, frailty, prior CABG, and co-morbidities (STS score 6.8, EuroScore II 12.8) made her high risk for redo-sternotomy for conventional aortic valve replacement.

Results: Due to small iliac arteries, she underwent TA-TAVI. Immediately after implantation of 26mm Transapical Transcatheter Aortic Valve, she developed ventricular embolization of the prosthesis resulting in severe aortic insufficiency and hemodynamic compromise. The wire and transapical sheath were maintained through the embolized valve annulus. Femoral cannulation and cardiopulmonary bypass were established. A second transcatheter valve was deployed transapically. The embolized valve was grasped with two clamps, crushed, and directly extracted through the LV apex. She was discharged home on post-operative day six. Patient was seen in the clinic three weeks after surgery and found to be recovering well.

Conclusion: Transapical valve extraction obviated the need for emergent redo sternotomy. In case of LV embolization after TA-TAVI, maintaining the wire across the annulus is critical to prevent overturning of the valve in the LV. A second prosthesis can be implanted. Retrieving the migrated valve directly from the LV apex can be considered to avoid sternotomy.

NOTES:

9V. Percutaneous Transfemoral Closure of a Pseudoaneurysm at the Left Ventricular Apical Access Site for Transcatheter Aortic Valve Implantation

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Authors: Ashkan Karimi[1], James C. Fudge[1], Anthony A. Bavry[1], David Anderson[1], ***D****Charles T. Klodell[1], John W. Petersen[1], Marc Litt[2], Floyd W. Burke[1], ***D****Thomas M. Beaver[1]

Author Institution(s): [1]University of Florida, Gainesville, FL; [2]Jacksonville Heart Center, Jacksonville, FL

COMMERCIAL RELATIONSHIPS: Charles T. Klodell: Principal Investigator Edwards Partner III Trial: Edwards Lifesciences; **Thomas M. Beaver:** Investigator and Research Support for Edwards PARTNER II Clinical Trial: Edwards Lifesciences

REGULATORY DISCLOSURE: This presentation illustrates an off-label use of Amplatzer™ muscular VSD occluder (St. Jude Medical, St. Paul, MN) for closure of a left ventricular pseudoaneurysm.

Objectives: The reported incidence of left ventricular apical access site pseudoaneurysm is 1-7% after transapical aortic valve implantation. In general left ventricular pseudoaneurysms carry 30-45% risk of free rupture and are traditionally repaired surgically; however, patients who undergo transcatheter aortic valve implantation are elderly, frail, high operative risk patients and the risk of a surgical repair is substantial. We illustrate percutaneous closure of a left ventricular apical pseudoaneurysm through a femoral approach as a minimally invasive alternative to open surgical repair.

Methods: This case illustrates a left ventricular apical pseudoaneurysm that developed at the transapical access site for transcatheter aortic valve implantation and was successfully excluded percutaneously with an Amplatzer™ muscular VSD occluder (St. Jude Medical, St. Paul, MN).

Results: The patient is an 86 year-old Caucasian male who presented with pre-syncope and was found to have severe aortic stenosis. He underwent transapical aortic valve implantation with a 26 mm Edwards Sapien valve. He presented three months later with visible pulsations through skin at the site of the anterolateral mini-thoracotomy incision and was found to have a left ventricular pseudoaneurysm at the site of transapical access. He underwent minimally invasive percutaneous closure of the pseudoaneurysm through a femoral approach without any complication.

Conclusion: Minimally invasive percutaneous technique is a viable alternative to open surgical repair for closure of left ventricular apical access site pseudoaneurysm after transapical aortic valve implantation.

NOTES:

1. Fifteen-year Experience With Aortic Valve Sparing - Aortic Root Replacement With the Reimplantation Technique

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Authors: Stefano Mastrobuoni[1], Laurent De Kerchove[1], Munir Boodhwani[2], Parla Astarci[1], Jean Rubay[1], Robert Verhelst[1], Philippe Noirhomme[1], Gebrine El Khoury[1]

Author Institution(s): [1]St. Luc's Hospital, Brussels, Belgium; [2]University of Ottawa Heart Institute, Ottawa ON, Canada

Discussant: *Duke E. Cameron, Johns Hopkins University School of Medicine, Baltimore, MD

Objectives: Aortic valve (AV) sparing aortic root replacement has been performed for over twenty years in selected centers. However, the surgical complexity and the concern for the durability of the AV repair compared to valve replacement have prevented its wide diffusion. In this study we present our overall experience with the AV reimplantation technique across 15 years and over 250 patients.

Methods: From 1999 to 2014, 279 consecutive adult patients underwent elective AV sparing-aortic root replacement with reimplantation technique. The mean age of this cohort was 48+15 years and 89.6% of patients were male. Ten percent of patients had Marfan syndrome and a bicuspid aortic valve was present in 41.6%. Mean duration of follow-up was 4.7+3.2 years.

Results: Sixty-day mortality was 0.72% (n=2). One patient experienced early repair failure and underwent re-repair. At discharge from hospital 97% of patients had <1+ AI. Seven patients (2.8%) required late AV reoperation. Freedom from AV reoperation was 99.6+0.4% and 94.7+1.9% at 1 and 5 years respectively. Freedom from recurrent AI (>2+) was 99.6+0.4% and 93.4+2.2% at 1 and 5 years respectively. Twelve patients died during follow-up. Therefore postoperative survival was 99.2+0.6%, 96.3+1.4 and 84.4+5.2% at 1, 5 and 10 years respectively. Long-term survival and freedom from AV reoperation were not significantly different in patients with BAV compared to patients with tricuspid AV after adjusting for age.

Conclusions: Aortic valve repair with the reimplantation technique has showed a low perioperative mortality and excellent long-term durability. Reimplantation of the aortic valve into a Dacron graft stabilize the AV annulus and prevent AI recurrence. Patients with BAV have not had significantly different outcomes with this technique compared to patients with tricuspid AV.

NOTES:

2. Effects of Delayed Surgical Resection on Short- and Long-term Outcomes in Clinical Stage I Non-small Cell Lung Cancer

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Authors: Pamela Samson, Aalok Patel, *Matthew Bott, *Traves Crabtree, *Daniel Kreisel, *Alexander S. Krupnick, *George A. Patterson, *Stephen Broderick, *Bryan Meyers, *Varun Puri

Author Institution(s): Washington University School of Medicine, Saint Louis, MO

Discussant: *Melanie A. Edwards, Saint Louis University School of Medicine, Saint Louis, MO

Objectives: Conflicting evidence currently exists regarding the causes and effects of delay of care in non-small cell lung cancer (NSCLC). We hypothesized that delayed surgery in early-stage NSCLC is associated with worse short- and long-term outcomes.

Methods: Treatment data of clinical stage I NSCLC patients undergoing surgical resection was obtained from the National Cancer Database (NCDB). Treatment delay was defined as resection eight weeks or more after diagnosis. Propensity score matching for patient and tumor characteristics was performed to create comparable groups of patients receiving early (less than eight weeks from diagnosis) and delayed surgery. Multivariable regression models were fitted to evaluate variables influencing delay of surgery.

Results: From 1998-2010, 39,995 patients with clinical stage I NSCLC received early surgery, while 15,658 patients received delayed surgery. 27,022 propensity-matched patients were identified. Those with a delay in care were more likely to be pathologically upstaged (18.3% stage 2 or higher vs. 16.6%, $p<0.001$), have an increased 30-day mortality (2.9% vs. 2.4%, $p = 0.01$), and have decreased median survival (57.7 ± 1.0 months versus 69.2 ± 1.3 months, $p <0.001$). Delay in surgery was associated with increasing age, non-Caucasian race, treatment at an academic center, urban location, income less than $35,000 and increasing Charlson comorbidity score ($p<0.0001$ for all). Delayed patients were more likely to receive a sublobar resection (17.2% vs. 13.1%, $p <0.001$).

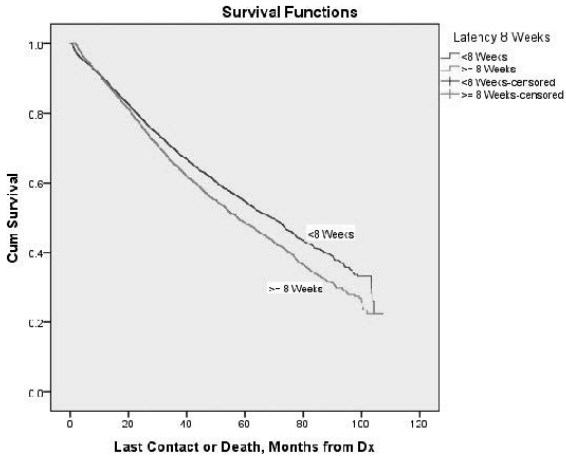
Conclusions: Patients receiving delayed resection for clinical stage I NSCLC have higher comorbidity scores that may affect ability to perform lobectomy and result in higher peri-operative mortality. However, delay in resection is independently associated with increased rates of upstaging and decreased median survival. Strategies to minimize delay while medically optimizing higher risk patients are needed.

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

Propensity-matched clinical stage I NSCLC patients from the National Cancer Data Base, divided into early and delayed resection groups.

Patient characteristics		Resection < 8 weeks after diagnosis (n=13,511)	Resection >8 weeks (n=13,511)	p value
Age at diagnosis		68.7 ± 9.8	68.8 ± 9.7	0.581
Male gender		48.1% (6505)	48.6% (6564)	0.473
Caucasian		87.1% (11,765)	87.2% (11,787)	0.689
Income ≥ $35,000		65.3% (8823)	66.2% (8946)	0.118
Treatment Facility Type	Non-Academic	59.0% (7969)	58.8% (7951)	0.834
	Academic	41.0% (5542)	41.2% (5560)	
Charlson/Deyo Score	0	47.8% (6459)	48.0% (6490)	0.205
	1	37.1% (5011)	36.2% (4895)	
	2	15.1% (2041)	15.7% (2126)	
Size of tumor		30.1 ± 22.6	30.5 ± 21.3	0.103
AJCC Clinical T stage	1	63.7% (8608)	64.1% (8656)	0.552
	2	36.3% (4903)	35.9% (4855)	
Surgical Margins	No residual tumor	96.3% (13005)	96.2% (12,999)	0.848
	Residual tumor present	3.7% (506)	3.8% (512)	
Type of operation	Sublobar	16.1% (2170)	15.8% (2130)	0.750
	Lobectomy	80.8% (10918)	81.0% (10946)	
	Pneumonectomy	3.1% (423)	3.2% (435)	

Table 1. Patients with clinical stage I NSCLC that underwent propensity matching based on age, gender, race, income, facility, Charlson/Deyo score, tumor size, clinical T stage, surgical margins, and type of resection.



Kaplan-Meier curve for propensity-matched clinical stage I NSCLC patients with early (less than 8 weeks from time of diagnosis) and delayed (8 weeks or greater) resection.

3. Long-term Outcomes After the Ross Procedure in Children Vary by Age at Operation

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Authors: Jennifer S. Nelson[1], Clayton N. Pratt[2], Sara K. Pasquali[2], Janet E. Donohue[2], Sunkyung Yu[2], Richard G. Ohye[2], Edward L. Bove[2], Jennifer C. Hirsch-Romano[2]

Author Institution(s): [1]University of North Carolina, Chapel Hill, NC; [2]University of Michigan, Ann Arbor, MI

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

Objectives: There are limited data regarding longitudinal outcomes following the Ross procedure in children. We evaluated longitudinal mortality and reintervention after the Ross procedure in a large pediatric cohort and assessed the impact of age at surgery on outcome.

Methods: A retrospective review of all patients <18 years-old who underwent a Ross operation at our institution (1991-2012) was conducted. In-hospital and longitudinal outcomes including morbidity, mortality, and re-intervention were evaluated.

Results: The overall cohort included 224 patients who underwent a Ross or Ross-Konno operation: 40 infants (<1 yr), 109 children (1-12 yrs) and 75 adolescents (>12 yrs). Infants were more likely to have complex left heart disease compared with children/adolescents (60% vs 34%; p=0.002). In-hospital mortality was 4% and major complications occurred in 17%, with the highest rates in neonates/infants (20% and 45% respectively; Table). Median follow up for the 84 subjects followed at our institution was 8.5 years (range, 0-21 years). Mortality during the study period was 19%, and was highest in infants (45%) vs. children (8%) and adolescents (14%), p<0.0001. Actuarial 10-year survival was 84% and freedom from left ventricular outflow tract (LVOT) reintervention was 73% at 10 years (Figure). All LVOT reinterventions occurred in subjects >1 year at the time of the Ross. Freedom from right ventricular outflow tract (RVOT) reintervention was 75% at 10 years. RVOT reintervention rates were significantly higher in subjects <1 year at the time of the Ross.

Conclusions: Outcomes after the Ross operation in children vary by age at operation. Infants more commonly have complex left heart disease and experience substantial morbidity and mortality. Children and adolescents have higher rates of LVOT reintervention, while infants are at higher risk of RVOT reintervention. These age delimited data will allow for improved parental counseling.

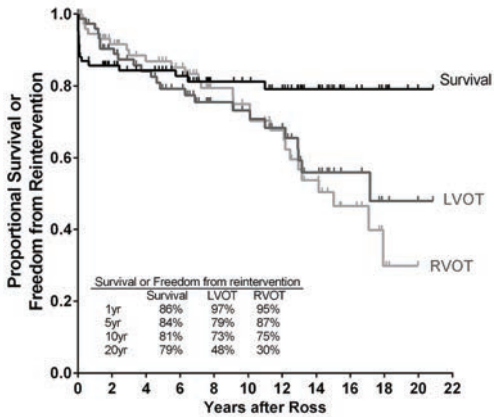
Morbidity, Mortality, And Reintervention By Age Group

		Age at Ross procedure			
	All	Infant (< 1 year)	Child (1-12 years)	Adolescent (> 12 years)	P-value†
In-hospital outcomes (total cohort)	N=224	N=40	N=109	N=75	
Major complications	38 (17.0%)	18 (45.0%)	11 (10.1%)	9 (12.0%)	<.0001
Mortality	9 (4.0%)	8 (20.0%)	0 (0.0%)	1 (1.3%)	<.0001
Longitudinal outcomes (patients followed at surgical site)	N=84	N=20	N=36	N=28	
Overall mortality	16 (19.0%)	9 (45.0%)	3 (8.3%)	4 (14.3%)	<.0001
LVOT reinterventions (surgical)	24 (28.6%)	0 (0.0%)	13 (36.1%)	11 (39.3%)	0.03
RVOT reinterventions (surgical or cath)	27 (32.1%)	9 (45.0%)	13 (36.1%)	5 (17.9%)	<.0001

Abbreviations: LVOT, left ventricular outflow tract; RVOT, right ventricular outflow tract.

** Data are presented as N (column %).*

† Comparisons were made as infant (< 1yr) vs. child or adolescent (≧ 1 yr) and p-value came from Chi-square test or Fisher's exact test for total cohort and Log-rank test for patients followed at surgical site.



Survival and Freedom from Reintervention after Ross

NOTES:

4. When the Ross Is Not an Option: Systemic Semilunar Valve Replacement in the Pediatric/Young Adult Population Using a Porcine Full-root Bioprosthesis

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Authors: *Jorge D. Salazar[2], Bhawna Gupta[2], *Charles D. Fraser, Jr.[1], *John H. Calhoon[3], *Makram R. Ebeid[2], *Mary B. Taylor[2], *Ali Dodge-Khatami[2]

Author Institution(s): [1]Baylor College of Medicine, Houston, TX; [2]The University of Mississippi Medical Center, Jackson, MS; [3]University of Texas Health Science Center San Antonio, San Antonio, TX

Discussant: ***D****John W. Brown, Indiana University School of Medicine, Indianapolis, IN

COMMERCIAL RELATIONSHIPS: DISCUSSANT: John W. Brown: Ownership Interest/ Board of Directors: Correx, Inc.; Speakers Bureau/Honoraria: Cryolife, Inc., Medtronic, Inc.

Objectives: Management of systemic semilunar valve disease in growing, young patients is challenging. When replacement is necessary, use of a pulmonary autograft is sometimes not possible for anatomic reasons or due to parental/patient preference. We employed a porcine, full-root bioprosthesis in this setting and report outcomes for the first such series.

Methods: Over nine years (2005-2013), 24 patients of mean age 13.1 years (range 3 months – 20.34 years) underwent operation for the indication of: mixed stenosis and insufficiency in 16/24 (67%), pure insufficiency in 7/24 (29%), and pure stenosis in 1/24 (4%). Eight patients had multiple prior cardiac operations, nine had prior repair or replacement of the systemic semilunar valve, and two had prior percutaneous balloon intervention. Survival, follow-up echocardiographic findings, and outcomes were documented. All patients were maintained on daily aspirin.

Results: There were no hospital deaths, and no early or late deaths. The mean survival for 23 patients was 40.3 months (range 7 – 97), with one patient moving abroad and lost to follow-up. Echocardiographic follow-up (mean 28.0 months) demonstrated that no patient developed more than mild insufficiency or mild-moderate stenosis (mean ≤2.8 m/sec). 20/24 (83.3%) showed no insufficiency and 14/24 patients (58.3%) showed no stenosis. Near or complete normalization of left ventricular mass and dimension was demonstrated (Table 1). There were no explants and no thromboembolic or bleeding events.

Conclusions: When use of a pulmonary autograft is not an option, the porcine full-root bioprosthesis appears to be favorable for systemic semilunar valve replacement in the pediatric/young adult population. Of note, when prosthetic degeneration does occur, stenosis predominates rather than insufficiency. Longer-term studies are warranted.

Table 1. Echocardiographic Findings at Last Follow-up.

Echocardiographic Findings	Mean	S.D.
Peak systolic gradient, mm Hg	33.4	20.1
Mean systolic gradient, mm Hg	18.1	9.3
LV mass index, grams/m2.7	49.9	25.0
LV shortening fraction, %	36.5	7.0
LV Internal Dimension-diastole, cm	4.1 (z = -1.3)	0.7

NOTES:

5. The Impact of Video-assisted Thoracoscopic Surgery on Payment, Healthcare Utilization, and Workplace Absenteeism for Patients Undergoing Lung Resection

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Authors: ***D***Thomas J. Watson[1], ***D***Jiejing Qiu[2]

Author Institution(s): [1]University of Rochester, Rochester, NY; [2]Covidien, Inc., Mansfield, MA

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

COMMERCIAL RELATIONSHIPS: Thomas J. Watson: Consultant/Advisory Board: Covidien; **Jiejing Qiu:** Employment/Senior Research Associate: Covidien, Inc **Discussant: Betty C. Tong:** Consultant/Advisory Board: W.L. Gore & Associates, Inc.

Objectives: Lung resection via video-assisted thoracoscopic surgery (VATS) has been increasing in prevalence, with the benefits of decreased pain and quicker recovery compared to thoracotomy (OPEN). Less is known about reimbursements, costs, and resource use with each approach. This study examined differences between VATS and OPEN lung resections in payment, healthcare utilization, and estimated days off work for healthcare visits from a commercial insurance database.

Methods: All adult inpatient discharges with an ICD-9-CM code for VATS (lobectomy 32.41, wedge 32.41) or OPEN (lobectomy 32.49, wedge 32.29) lung resection in 2010 were identified from the Truven Health Analytics MarketScan® Commercial Claims and Encounters Database.

Results: A total of 2,611 patients undergoing lobectomy (VATS=270, OPEN=669) or wedge resection (VATS=1,332, OPEN=340) were identified. OPEN lobectomies had a longer length of stay (mean difference=1.79 days, $p<0.0001$), and higher net payment to hospitals (mean difference=$3,497, $p=0.009$) and physicians (mean difference=$433, $p=0.01$) compared to VATS. Similar findings were noted after wedge resections. The number of postoperative outpatient visits within 90 days increased 24% (95% CI: 1.03-1.49) for OPEN compared to VATS lobectomies. OPEN lobectomies had 1.28 times (95% CI: 1.12-1.46) and 1.14 times (95% CI: 1.01-1.28) increased healthcare utilization days within 90 days and 365 days after surgery, respectively, compared to VATS (Table). No significant differences in healthcare utilization were noted between OPEN and VATS wedge resections, except for fewer hospital outpatient visits within 90 days in the OPEN group.

Conclusions: Compared to an OPEN approach, lobectomy via VATS is associated with lower hospital and physician payments, and less healthcare utilization both in the early postoperative period as well as during the first year after surgery. These reductions are important in an era of value-based purchasing.

Healthcare utilization for lobectomy and wedge resection within 90 and 365 days

	Lobectomy		Wedge	
	Within 90 days	Within 365 days	Within 90 days	Within 365 days
	Estimate1 (95% CI)	Estimate1 (95% CI)	Estimate1 (95% CI)	Estimate1 (95% CI)
Office visits (ratio)	1.09 (0.94, 1.25)	1.05 (0.94, 1.18)	0.95 (0.83, 1.09)	0.99 (0.89, 1.11)
Hospital outpatient visits (ratio)	1.24 (1.03, 1.49)2	1.13 (0.96, 1.33)	0.85 (0.73, 0.99)2	0.94 (0.79, 1.12)
ER visits (odds ratio)	1.15 (0.74, 1.80)	1.28 (0.91, 1.83)	1.13 (0.79, 1.62)	1 (0.74, 1.33)
Inpatient services (odds ratio)	1.86 (1.18, 2.94)2	1.22 (0.86, 1.72)	0.9 (0.65, 1.25)	0.83 (0.63, 1.11)
Estimated days of health care utilization (ratio)	1.28 (1.12, 1.46)2	1.14 (1.01, 1.28)2	0.96 (0.85,1.09)	0.95 (0.84, 1.08)
Healthcare expenditure (ratio)	1.24 (0.99, 1.55)	1.02 (0.83, 1.25)	0.9 (0.71, 1.14)	0.84 (0.69, 1.03)
Drug expenditure (ratio)	1.35 (1.05, 1.73)2	1.18 (0.91, 1.53)	0.79 (0.60, 1.05)	0.77 (0.59, 1.04)

1: VATS is the reference group. 2: Statistically significant, p 0.05

NOTES:

6. The Impact of Transcatheter Aortic Valve Replacement on Surgical AVR in Michigan

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Discussant: ***D****Michael J. Reardon, Methodist DeBaket Heart & Vascular Center, Houston, TX

COMMERCIAL RELATIONSHIPS: Discussant: Michael J. Reardon: Consultant/Advisory Board: Medtronic, Inc.

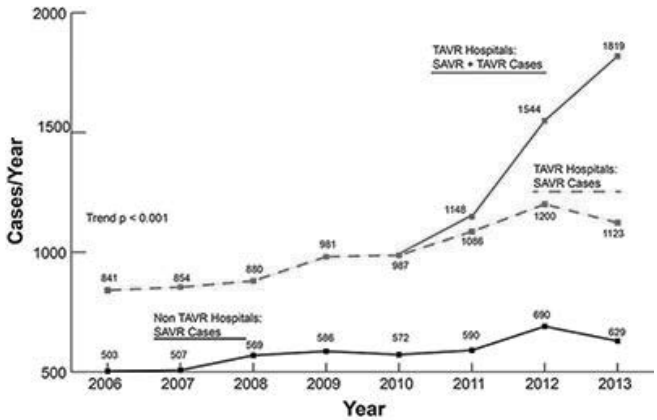
Objectives: Transcatheter aortic valve replacement (TAVR) has emerged as an important option for the treatment of aortic stenosis. We characterize its early impact on surgical aortic valve replacement (SAVR) in Michigan.

Methods: We analyzed data obtained following AVR (n=7107) or AVR/CABG (n=5491) and TAVR (n=640) using a statewide cardiac surgical quality collaborative from 2006-2013. Hospitals were stratified based upon local TAVR availability to determine its impact on patient profiles, SAVR volumes and outcomes. During this period, 13 hospitals developed TAVR programs.

Results: From 2006-2013, SAVR volume increased by 33.5% at TAVR hospitals, and 25.1% at non-TAVR hospitals, (p (trend) < 0.001) (Figure 1). When accounting for TAVR volume, overall AVR volume increased 116.2% at TAVR Hospitals (p(trend) < 0.001). In TAVR Hospitals, patient characteristics in SAVR as assessed by the STS predicted risk of mortality (PROM) were comparable before (3.8±3.7%) and after (3.6±3.7%) initiation of TAVR (p=0.06). 30-day mortality was also similar (pre 2.5% vs. post 2.4%, p=0.83). Rates of major complications including stroke (pre 1.5% vs. post 1.4%, p=0.84), and renal failure (pre 4.1% vs. post 3.1%, p= 0.09) were similar. Length of stay decreased slightly from 8.8 d to 8.4 d (p=0.05). When analyzing high risk SAVR patients (i.e. PROM>8%), again neither mortality, stroke nor renal failure were significantly different (all p>0.15). Similar results were identified in nonTAVR Hospitals before and after initiation of TAVR within the state. (Table).

Conclusions: TAVR implementation in Michigan has dramatically increased overall surgical AVR volume. This phenomenon has occurred with little change in preoperative risk profile, and surprisingly, without improving early SAVR outcomes. As TAVR utilization increases, these issues may be further clarified and elucidated.

SAVR results at *TAVR* Hospitals			
Variable	**Before TAVR**	**After Start TAVR Program**	**p-Value**
Number of Patients	2073	2323	
Predicted Risk of Mortality (%)	3.76 ± 3.65	3.55 ± 3.69	0.059
Operative Mortality (%)	2.5% (52/2073)	2.4% (56/2323)	0.834
Renal Failure	4.1% (84/2073)	3.1% (72/2323)	0.088
Permanent Stroke	1.5% (31/2073)	1.4% (33/2323)	0.836
Length of Stay (d)	8.81 ± 6.87	8.41 ± 6.56	0.047
SAVR results at *TAVR* Hospitals PROM >8			
Number of Patients	200	180	
Predicted Risk of Mortality (%)	12.39 ± 4.91	13.10 ± 6.42	0.221
Operative Mortality (%)	6.0% (12/200)	10.0% (18/180)	0.149
Renal Failure	12.0% (24/200)	13.9% (25/180)	0.583
Permanent Stroke	3.0% (6/200)	1.7% (3/180)	0.393
Length of Stay (d)	14.58 ± 12.26	12.91 ± 9.66	0.145
SAVR results at *Non-TAVR* Hospitals			
Variable	**Before TAVR**	**After Start TAVR Program**	**p-Value**
Number of Patients	1162	1319	
Predicted Risk of Mortality (%)	3.56 ± 3.90	3.58 ± 3.52	0.907
Operative Mortality (%)	2.9% (34/1162)	3.1% (41/1319)	0.791
Renal Failure	3.5% (41/1162)	2.4% (32/1319)	0.105
Perm Stroke	1.7% (20/1162)	1.7% (23/1319)	0.966
Length of Stay (d)	8.36 ± 6.75	7.72 ± 5.26	0.009
SAVR results at *Non-TAVR* Hospitals PROM >8			
Number of Patients	95	119	
Predicted Risk of Mortality (%)	13.82 ± 6.12	12.15 ± 4.96	0.029
Operative Mortality (%)	10.5% (10/95)	10.9% (13/119)	0.926
Renal Failure	11.6% (11/95)	9.2% (11/119)	0.576
Permanent Stroke	4.2% (4/95)	1.7% (2/119)	0.265
Length of Stay (d)	13.17 ± 10.32	11.37 ± 8.00	0.152



NOTES:

7. Thoracoscopy vs. Thoracotomy for Diaphragm Plication: A Value Based Comparison

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Authors: Onkar V. Khullar, Srini Tridandapani, *Felix G. Fernandez, *Seth D. Force, *Allan Pickens

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

Discussant: *Theolyn N. Price, Cardiac & Thoracic Surgery Associates, Colorado Springs, CO

Objectives: Diaphragm plication remains an infrequently used treatment for diaphragm paralysis/eventration. There has been little data comparing cost and radiographic improvement following thoracoscopic versus open diaphragm plication. We hypothesized that thoracoscopy would result in decreased length of stay (LOS) and cost, with no difference in radiographic improvement or postoperative outcomes.

Methods: We performed a retrospective case series of all thoracoscopic and open diaphragm plications at a single institution from 2009 to 2013. Operative duration, chest tube duration, postoperative LOS, ICU stay, ventilator days, degree of radiographic improvement, and total hospital cost were determined. Radiographic improvement was measured as percent increase in distance from chest apex to diaphragm normalized to the non-operative side in order to control for inspiratory effort. Cost data was available from 2010 forward. Group differences were assessed using two-sample t- and chi-square tests for numerical and categorical variables, respectively.

Results: Forty-seven total patients were identified, 18 repaired via thoracotomy and 29 via thoracoscopy. One thoracoscopy case was converted to thoracotomy for a ruptured diaphragm. No difference was found in radiographic improvement (42.3% vs 38.5%, $p = 0.7$). Postoperative LOS was significantly shorter after thoracoscopy (4.1 vs 6.7 days, $p = 0.005$), although no difference in operative time or chest tube duration was seen (Table 1). Total hospital cost trended in favor of thoracoscopy ($11,701 vs $14,773, $p = 0.12$), but did not reach statistical significance.

Conclusions: Thoracoscopic plication can be performed with decreased LOS and equivalent radiographic improvement when compared with open plication. Overall cost seems to be lower with a VATS approach but did not reach statistical significance. Thoracoscopic plication should be considered when treating patients with diaphragm paralysis.

Postoperative Outcomes and Cost Comparison of Thoracoscopy vs Thoracotomy for Diaphragm Plication

Characteristic	Thoracoscopy N=26	Thoracotomy N=12	P value
Operation Time (minutes)	124.7 ± 29.0	125.0 ± 35.3	0.97
Postop LOS (days)	4.1 ± 1.9	6.7 ± 3.3	0.005
Chest Tube Days	3.4 ± 2.5	4.2 ± 2.2	0.30
Epidural Days	0.2 ± 0.7	2.9 ± 1.2	<0.001
PCA Days	1.2 ± 0.9	0.7 ± 1.3	0.15
ICU Days	0.3 ± 0.8	0.6 ± 1.6	0.51
Ventilator Days	0.1 ± 0.6	0.1 ± 0.3	0.95
Atrial Fibrillation	4 (14.3%)	2 (11.1%)	0.76
Pneumonia	1 (3.6%)	0 (0%)	0.42
% Radiographic Improvement	42.3% ± 30.7%	38.5% ± 29.7%	0.70
Hospital Cost ($)*	11,701 ± 5,273	14,773 ± 7066	0.12

**Hospital cost reported as median and compared with Wilcoxon test.*

NOTES:

8. Learning Habits of the Current Cardiothoracic Resident: Analysis of the In-training Examination Survey

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Authors: David D. Odell[1], Damien La Par[12], Ryan A. Macke[4], Gabe Loor[3], Walter F. DeNino[11], Bill Stein[7], Jennifer S. Nelson[5], Kathleen Berfield[9], John Lazar[8], Vakhtang Tchantchaleishvili[10], Samuel Youssef[6], Tom C. Nguyen[2]

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

Objectives: The educational curriculum in cardiothoracic (CT) surgery is undergoing extensive revision including development of new curricula, learning assessment tools and educational milestones. Accurately understanding learning behavior is key in curriculum development, yet little information is available regarding the way in which current CT residents learn. We examine educational resource utilization by CT residents.

Methods: A pre-exam 30 question survey is required in order to sit for the In-Training Exam (ITE). Questions were constructed utilizing Likert Scale responses to examine learning behavior and curricular resources utilization patterns. Learning patterns among all residents and within specific training pathways (2-year versus 3-year traditional programs and 6-year integrated programs (I-6)) were assessed.

Results: 314 residents were surveyed (n=122 2-yr, n=96 3-yr, n=96 I-6). Study time periods were typically less than one hour (25.4% <30 min per session; 56.8% 30-60 min). A majority of residents study in the hospital during the work day opposed to on independent time at home or elsewhere. Greater than 50% of study is done online, with 17% learning exclusively online. 78% of residents believe online education will increase in the next five years. A minority (22%) primarily used textbooks, whereas 72% primarily used online resources. When asked about curriculum needs, residents overwhelmingly (95%) favor further development of web-based resources (guided curriculum 57%; video instruction 20%). Incorporation of simulation was favored by the majority of residents and was felt to be more valuable in cardiac surgery than thoracic surgery.

Conclusions: CT residents choose to learn in truncated periods of time (<1 hour) and often in point-of care settings. Online and electronic resource usage is increasing common. Ongoing curriculum development should focus on the creation of resources that correspond to the learning style of the intended audience.

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

	Proportion of Respondent's Time					
Time in Independent Study/Environment (%)						
	Not Used	*1-20%*	*21-40%*	*41-60%*	*61-80%*	*81-100%*
Hospital	*4.1*	32.8	35.4	21.0	4.4	2.2
Library	*64.3*	25.5	5.7	3.5	0.6	0.3
Home	*0.9*	17.5	25.1	31.2	19.7	5.4
Public Place	*62.1*	20.7	9.6	5.7	0.9	0.9
Commute	*78.0*	17.8	1.9	1.6	0.3	0.3
Resource Platform Utilization (%)						
	Not Used	*1-20%*	*21-40%*	*41-60%*	*61-80%*	*81-100%*
Textbook	*3.1*	34.7	28.7	17.8	11.4	4.1
Online Textbook	*13.7*	38.9	27.4	11.8	6.1	2.2
eReader	*36.3*	29.9	16.6	10.8	5.1	1.3
Journal Article	*3.5*	49.4	30.3	10.8	4.8	1.3
Web Search	*13.7*	49.7	21.0	9.9	3.5	2.2
TSDA Curriculum	*23.9*	40.8	19.7	11.1	3.8	0.6
Lectures	*10.2*	55.1	20.1	9.8	3.8	0.9

Resident study location and educational resources used

NOTES:

9. Bilateral IMA Use for Coronary Artery Bypass Grafting Remains Underutilized: A Propensity Matched Multi-Institution Analysis

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Discussant: *Michael R. Petracek, Vanderbilt University, Nashville, TN

Objectives: Bilateral internal mammary arterial (BIMA) grafts have repeatedly demonstrated superior outcomes compared to single IMA (SIMA) following coronary artery bypass grafting (CABG). Despite known survival benefits with BIMA use, perceived perioperative challenges often preclude BIMA use. We hypothesized that the use of BIMA remains underutilized, even in low risk patients.

Methods: All 43,823 patients undergoing isolated CABG with ≥ 2 vessel grafting over the previous 12 years in a regional STS database were evaluated. Patients were stratified by BIMA versus SIMA use. Surgical candidates considered low risk for BIMA use included: age<70, no or mild chronic lung disease, BMI < 30, and absence of diabetes. BIMA patients (n=1,333) were 1:1 propensity-matched to SIMA patients (n=1,333) and outcomes were compared.

Results: Overall, BIMA use was 3% (n=1,333), while 24% (n=10,327) of patients met low risk criteria for BIMA use. Furthermore, among patients meeting low risk criteria, BIMA utilization was 6% (n=615). Risk-adjusted, propensity-matched comparisons revealed similar preoperative risk profiles between BIMA and SIMA patients (PROM 1.1% vs. 1.1%, P>0.05). BIMA use was associated with longer cross clamp time (71 v 62 min, P<0.05). Importantly, BIMA use was not associated with increased postoperative mortality, morbidity, or hospital length of stay (all P>0.05, Table). However, hospital readmission within 30 days was 41% greater for BIMA patients compared to SIMA patients (P=0.01,Table).

Conclusions: The use of bilateral internal mammary arterial grafts appears to remain underutilized in the modern surgical era even in low surgical risk patients. BIMA use does not appear to increase the risk of postoperative morbidity, although requires longer operative times and a higher risk for readmission. Efforts to more clearly understand surgeon motivators for the use of BIMA grafting are needed.

Outcomes for 1:1 Propensity Matched Patient Cohorts Undergoing CABG Operations

Outcome	BIMA (n=1,333)	No BIMA (n=1,333)	*P*
Any Postoperative Event	22.7%	24.6%	0.24
Deep Sternal Wound Infection	0.4%	0.2%	0.48
Reoperation for Bleeding/Tamponade	2.0%	1.7%	0.47
Prolonged Ventilation	4.2%	5.1%	0.27
Readmission within 30 days	8.6%	6.1%	0.01
Operative Mortality	1.1%	0.7%	0.30

NOTES:

10. Contemporary Results of Open Surgical Repair in Patients With Marfan Syndrome and Distal Aortic Dissection in the Endovascular Era

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Author Institution(s): Baylor College of Medicine/Texas Heart Institute, Houston, TX

Discussant: ***D****G. Chad Hughes, Duke University Medical Center, Durham, NC

COMMERCIAL RELATIONSHIPS: Joseph S. Coselli: Royalties/Consultant/Advisory Board: Vascutek Ltd., a Terumo Company

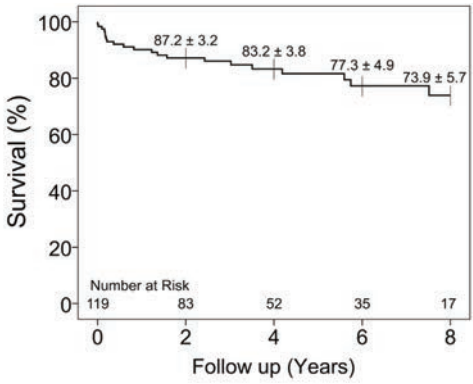
DISCUSSANT: G. Chad Hughes: Consultant/Advisory Board: W.L. Gore & Associates, Inc., Medtronic, Inc., Vascutek Terumo; Speakers Bureau/Honoraria: W.L. Gore & Associates, Inc., Medtronic Vascular, Vascutek Terumo

Objectives: Treatment paradigms for aortic dissection include endovascular repair of the distal aorta in patients with complicated acute dissection or progressive expansion of chronic dissection. Such repair is generally contraindicated in patients with Marfan syndrome (MFS); open repair remains the gold standard. We examined outcomes of surgical repair of thoracoabdominal aortic aneurysm (TAAA) in a contemporary series of MFS patients with distal aortic dissection.

Methods: Data were collected prospectively for 119 consecutive MFS patients with aortic dissection (69 male [58%]; mean age 43±13 y, range 17-76 y) who underwent open TAAA repair between January 1, 2004 and December 31, 2013; 28 of these repairs (24%) were emergent or urgent. The types of dissection comprised DeBakey type I aortic dissections in 55 patients (46%), retrograde type I in 5 patients (4%), type IIIA in 7 patients (6%), type IIIB in 49 patients (41%), and localized dissection in 3 (3%). Dissection was chronic in 110 patients (92%). Symptoms were present in 95 patients (80%). Repairs included 87 extensive repairs (73%; extent I=26; extent II=61). Left heart bypass was used in 81 patients (68%), hypothermic circulatory arrest in 6 patients (5%), and cerebrospinal fluid drainage in 106 (89%).

Results: There were 4 early deaths (3%). There were no cases of stroke or permanent paraplegia; 1 patient (1%) had permanent paraparesis, and 5 (4%) had permanent renal failure. Actuarial survival was 87.2%±3.2% at 2 years and 73.9%±5.7% at 8 years (Figure).

Conclusions: Contemporary open TAAA repair in MFS patients with aortic dissection had excellent outcomes in this series the largest to focus on MFS, dissection, and open TAAA repair. It is questionable whether these results could be improved upon by expanding current endovascular approaches to include MFS patients; the premise and durability of such applications in MFS remain uncertain.


100
80
60
40
20
0
Survival (%)
87.2 ± 3.2
83.2 ± 3.8
77.3 ± 4.9
73.9 ± 5.7
Number at Risk
119
83
52
35
17
0
2
4
6
8
Follow up (Years)

NOTES:

1B. Pulsatile Flow Does Not Improve Function During Prolonged Ex Vivo Lung Perfusion

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Authors: Erin Schumer, Keith Zoeller, Paul Linsky, Gretel Monreal, Michael Sobieski, Steven Koenig, *Mark Slaughter, Victor van Berkel

Author Institution(s): University of Louisville, Louisville, KY

Discussant: ***D***Michael J. Weyant, University of Colorado, Aurora, CO

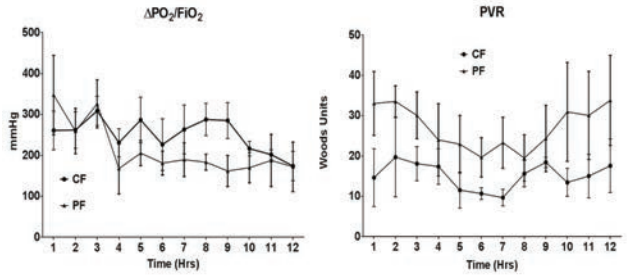
COMMERCIAL RELATIONSHIPS: DISCUSSANT: Michael J. Weyant: Principal Investigator: XVIVO, Inc.

Objectives: *Ex vivo* lung perfusion (EVLP) has the potential to increase the donor pool for lung transplantation by facilitating resuscitation and extended evaluation of marginal organs. Current methodology employs continuous flow pumps. In vivo, continuous flow has been shown to increase pulmonary vascular resistance (PVR). Thus, pulsatile flow EVLP may reduce PVR and improve organ preservation by restoring physiologic flow.

Methods: Lung blocks harvested from male pigs were randomly allocated into continuous flow (CF, n=3) or pulsatile flow (PF, n=4) groups. CF and PF were provided by a centrifugal and pulsatile ventricular assist device, respectively. Mean arterial pressure for CF and PF was maintained at 11.14±0.25 and 14.04±0.35 mmHg, respectively. The PF group had a pulse pressure of 24.44±1.14 mmHg. Lungs were ventilated at 4-5 mL/kg, 21% FiO2 and perfused with an acellular, albumin-based solution corrected for osmolarity, acid/base balance, and CO2 concentration (≤20 hours at 30°C). Prostaglandin E1 and 30% albumin were infused continuously at 250 ug/hr and 100 mL/hr, respectively. Hemodynamic, respiratory, and blood gas parameters were recorded hourly. Parenchymal biopsies were used for quantification of wet:dry ratio and IL-6, IL-8, and TNF-uusing ELISA.

Results: CF and PF results for PVR and ΔPO2/FiO2 are shown in Figure 1. Wet:dry ratio was 5.53±0.56 and 5.32±0.16 at baseline and 5.27±0.48 and 4.70±0.25 at hour 12 for CF and PF, respectively. Peak airway pressure (PAWP) in cm H2O was 17.0±1.2, 18.5±2.5 at baseline and 20.7±1.7 and 23.3±3.1 at hour 12 for CF and PF, respectively. There were no significant differences in TNF-u IL-6, and IL-8 concentrations, PVR, ΔPO2/FiO2, wet:dry ratio, and PAWP between CF and PF.

Conclusions: The EVLP system successfully maintained lungs up to 20 hours using a modified Steen perfusate. These data suggest PF does not offer immediate benefits over CF for prolonged ex vivo lung preservation.



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

NOTES:

2B. Circulating Tumor Cells From 4D Model Has Increased Activator Protein-1 Expression Compared to Primary Tumor

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

COMMERCIAL RELATIONSHIPS: Min P. Kim: Speaker Bureau/Honoraria: Ethicon Endo-Surgery, Inc.

Objectives: To determine the transcription factor that is important in formation of CTC in the 4D lung cancer model.

Methods: The *ex vivo* 4D metastatic lung cancer model was seeded with H1299 cells. We performed lobectomy of the primary tumor on day 2 and day 25 and metastatic lesion on day 10 and day 25 and isolated CTCs on day 10 and day 25. Total RNA was extracted and OneArray microarray was used to determine the gene expression profile for the tumor cells in each of these three phases and the two time points. We analyzed for the transcription factor that was elevated in CTC but not in primary tumor or metastatic lesion. Furthermore, these transcription factors were analyzed in the primary tumor, CTCs and metastatic lesion from the 4D model seeded with A549 or H460 cells.

Results: Microarray analysis of the primary tumor and metastatic lesion between two time points showed differences in gene expression due to tumor growth while in CTC the difference was due to difference in metabolic condition at two time points. We then analyzed all of the microarray data to look at the difference among primary tumor, CTC and metastatic lesion. We found that 59 genes were up regulated and 20 genes were downregulated in the CTCs as compared to the primary tumor and metastatic lesion. When we analyzed for transcription factors, we found that both c-Fos and c-Jun, the components of activator protein-1, were significantly elevated in the CTCs compared to the primary tumor and metastatic lesion. We then analyzed the specimen from 4D model seeded with A549 and H460. In both cell lines, there was consistent elevation of c-Fos and c-Jun in CTCs as compared to the primary tumor.

Conclusions: Activator Protein-1, a transcription factor, is elevated in the circulating tumor cells of the 4D model compared to the primary tumor. This transcription factor may play an important role in the formation of circulating tumor cells and lung cancer progression.

NOTES:

3B. Are Histologic Abnormalities More Severe in Bicuspid Aortopathy?

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Authors: Elbert Heng, James Stone, Thomas MacGillivray, Jennifer Walker, Joshua Baker, Gus Vlahakes, Hang Lee, *Thoralf Sundt

Author Institution(s): Massachusetts General Hospital, Boston, MA

Discussant: *Jorge D. Salazar, University of Mississippi School of Medicine, Jackson, MS

Objectives: A more aggressive approach to aortic resection for dilation has been advocated in the setting of a bicuspid aortic valve (BAV). The clinical implications of such recommendations are enormous given the population frequency of BAV, despite scarce literature to substantiate or refute the notion that aortic material properties are inherently weaker in BAV aortopathy. We therefore compared the degree of histologic abnormality in dilated aortas associated with bicuspid versus trileaflet aortic valve (TAV).

Methods: Aortic specimens resected from patients with BAV (n=61, age 57±10 years) and TAV (n=34, age 69±12 years) and normal diameter aortas from patients undergoing cardiac transplantation (n=16, age 58±6 years) were compared for elastic fiber loss (EFL graded 0-4), smooth muscle cell loss (SMCL graded 0-4), medial proteoglycan deposition (MPD graded 0-3), medial fibrosis (MF graded 0-3) and atherosclerosis (0-3). Patients with known connective tissue disorders, systemic inflammatory conditions, or dissection were excluded.

Results: When specimens were considered across all diameters, EFL, SMCL, MF and Atherosclerosis were more severe in aorta associated with TAV than BAV. When stratified to compare only those aortas within the 4-5cm range, the same trend persists although statistical significance was lost for EFL and MF; SMCL and atherosclerosis remained statistically significantly worse for TAV. When histologic abnormality was graded against diameter, the only correlation was EFL for TAV patients.

Conclusions: These data do not support more severe medial abnormality for aneurysms associated with BAV compared with TAV, nor by inference, a more aggressive approach to surgical intervention for aortic dilatation associated with BAV; indeed these findings arguably support the converse. The lack of correlation between aortic diameter and histological abnormality highlights the inadequacy of diameter alone as a criterion for aortic resection.

Spearman's correlations for histologic abnormality versus diameter

	Normal Control (n=16)		TAV (n=34)		BAV (n=61)	
	Spearman's	p	Spearman's	p	Spearman's	p
EFL	-0.118	0.66	0.517	0.002	-0.056	0.67
SMCL	-0.402	0.12	0.266	0.14	-0.073	0.58
MPA			-0.083	0.65	-0.013	0.92
MF	0.000	1.0	-0.020	0.91	-0.035	0.79
Atherosclerosis			0.295	0.10	0.185	0.16

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

NOTES:

4B. Pediatric End-stage Failing Hearts Demonstrate Increased Cardiac Stem Cells

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Authors: Brody Wehman, Sudhish Sharma, Rachana Mishra, David L. Simpson, Savitha Deshmukh, *Sunjay Kaushal

Author Institution(s): University of Maryland Medical Center, Baltimore, MD

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

COMMERCIAL RELATIONSHIPS: DISCUSSANT: John E. Mayer: Consultant/Advisory Board: Medtronic, Inc.

Objectives: Cardiac stem cell (CSC) therapy has shown promise in the treatment of adults following myocardial infarction and may hold a similar benefit for children with end-stage heart failure (ESHF). We sought to determine the location and expression of CSCs in children with ESHF, which has not been described. We hypothesized that the ESHF myocardium reverses to not only a fetal gene program but also a developmental program by increasing the number of CSCs when compared to congenital heart disease (CHD) patients with normal myocardium.

Methods: Tissue samples were obtained from the explanted hearts of children undergoing heart transplantation with ESHF, defined as NYHA class III or IV and ejection fraction <20%, and from age-matched patients undergoing routine congenital cardiac surgery. The expression profile of cardiac-specific stem cell markers, including c-kit and Islet-1 (ISL-1), was determined using quantitative RT-PCR and immunofluorescence. Data are presented as mean +/- standard error and analyzed by Mann-Whitney t-test.

Results: ESHF myocardium (n=15) had a 2-fold increase in expression of c-kit and a 3-fold increase in the expression of ISL-1 when compared to age-matched controls (n=15) (Fig. 1a, b). There was no difference in the expression of c-kit+ cells between infants and children in ESHF myocardium, which is in contrast to our previously reported finding that showed an age-dependent decrease in c-kit+ cells in CHD patients with normal myocardium (Fig. 1d). ESHF myocardium had a reduction of α-myosin heavy chain (MHC) mRNA expression by 4.5-fold and upregulated β-MHC and atrial natriuretic factor by 7.5-fold and 8-fold, respectively (Fig. e-g), consistent with the previously described switch to the fetal gene program.

Conclusions: Compared to CHD with normal myocardium, ESHF myocardium demonstrates increased CSCs and evidence of reversal to a fetal gene program. The exact role of these ESHF-derived CSCs within the myocardium is not yet defined.

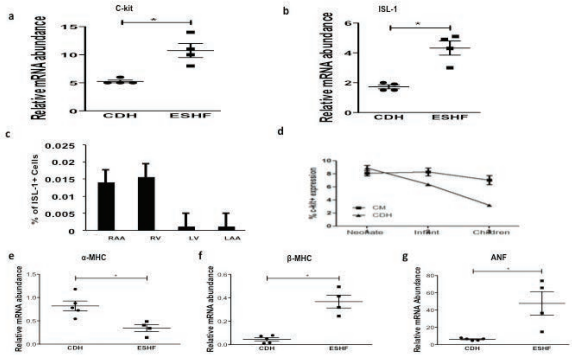

*Figure 1. Quantitative RT-PCR in the right atrium of ESHF vs. CHD for mRNA expression of (a) c-kit (CHD, n=4, 5.3±0.3 vs ESHF, n=4, 10.8±1.3, P= 0.03) and (b) ISL-1 (CHD, n=4, 1.7±0.1 vs ESHF, n=4, 4.3±0.4, P= 0.03) (c) ISL-1 expression as determined by immunofluorescence showed increased expression in right sided structures (d) Unlike CHD-derived CDCs, c-kit expression in ESHF-derived CDCs is age independent and shows high expression with increasing age. Quantitative RT-PCR of ESHF vs. CHD for mRNA expression of (e) αß-MHC (CHD, n=5, 0.82±0.1%, vs. ESHF, n=5, 0.34±0.7%, P =0.015), (f) αß-MHC (CHD n=5, 0.05±0.01% vs. ESHF, n=4, 0.37±0.05%, P=0.015), and (g) ANF (CHD, n=5, 6.0±0.63% vs. ESHF n=4, 47.7±13.7%, P=0.015). Data are represented as mean ± S.E.M. analyzed by t-test (Mann-Whitney test) followed by Dunns post hoc test. *P<0.05, **P<0.001.*

NOTES:

5B. Timing of Adding Blood to Prime Affects Inflammatory Response to Neonatal Cardiopulmonary Bypass

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Authors: ***D***Benjamin S.Schmidt, ***D***Magan R.Lane, ***D***Vanessa M.DiPasquale, ***D***Lori P.Graf, ***D****Yoshio Ootaki, ***D***James E.Jordan, ***D****Ross M.Ungerleider

Author Institution(s): Wake Forest Baptist Health, Winston Salem, NC

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

COMMERCIAL RELATIONSHIPS: Benjamin S. Schmidt: Research Support: Medtronic, Inc.; **Magan R. Lane:** Research Support: Medtronic, Inc.; **Vanessa M. DiPasquale:** Research Support: Medtronic, Inc.; **Lori P. Graf:** Research Support: Medtronic, Inc.; **Yoshio Ootaki:** Research Support: Medtronic, Inc.; **James E. Jordan:** Research Support:Medtronic, Inc.; **Ross M. Ungerleider:** Research Support: Medtronic, Inc.

Objectives: Complications from systemic inflammation are reported in neonates following exposure to cardiopulmonary bypass (CPB). Previous work has demonstrated a significant advantage to the use of asanguinous prime (AP) versus blood prime (BP) in reducing these complications. However, use of AP in neonates can result in significant hemodilution requiring addition of blood at some point. This study investigates whether the addition of blood after institution of CPB alters the inflammatory response compared to a BP at the time CPB is instituted.

Methods: Neonatal swine (3.96±0.25kg, n=19) were randomized into four groups: BP (n=5); APBC (blood after CPB but before cooling) (n=3); APEC (blood after cooling, prior to low flow (LF)) (n=5); and APER (blood after rewarming) (n=6). CPB strategy (all groups) involved cooling to 18°C, 30 minutes of 50ml/kg LF and rewarming to 36°C. Total CPB exposure for each group was 2 hours. Endpoints measured were cytokines, lactic acid, perioperative animal weight gain, hematocrit, and volume requirements during CPB.

Results: While the hematocrit between groups varied throughout CPB, all groups ended with a similar value. Although they spent some portion of CPB with a lower hematocrit, AP groups did not have elevated lactic acid levels at the end of CPB compared to BP. AP groups released less IL-8 than BP, with the EC group producing the least (33±20pg/ml vs 148±43pg/ml, $p<0.05$). All AP groups exhibited less edema than the BP group, with the least body weight gain noted in the EC group (29±55g vs 727±135g, $p<0.05$).

Conclusions: This study suggests that using an AP for neonates being cooled to deep hypothermia is practical. Adding blood to the circuit at the end of cooling elevates hematocrit to target levels prior to exposure to low flow without deleterious effects. Exposure to CPB with an AP followed by later addition of blood reduces inflammation compared to CPB with a BP.

NOTES:

6B. Spinal Cord Ischemia Reperfusion Injury Induces Erythropoietin Receptor Expression

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Authors: Lisa S. Foley, Daine T. Bennett, Kirsten A. Freeman, Marshall Bell, Joshua Mares, Xiangzhong Meng, *David A. Fullerton, *Thomas B. Reece

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

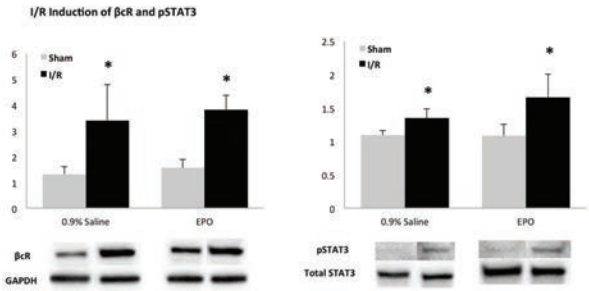
Discussant: *John W. Hammon, Wake Forest University Medical Center, Winston-Salem, NC

Objectives: Paraplegia remains a devastating complication of thoracoabdominal aortic surgery, occurring in up to 20% of complex cases. Erythropoietin (EPO) attenuates this injury in models of spinal cord ischemia. Upregulation of the ßcR subunit of the EPO receptor is associated with reduced damage in murine models of neural injury. This receptor activates anti-apoptotic pathways including STAT3. We hypothesized that spinal cord ischemia reperfusion injury upregulates the ßcR receptor subunit with a subsequent increase in activated STAT3.

Methods: Adult male C57/BL6 mice received an IP injection of 0.5mLs of EPO (10U/kg) or 0.9% saline following induction of anesthesia. Spinal cord ischemia was induced via sternotomy and 4-minute thoracic aortic cross-clamp. Sham mice underwent sternotomy without cross-clamp placement. Following four hours of reperfusion, spinal cords were harvested and homogenized. ßcR receptor subunit expression and STAT3 activation was evaluated by Western blot.

Results: Ischemia reperfusion (IR) increased ßcR subunit expression in spinal cords of IR/control and IR+EPO mice compared to shams (1.35 ± 0.14 vs 1.09 ± 0.07, $p=0.01$ and 1.66 ± 0.35 vs 1.08 ± 0.17, $p=0.02$). Additionally, both IR injury and IR+EPO administration demonstrated increased STAT3 activation compared to shams (3.4 ± 1.39 vs 1.31 ± 0.3, $p=0.01$ and 3.80 ± 0.58 vs 1.56 ± 0.32 $p=0.01$, respectively).

Conclusions: Ischemia reperfusion injury induces the ßcR subunit of the EPO receptor and initiates early downstream anti-apoptotic signaling through STAT3 activation. Further investigation into the role of the ßcR receptor subunit is warranted to determine tissue protective functions of EPO. Elucidation of mechanisms involved in spinal cord protection is essential for reducing delayed paraplegia.



ßcR receptor subunit expression and STAT3 activation are increased in all ischemic groups compared with shams.

NOTES:

11. Surgical Therapy Is an Important Multimodality Component in Patients With Distal Esophageal Adenocarcinoma Independent of Regional Lymph Node Location

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Authors: Boris Sepesi[1], Henner M. Schmidt[2], Michal Lada[3], *Garrett L. Walsh[1], *Reza J. Mehran[1], *David C. Rice[1], *Jack A. Roth[1], *Ara A. Vaporciyan[1], Jaffer A. Ajani[1], Thomas J. Watson[3], *Stephen G. Swisher[1], Donald E. Low[2], *Wayne L. Hofstetter[1]

Author Institution(s): [1]University of Texas MD Anderson Cancer Center, Houston, TX; [2]Virginia Mason Medical Center, Seattle, WA; [3]University of Rochester Medical Center, Rochester, NY

Discussant: *Mark J. Krasna, Jersey Shore University Medical Center, Neptune, NJ

Objectives: The AJCC 7th edition esophageal cancer staging was based on outcomes of surgical therapy alone eliminating nodal location from its schema. This system has not been validated in the multimodality clinical setting and location of regional nodal disease continues to influence treatment decisions. The aim of our study was to evaluate outcomes based on the clinical nodal disease location, following tri-modality therapy of distal/gastroesophageal junction (GEJ) adenocarcinoma.

Methods: This was a multi-institutional retrospective study, involving distal esophageal/GEJ adenocarcinoma clinically node positive (cN+) patients treated with tri-modality therapy between 01/2002 and 12/2011. Nodal stations were classified as individual variables; paratracheal, subcarinal, celiac, lower esophageal, paraaortic, supraclavicular, and perigastric/perihepatic. Overall survival (OS) was estimated with the Kaplan Meier method. Univariate and multivariate analyses were performed to identify variables associated with OS.

Results: A total of 196 cN+ patients met the study criteria. The most prevalent nodal disease was in the perigastric region 72% (141/196); paratracheal nodal involvement was present in 19/196 (10%) of patients. None of the nodal disease locations was significantly associated with OS on univariable analysis. Multivariable analysis identified age (HR 1.036, p=0.001), male sex (HR 2.39, p=0.003), pathologic T3 (HR 1.81, p=0.048) and N3 (HR 2.93, p=0.003) to be significantly associated with survival.

Conclusions: Location of cN+ regional node disease relative to the primary esophageal adenocarcinoma is not predictive of survival following trimodality therapy. Rather age, sex, pathologic depth and number of involved nodes were independent predictors of survival. Surgery continues to play an important role in survival outcomes irrespective of nodal distribution in the chest and abdomen.

NOTES:

12. The STS Adult Cardiac Surgery Database Version 2.73: More is better!

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Authors: Terry Shih[1], Gaetano Paone[2], Patricia F. Theurer[3], Donna McDonald[5], Gail F. Bell[3], Jaelene K. Williams[3], *David M. Shahian[4], *Richard Prager[1]

Author Institution(s): [1]University of Michigan, Ann Arbor, MI; [2]Henry Ford Hospital, Detroit, MI; [3]MSTCVS Quality Collaborative, Ann Arbor, MI; [4]Massachusetts General Hospital, Boston, MA; [5]The Society of Thoracic Surgery, Chicago, IL

Discussant: David M. Shahian, Massachusetts General Hospital, Boston, MA

Objectives: With the introduction of Version 2.73, a number of new patient risk factors are now captured in The Society of Thoracic Surgeons' (STS) Adult Cardiac Surgery Database. We sought to evaluate the potential association of these new risk factors with operative mortality.

Methods: We reviewed all patients with a STS Predicted Risk of Mortality (PROM) in our statewide quality collaborative database from July 2011 to December 2013 (N=19,743). Univariate analyses were used to determine significant associations between mortality and the new risk factors in version 2.73 (Table). We then performed multivariable analysis, incorporating the STS PROM into our regression.

Results: In the univariate model, patients with recent smoking history, other tobacco use, sleep apnea, altered neurologic status, syncope, illicit drug use, and cancer within five years had no significant difference in mortality ($p>0.05$). Patients with an elevated MELD score, abnormal pulmonary function tests (PFTs), home oxygen use, inhaled medications or bronchodilator therapy, history of liver disease, , recent pneumonia, mediastinal radiation, and prolonged five-meter walk tests had significant increases in operative mortality ($p<0.05$). Alcohol use was inversely associated with mortality. In multivariable analysis incorporating the STS Predicted Risk models, elevated MELD score, abnormal PFTs, home oxygen use, inhaled medications or bronchodilator therapy, liver disease, and prolonged five-meter walk testing were independently predictive of mortality.

Conclusions: In this analysis, several of the new STS data variables were significantly associated with operative mortality after cardiac surgery. The addition of these patient factors improves our understanding of evolving patient demographics and comorbid conditions and their impact on perioperative risk. This will improve both shared decision-making and assessments of provider performance.

Univariate and Multivariable Analysis for New Patient Risk Factors and Associations with Mortality

Variable	N_(%)	Operative Mortality (%) Yes | No	Unadjusted p value	Adjusted p value, (Adjusted Odds Ratio 95% CI)
Overall	19743 (-)	2.2	-	-
Isolated CABG	13280 (67.3%)	1.9	-	-
Isolated Valve*	3943 (20.0%)	2.1	-	-
CABG+Valve*	2520(12.8%)	3.8	-	-
Current Smoker (<2 weeks)	3842 (19.5%)	2.0 | 2.2	0.48	0.48 (0.90, 0.69-1.19)
Other Tobacco Use	711 (3.6%)	2.8 | 2.2	0.24	0.07 (1.55, 0.97-2.49)
MELD Score			<0.001	
<10	13788 (69.8%)	1.5		Reference
10-20	2906 (14.7%)	4.5		<0.001 (1.76, 1.38-2.24)
>20	334 (1.7%)	7.2		0.83 (1.06, 0.62-1.81)
MELD Score Missing	2715 (13.8%)	2.4		0.13 (1.26, 0.94-1.70)
FEV1 Testing			<0.001	
>75% predicted	5755 (29.2%)	1.4		Reference
50-75% predicted	3372 (17.1%)	2.5		0.12 (1.29, 0.94-1.77)
<50% predicted	1087 (5.5%)	6.3		0.005 (1.71, 1.18-2.47)
Not Performed	9529 (48.3%)	2.1		0.18 (1.21, 0.92-1.59)
Home Oxygen Use	411 (2.1%)	7.1 | 2.1	<0.0001	0.007 (1.82, 1.18-2.83)
Inhaled Medications/ Oral Bronchodilators	2681 (13.6%)	3.9 | 1.9	<0.0001	0.01 (1.39, 1.08-1.79)
Sleep Apnea	2352 (11.9%)	2.0 | 2.2	0.63	0.36 (0.86, 0.63-1.19)
Liver Disease	512 (2.6%)	4.5 | 2.1	0.0003	0.002 (2.04, 1.29-3.23)
Unresponsive Neurologic State	56 (0.3%)	5.4 | 2.2	0.10	0.92 (1.07, 0.30-3.83)
Syncope	876 (4.4%)	3.0 | 2.1	0.10	0.53 (1.15, 0.75-1.76)
Illicit Drug Use	953 (4.8%)	2.3 | 2.2	0.78	0.72 (1.09, 0.68-1.73)
Alcohol Use			<0.001	
≤1 drink/week	16049 (81.3%)	2.3		Reference
2-7 drinks/week	2127 (10.8%)	1.5		0.24 (0.80, 0.55-1.16)
≥8 drinks/week	1567 (7.9%)	1.9		0.93 (1.02, 0.69-1.50)
Pneumonia			<0.001	
None	18024 (91.3%)	2.1		Reference
Recent (<1 month)	563 (2.9%)	5.9		0.45 (1.18, 0.78-1.79)
Remote (>1 month)	1156 (5.9%)	2.2		0.17 (0.74, 0.48-1.14)
Mediastinal Radiation	238 (1.2%)	4.2 | 2.2	0.03	0.10 (1.81, 0.89-3.66)
Cancer within 5 years	1047 (5.3%)	2.7 | 2.2	0.26	0.81 (1.05, 0.70-1.59)
Five Meter Walk Test			<0.001	
≤6 seconds	2061 (10.4%)	1.6		Reference
>6 seconds	469 (2.9%)	4.7		0.007 (2.08, 1.23-3.53)
Not Performed	17113 (86.7%)	2.2		0.62 (0.91, 0.62-1.32)

**Valve procedures include aortic valve replacement, mitral valve replacement, and mitral valve repair*

NOTES:

13. A Community-based Multi-disciplinary CT Screening Program Improves Lung Cancer Survival

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Authors: ***D****Daniel L. Miller, William D. Mayfield, Theresa D. Luu, Gerald A. Helms, Allan R. Muster, Vickie J. Beckler, Aaron Caan

Author Institution(s): WellStar Healthcare, Marietta, GA

Discussant: *John A. Howington, NorthShore University HealthSystem, Evanston, IL

COMMERCIAL RELATIONSHIPS: Daniel L. Miller: Consultant/Advisory Board: Ethicon Endo-Surgery, Inc., Bard-Davol, Inc.

Objectives: Lung cancer is the most common cause of cancer deaths in the US. Overall survival is less than 17% with the majority of patients presenting with advanced disease. The NLST showed that cancer mortality can be reduced with CT screening of high risk patients. Unfortunately, that study completed enrollment in 2004; results published in 2011. Today, no formal lung screening is offered. We report our results of a community-based multi-disciplinary lung cancer screening program.

Methods: In 2008, we started a self-pay lung cancer CT screening program within our Healthcare System (HCS). Our HCS consist of five Hospitals, four health parks and 12 imaging centers and provides care in a five county area of approximately 1.4 million people.

Results: A total of 1267 patients have undergone self-pay CT lung cancer screening within our HCS from 2008 through 2013; 25 lung cancers (1.9%) were diagnosed with 13 (52%) of these in the NLST criteria. During that same time period 2688 patients were treated for lung cancer within our HCS that were not Screened. There was a significant difference in Stage presentation between the two groups. Screened patients were stage I or II in 64% versus 36% in No screened patients, while 36% were stage III or IV in Screened patients versus 64% in the No screened patients. Five-year survival was also significantly increased for the Screened patients versus the No screened patients with a 17% increase for the Stage I patients and 15% increase for Stage II patients. There was no difference in survival between the groups for stage III or Stage IV patients.

Conclusions: A community-based multi-disciplinary lung cancer CT screening program can improve survival of patients with lung cancer. This improvement was caused by a complete stage-shift and in the care of patients with early stage disease (VATS lobectomy and adjuvant chemotherapy). Lung cancer CT screening needs to expand to patients outside of NLST criteria who are also at risk.

NOTES:

14. Moderate vs. Deep Hypothermia With Antegrade Cerebral Perfusion for Acute Type A Aortic Dissection

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Authors: Bradley G. Leshnower, *Vinoud Thourani, *Michael Halkos, Eric Sarin, William B. Keeling, *Robert A. Guyton, *Edward P. Chen

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

Discussant: *Anthony L. Estrera, University of Texas Houston Medical School, Houston, TX

Objectives: Moderate hypothermic circulatory arrest (MHCA) and unilateral selective antegrade cerebral perfusion (USACP) is an accepted method of cerebral protection in elective aortic surgery. This study evaluates the safety of MHCA vs the gold standard of deep hypothermic circulatory arrest (DHCA) in patients undergoing emergent repair of acute Type A aortic dissection (Type A).

Methods: A retrospective review of a US aortic surgical database from 2004-2013 identified 243 patients who underwent Type A with right axillary artery cannulation, USACP and hypothermic circulatory arrest. Seventy-seven patients underwent DHCA at ≤ 24°C and 185 patients underwent MHCA at >24°C. Propensity scores were used to model adverse outcomes as a function of MHCA vs DHCA.

Results: The mean age was 55 years-old in each group. The number of root replacements (MHCA 27.2% vs. DHCA 29.6%, p=0.71) and total arch replacements (MHCA 8.3% vs DHCA 10.7%, p=0.58) were equivalent between the two groups. DHCA patients underwent circulatory arrest at significantly lower temperatures (DHCA 21.5 ± 2.1°C vs MHCA 27.3 ± 1.7°C, p <0.001). There were no significant differences in cardiopulmonary bypass, cross clamp or circulatory arrest times between the two groups. Mortality was 16.9% in DHCA patients, and 10.6% in MHCA patients (p>0.05). There was no significant difference in stroke (MHCA 8.4% vs DHCA 10.1%, p=0.68), temporary neurologic dysfunction (MHCA 5.4% vs DHCA 7.3%, p= 0.58), or renal failure (MHCA 7.8% vs DHCA 13.4%, p=0.19) between the two groups. The incidence of respiratory failure requiring tracheostomy was significantly less in MHCA patients (MHCA 5.4% vs DHCA 15.9%, p <0.001). Temperature was not found to be a predictor of adverse outcome in patients undergoing Type A with uSACP (Table)

Conclusions: MHCA+uSACP produces equivalent outcomes to DHCA+uSACP in patients undergoing emergent Type A repair. This obviates the need for DHCA in the surgical treatment of Type A.

Adjusted Multivariate Analysis of Temperature as a Predictor of Adverse Outcomes during Acute Type A

Outcome	MHCA vs. DHCA AOR (95% CI)	P
Death	0.83 (0.34-2.01)	0.68
Stroke	0.79 (0.28-2.24)	0.65
Temporary Neurologic Dysfunction	0.76 (0.22-2.66)	0.67
Diaysis Dependent Renal Failure	0.72 (0.27-1.96)	0.52
Tracheostomy	0.36 (0.13-1.01)	0.05

MHCA: Moderate Hypothermic Circulatory Arrest

DHCA: Deep Hypothermic Circulatory Arrest

AOR: Adjusted Odds Ratio

NOTES:

15. Establishing Contemporary Benchmarks for Surgical Pulmonary Valve Replacement: Analysis of The Society of Thoracic Surgeons Congenital Heart Surgery Database

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Authors: Amber D. Khanna[1], Kevin Hill[2], Sara K. Pasquali[6], Amelia S. Wallace[2], Joseph D. Kay[1], Frederick A. Masoudi[1], Marshall L. Jacobs[3], *Jeffrey P. Jacobs[4], Tara Karamlou[5]

Author Institution(s): [1]University of Colorado Anschutz Medical Campus, Aurora, CO; [2]Duke University School of Medicine, Durham, NC; 3Johns Hopkins University School of Medicine, Baltimore, MD; [4] Johns Hopkins All Children's Hospital, St. Petersburg, FL; [5]University of California, San Francisco, San Francisco, CA; [6]University of Michigan, Ann Arbor, MI

Discussant: *Brian E. Kogon, Emory University, Children's Hospital at Egleston, Atlanta, GA

Objectives: Trans-catheter pulmonary valve replacement (PVR) is becoming more widely available. We sought to establish benchmark data for surgical PVR.

Methods: We examined in-Hospital outcomes from surgical PVR in The Society of Thoracic Surgeons Congenital Heart Surgery Database (2007-2013), with focus on patients likely to be eligible for trans-catheter PVR (i.e., ≥ 5 years age, ≥ 30 kg). The cohort was divided into three procedural groups: isolated PVR, isolated right ventricle to pulmonary artery (RV-PA) conduit, and remaining patients with concomitant procedures or endocarditis. Patient characteristics, morbidity and mortality were described.

Results: Of 5233 eligible patients, median age was 17 years-old (IQR 14, 25 yrs). Age was ≥ 40 years-old in 8.4%. BMI was ≥ 30 in 13.7%. Pre-operative factors (potential risk factors) are shown in table 1. As the number of prior cardiopulmonary bypass operations (CPBs) increased, preoperative factors increased (1.9%, 3.0%, 5.3%, 4.9%, 10% for 0, 1, 2, 3, and 4 or more prior CPBs respectively). As age increased, preoperative factors increased (2.4%, 4.8%, and 8.0% for ages < 20, 20-39, 40+). In-Hospital mortality was 0.9% for the entire cohort; 0.2% for isolated PVR group, 1.1% for isolated RV-PA group and 1.1% for the concomitant procedure group. Overall, 2.8% experienced one or more of six major complications (1.6%, 0.0%, and 3.4% in isolated PVR, isolated RV-PA conduit, and concomitant procedure groups respectively). Unadjusted mortality increased with increasing number of prior CPBs (0.6%, 0.6%, 1.2%, 2.3%, and 2.9% for 0, 1, 2, 3, and 4 or more prior CPBs respectively.) Unadjusted mortality also increased with increasing age (0.7%, 0.8% and 3.0%, for ages < 20, 20-39, and 40+).

Conclusions: In the modern era, surgical pulmonary valve replacement is associated with a low risk of mortality or major complications. As age and number of prior CPBs increases, risk of PVR increa**ses.**

Pre-operative Factors and Surgical Outcomes for Pulmonary Valve Replacement

	All PVRs n=5233	Isolated PVR n=1201	Isolated RV-PA conduit n=266	Concomitant procedures n=3766
Any pre-operative factor	3.6%	2.5%	3.0%	3.9%
Arrhythmia	2.1%	1.7%	2.1%	2.2%
Renal failure	0.1%	0.3%	0.0%	0.03%
Endocarditis	0.4%	0.0%	0.0%	0.6%
Neurologic deficit	1.0%	0.4%	1.2%	1.1%
Diabetes	0.4%	0.5%	0.0%	0.3%
Mechanical ventilator support	0.1%	0.0%	0.0%	0.2%
In-hospital mortality	**0.9%**	**0.2%**	**1.1%**	**1.1%**
Length of stay - median (IQR)	**5 (4, 6)**	**4 (3, 5)**	**5 (4, 6)**	**5 (4, 6)**
Any major complication	**2.8%**	**1.6%**	**0.0%**	**3.4%**
Neurologic deficit	0.6%	0.4%	0.0%	0.8%
Renal failure	0.4%	0.2%	0.0%	0.5%
Unplanned reoperation	0.9%	0.6%	0.0%	1.1%
AV block requiring pacemaker	0.3%	0.0%	0.0%	0.4%
Mechanical Circulatory Support	0.7%	0.3%	0.0%	0.9%
Phrenic nerve injury	0.3%	0.2%	0.0%	0.4%

NOTES:

16. Longitudinal Trends in Morbidity and Mortality With Introduction of Robotic Assisted Thoracic Surgical Procedures at a Major Academic Cancer Center

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Authors: Inderpal Sarkaria, Amanda A. Ghanie, Joe Dycoco, Rachel Grosser, David J. Finley, Nabil P. Rizk, James Huang, Prasad Adusumilli, Robert J. Downey, Manjit S. Bains, Valerie W. Rusch, *David R. Jones

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

Discussant: ***D***Mark W. Onaitis, Duke University Medical Center, Durham, NC

COMMERCIAL RELATIONSHIPS: DISCUSSANT: Mark W. Onaitis: Speakers Bureau/ Honoraria: Intuitive Surgical, Inc.

Objectives: Robotic assisted video assisted thoracic surgical (RA-VATS) lobectomy, thymectomy, and robotic assisted minimally invasive esophagectomy (RAMIE) were introduced at a high volume institution in 2002, 2009, and 2011, respectively. Practice penetration and comparative measures of quality for these procedures were examined over time.

Methods: All robotic assisted thoracic surgical procedures performed during the study period were retrospectively identified from a prospectively maintained database. Data comparing open, VATS, and robotic assisted procedures were assessed, including robotic utilization trends, morbidity, mortality, and length of Hospital stay (LOS), for lobectomy, esophagectomy, and thymectomy.

Results: Between 2002 and 2013, a total 731 robotic thoracic procedures were performed. Robotic assisted lobectomies, thymectomies, and esophagectomies grew annually from 3% to 22%, 13% to 47%, and 20% to 37% from introduction year to 2013 (Figure 1). RAMIE and RA-VATS lobectomy morbidity and RA-VATS lobectomy mortality were higher than VATS or open cases, with program inception and with staff and/ or procedure change, and rapidly decreased to service norms (Table 1). There was no difference in LOS between RA-VATS and VATS lobectomy over time. RAMIE and RA-VATS thymectomy LOS were decreased compared with open procedures.

Conclusions: Use of robotics for major thoracic procedures increased annually over the past decade. Procedure-specific morbidity and/or mortality rates were higher than service norms but normalized rapidly. While these procedures may be introduced into practice without enduring deviations in quality indicators, standardized protocols for **Introduction** of new technology should be considered to minimize risks associated with initial phases of utilization and learning.

Morbidity and mortality rates in year of procedure inception and final year of study

Procedure	Inception Year Morbidity	Inception Year Mortality	Procedure/Staff Change Morbidity	Procedure/Staff Change Mortality	2013 Morbidity	2013 Mortality
RA-VATS Lobectomy	4.50% (3/66)*	0.00% (0/66)*	13.7% (10/73)**	5.47% (4/73)**	3.60% (3/83)	0.00% (0/83)
VATS Lobectomy	1.97% (7/354)*	0.60% (2/354)*	4.7% (10/213)**	0.94% (2/213)**	6.90% (9/130)	0.00% (0/130)
RAMIE	19.0% (4/21)	0.0% (0/21)	NA	NA	2.50% (1/40)	0.00% (0/40)
Open Esophagectomy	13.4% (11/82)	4.9% (4/82)	NA	NA	12.10% (8/66)	3.00% (2/66)
RA-VATS Thymectomy	0.00% (0/5)	0.0% (0/5)	NA	NA	0.00% (0/14)	0.00% (0/14)
Open Thymectomy	8.80% (3/34)	0.0% (0/34)	NA	NA	18.8% (3/16)	0.00% (0/16)

**2002-2007 **2011-2012*

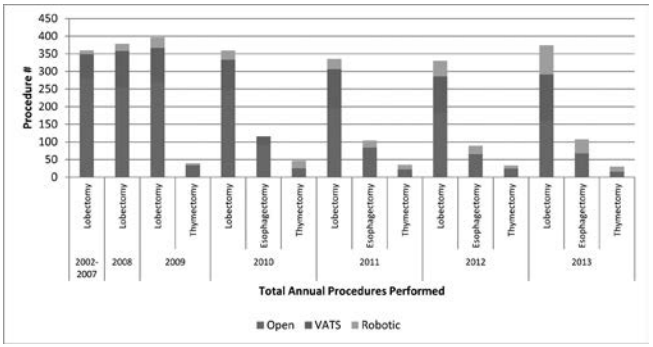

Figure 1. Trends in annual rates of open, VATS, and robotic assisted procedures for lobectomy, esophagectomy, and thymectomy from 2002 to 2013 at a major academic cancer center.

NOTES:

17. Variation in Outcomes for Risk-adjusted Pediatric and Congenital Cardiac Operations: An Analysis of The Society of Thoracic Surgeons (STS) Congenital Heart Surgery Database

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Authors: *Jeffrey P. Jacobs[1], Sean M. O'Brien[2], Sara K. Pasquali[3], *J. William Gaynor[4], Tara Karamlou[7], Karl F. Welke[5], Giovanni Filardo[6], Jane M. Han[8], Sunghee Kim[2], David M. Shahian[9], Marshall L. Jacobs[10]

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Discussant: ***D****Frederick L. Grover, University of Colorado Denver, Aurora, CO

COMMERCIAL RELATIONSHIPS: DISCUSSANT: Frederick L. Grover: Consultant/ Advisory Board: Somalution

Objectives: The empirically derived 2014 STS Congenital Heart Surgery Database (STS-CHSD) Mortality Risk Model incorporates both procedural stratification by STAT Mortality Category and patient factors. The purpose of this analysis is to assess variation in pediatric and congenital cardiac surgical outcomes across centers using this new risk model.

Methods: All index cardiac operations in the STS-CHSD (January 1, 2010–June 30, 2013) were eligible for inclusion. Isolated PDA closures in patients <2.5kg were excluded, as were centers with >10% missing data and patients with missing data for key variables. The risk model includes the following covariates: STAT Mortality Category, age, previous cardiovascular operation(s), any noncardiac abnormality, any chromosomal abnormality or syndrome, important preoperative factors (mechanical circulatory support, shock persisting at time of surgery, mechanical ventilation, and renal dysfunction), prematurity (for neonates only), weight (for neonates only), and weight-for-age and sex Z-score (for infants only).

Results: 40,835 operations from 80 centers were included. Overall discharge mortality was 3.7% (1508/40,835). Discharge mortality by age category was: neonates (10.0% [900/9015]), infants (3.0% [449/15,107]), children (0.9% [126/14,639]), and adults (1.6% [33/2074]).

Variation across centers was assessed for all patients and within age categories. Centers for which the 95% confidence interval for observed-to-expected mortality ratio does not include unity (does not overlap with the number 1) are identified as one star (low performing) or three star (high performing) programs with respect to discharge mortality for that age category (see Table).

Conclusions: The 2014 STS-CHSD Mortality Risk Model can be used to describe center-level performance. Identification of low performing and high performing programs may facilitate quality improvement.

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

The 2014 STS Congenital Heart Surgery Database (STS-CHSD) Mortality Risk Model

	Total Programs Number (%)	**One Star Programs** Number (%)	**Two Star Programs** Number (%)	**Three Star Programs** Number (%)
Neonates	79 (100%)	12 (15.1%)	64 (81.0%)	3 (3.8%)
Neonates and Infants	80 (100%)	14 (17.5%)	62 (77.5%)	4 (5.0%)
Neonates, Infants, and Children	80 (100%)	13 (16.3%)	62 (77.5%)	5 (6.3%)
Neonates, Infants, Children, and Adults	80 (100%)	13 (16.3%)	62 (77.5%)	5 (6.3%)

NOTES:

18. Residents' Perceptions of Two- vs. Three-year Cardiothoracic Training Programs (2013 and 2014 TSRA/TSDA In-training Exam Survey)

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Authors: Tom C. Nguyen[1], David Odell[2], Elizabeth H. Stephens[3], Gabriel Loor[4], Damien J. LaPar[5], Walter F. DeNino[6], Benjamin Wei[7], Muhammad Aftab[8], Ryan A. Macke[9], Jennifer S. Nelson[10], Kathleen Berfield[11], John Lazar[12], William Stein[14], Samuel J. Youssef[15], Vakhtang Tchantchaleishvili[13]

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Discussant: *William A. Baumgartner, Johns Hopkins University School of Medicine, Baltimore, MD

Objectives: Resident perception of 2 vs. 3-year programs has never been characterized. The objective of this study was to use the mandatory TSRA/TSDA In-Training Examination (ITE) survey to compare 2 vs. 3-year cardiothoracic training programs from graduating residents.

Methods: Each year ACGME cardiothoracic residents are required to take a 30-question survey designed by the Thoracic Surgery Residents Association (TSRA) and Thoracic Surgery Directors Association (TSDA) prior to taking the ITE. The survey, thus, has a 100% response rate. 2013 and 2014 ITE responses from graduating residents in 2 vs. 3-year training programs were compared quantitatively. Wilcoxon Signed-Rank Test was used to analyze ordinal and interval data. Nominal data was analyzed as contingency tables using Fisher's exact test.

Results: 416 ITE surveys were collected of which 167 were from graduating residents (2-year, n=96; 3-year n=71). There was no difference in perception of being prepared for the ABTS Exams or amount of debt between 2 vs. 3-year respondents. Respondents expressed similar interests in terms of specialization, however interest in cardiac predominated in 3-year while interest in thoracic dominated in 2-year respondents. There was no difference in intended practice type (i.e. academic vs. private practice). More residents from 2-year programs expressed difficulty meeting case requirements and planned on additional training, while more residents from 3-year programs felt adequately trained and prepared for independent practice. (TABLE)

Conclusions: There was no difference in field of interest, practice type, and amount of debt between 2 vs. 3-year programs. Respondents from 2-year programs expressed more difficulty in meeting case requirements, while residents from 3-year programs felt more prepared for independent practice. The TSRA/TSDA ITE survey results may have important implications in developing 2 vs. 3-year training programs.

	2-YEAR	3-YEAR	p-value
	FIELD of INTEREST		
Adult Cardiac	36.5%	46.5%	0.37
General Thoracic	38.5%	29.6%	
Other	25.0%	23.9%	
	INTEREST in PRACTICE TYPE		
Academic	43.8%	54.9%	0.24
Private	34.4%	32.4%	
Undecided	21.9%	12.7%	
	PLAN for ADDITIONAL TRAINING		
Yes	41.7%	15.5%	<0.01
	ADEQUATELY TRAINED		
Agree	84.4%	93.0%	0.08
Disagree	3.1%	1.4%	
Neutral	12.5%	7.0%	
	PREPARED for INDEPEDENT PRACTICE		
Agree	79.2%	93.0%	0.01
Disagree	3.1%	1.4%	
Neutral	17.7%	5.6%	
	PREPARED for ABTS EXAMS		
Agree	69.8%	73.2%	0.62
Disagree	5.2%	4.2%	
Neutral	25.0%	22.5%	
	AMOUNT of EDUCATIONAL DEBT		
< $200K	68.8%	64.8%	0.84
> $200K	29.2%	33.8%	
N/A	2.1%	1.4%	
	MEET CASE REQUIREMENT		
Yes	82.6%	98.5%	<0.01
No	17.4%	1.5%	

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19. Retrograde Ascending Aortic Dissection After TEVAR for Distal Aortic Dissection and Zone 0 Landing: Association, Risk Factors, and True Incidence

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Authors: ***D**** Ourania Preventza[1], Andrea Garcia[2], *Denton Cooley[1], Lorena Gonzales[2], ***D**** Joseph Coselli[1]

Author Institution(s): [1]Texas Heart Institute at Baylor St. Luke's Medical Center, Houston, TX; [2]Baylor College of Medicine, Houston, TX

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

COMMERICAL RELATIONSHIPS: **Ourania Preventza:** Consultant: Medtronic, Inc.; Speaker Bureau/Honoraria: Cook Medical, Inc., W.L. Gore & Associates, Inc.; **Joseph S. Coselli:** Consultant/Advisory Board: Medtronic, Inc., St. Jude Medical, Inc. Terumo, Vascutek, W.L. Gore & Associates, Inc.; Speakers Bureau/Honoraria: Terumo, Vascutek

REGULATORY DISCLOSURES: This presentation describes the off-label use of Gore Thoracic Stent graft for various thoracic aortic pathologies of the arch and of the descending thoracic aorta. This stent graft is approved by the FDA for some of the pathologies described in the abstract. This presentation describes the off-label use of Cook TX-2 Thoracic Stent graft for various thoracic aortic pathologies of the arch and of the descending thoracic aorta. This stent graft is approved by the FDA for some of the pathologies described in the abstract. This presentation describes the off-label use of the Medtronic Thoracic Endograft, which is FDA approved.

Objectives: Thoracic endovascular aortic repair (TEVAR) for distal aortic dissection and zone 0 deployment are associated with retrograde ascending aortic dissection (rAAD), yet few data exist regarding rAAD's true incidence. The aim of our study was to determine the true incidence of rAAD, to contribute to the sparse literature, and to challenge this reported association.

Methods: From January 2005 to March 2014, 300 patients underwent TEVAR and were at at risk for rAAD. We excluded patients who had prior ascending or hemiarch grafts, had traditional or frozen elephant trunk grafts, or required concomitant ascending graft placement. Patients in Group A (n=106, 35.3%) had distal aortic dissection (n=71, 67.0%) or required landing of the endograft in zone 0 of the native ascending aorta (n=35, 33.0%). Patients in Group B (n=194, 64.7%) had non-dissected descending or distal arch aneurysm (n=172), penetrating ulcer (n=10), coarctation (n=5), endoleak (n=4), aortobronchial fistula (n=2), or transection (n=1).

Results: The incidence of rAAD was 1.3% overall (n=4), 0.9% in Group A (n=1, Gore TAG device), and 1.5% in Group B (n=3; 1 Talent Captivia, 2 Cook Zenith TX2). No zone 0-treated patient had rAAD. The Group A patient required aortic arch debranching and endovascular exclusion of the arch. Of the Group B patients, 2 died and 1 was treated nonoperatively. The median interval between TEVAR and rAAD was 11 days. Aggressive balloon dilatation (n=1) and stent graft manipulation (n=3) were the causes of rAAD.

Conclusions: Post-TEVAR rAAD is a rare but lethal complication, so contributing to the literature is extremely important. Prompt recognition and prevention by experienced operators is crucial. rAAD is not device specific and does not appear to be associated with distal aortic dissection or landing in zone 0. To our knowledge, this is one of the few studies to report the true incidence of rAAD in patients who are at risk.

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

NOTES:

20. Short- and Mid-term Outcomes in Transcatheter Aortic Valve Replacement in Ninety-five Nonagenarians: Comparison of Transfemoral and Alternative Access Procedures

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Authors: Michael O. Kayatta, Vasilis Babaliaros, Eric Sarin, Patrick Kilgo, Chun Li, Chandan Devireddy, Bradley G. Leshnower, Kreton Mavromatis, Amanda Maas, Robert A. Guyton, James Stewart, Peter Block, Stam Lerakis, ***D****Vinod Thourani

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

Discussant: *Thomas M. Beaver, University of Florida, Gainesville, FL

COMMERICAL RELATIONSHIPS: Vinod Thourani: Consultant/Advisory Board: Edwards Lifesciences, Sorin, St. Jude Medical, Inc., DirectFlow; Co-founder/Ownership Interest: Apica

Objectives: There has been increasing scrutiny on the outcomes for aortic valve replacement (AVR) performed in the extreme age groups resulting in hesitancy to refer for surgery. Consequently, transcatheter aortic valve replacement (TAVR) may offer these patients a treatment alternative. The objective of this study was to describe outcomes in nonagenarians using transfemoral and alternative access techniques.

Methods: A retrospective review was performed on patients who underwent TAVR from 09/2007 through 02/2014 in an US academic institution. Ninety-five TAVR procedures were performed in nonagenarians using a balloon expandable valve: transfemoral (TF, n=66), transapical (TA, n=14), transaortic (TAo, n=14), and transcarotid (TC, n=1). Morbidity and 30-day and mid-term mortality were assessed. Kaplan-Meier plots were used to determine 5-year survival rates.

Results: The mean age was 91.8±1.8 years and 49 (52%) were female. Postoperative morbidity (Table 1) included one patient (1%) each of stroke, MI, pneumonia, and renal failure. The mean postoperative length of stay was 7.0±5.3 days for all patients. Overall 30-day mortality was 3.2%, much less than the STS PROM of 14.5±7.3%. There were no deaths in the TF patients, but there were 2 (14.3%) TA and 1 (7.1%) TAo deaths. The Kaplan-Meier estimate of median survival was 3.2 years.

Conclusions: A tailored approach in these extreme aged, high-risk patients leads to excellent outcomes in both the short and medium term. Improvements in alternative access TAVR is required to minimize morbidity and mortality. Referral for TAVR in nonagenarians should not be precluded based on age alone.

Short-term Postoperative Outcomes

TAVR Approach	All (n=95)	TF (n=66)	Non-TF (n=29)	p-value
Stroke, n (%)	1 (1.1)	1 (1.5)	0 (0.0)	0.74
MI, n (%)	1 (1.1)	1 (1.5)	0 (0.0)	0.74
Pneumonia, n (%)	1 (1.1)	1 (1.5)	0 (0.0)	0.74
Atrial Fibrillation, n (%)	16 (16.8)	3 (4.5)	12 (41.4)	**< 0.001**
Vent hrs, mean ± SD	29.7± 74.2 Median: 10.3	23.3 ± 75.5 Median: 8.3	39.0 ± 72.8 Median: 14.8	0.44
Postop LOS (d), mean ± SD	7.0 ± 5.3 Median: 6.0	6.0 ± 4.8 Median: 5.0	9.0 ± 5.6 Median: 7.5	**0.019**
30-Day Mortality, n (%)	3 (3.2)	0 (0.0)	3 (10.3)	0.067

NOTES:

21. Early and Late Outcomes After Complete Aortic Replacement

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Authors: *Anthony L. Estrera, Harleen Sandhu, Tom C. Nguyen, Ali Azizzadeh, Kristofer Charlton-Ouw, Charles C. Miller, *Hazim J. Safi

Author Institution(s): University of Texas Medical School at Houston, Memorial Hermann Heart and Vascular Institute, Houston, TX

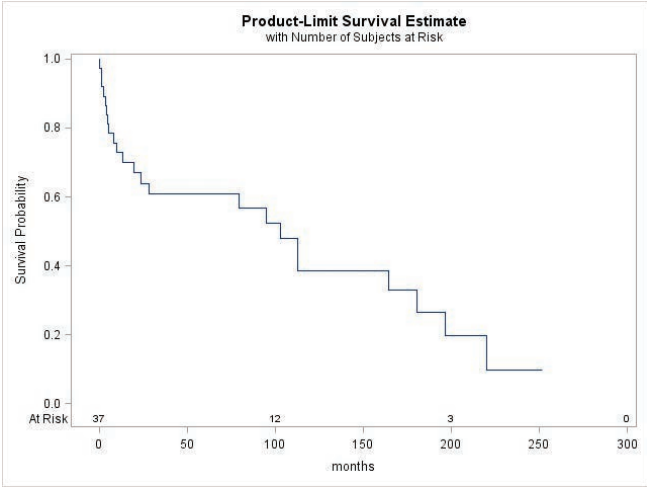
Discussant: *John A. Kern, University of Virginia Health System, Charlottesville, VA

Objectives: Repair of aneurysms and dissection involving the entire thoracoabdominal aorta (aortic root to the iliac bifurcation) remains a surgical challenge often requiring multiple procedures. We describe our experience with complete aortic replacement.

Methods: Between 1991 and 2013, 3012 repairs of the aortic root, ascending, transverse arch or thoracoabdominal aorta have been performed. Of these, we treated 37 patients with total aortic replacement. Staged repair of the aortic root/ascending/arch and thoracoabdominal segments was utilized when feasible. Median age was 54.4 +/- 14.1 years, and 14/37 patients (38%) were women.

Results: We performed 71 operations (31 ascending and 37 thoracoabdominal repairs) in 37 patients; one patient had three and another had four procedures. Six patients had their ascending/aortic root operations performed outside our institution, with thoracoabdominal completion performed in our center. 11/37 (29.8%) had Marfan syndrome or other connective tissue abnormalities. Acute dissection was present in 2/37 (5.4%), and chronic dissection in 23/37 (62.2%). History of coronary artery disease was present in 9/37 (24.3%), hypertension in 26/37 (70.3%). Median preoperative GFR was 86.7 ml/min 1.75 mm3 (interquartile range 65-118). Median interval between stages of repair was 2.5 months. Early mortality after stage 1 was 0%, with all patients in this series progressing to complete aortic replacement. Mortality following stage completion was 2.7% at 30 days, 8.1% at 45 days, 27% at one year, and 39% at 5 years. Median follow-up time was 49.9 months (interquartile range 9-113). See Figure 1.

Conclusions: Complete aortic replacement can be performed with acceptable morbidity and mortality. Most of these patients were younger, have associated dissection, and require multiple stages for completion. Even with thorough surveillance, further study is required to determine the reasons for marginal late survival.



Late Survival After Complete Aortic Replacement (by Kaplan-Meier Estimate)

NOTES:

22. Long-term Survival Following Bovine Pericardial Versus Porcine Stented Bioprosthetic Aortic Valve Replacement: Does Valve Choice Matter?

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Authors: Asvin M. Ganapathi, Brian R. Englum, Jeffrey Keenan, *Hanghang Wang, Matthew A. Schechter, *Donald D. Glower, *G. Chad Hughes

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

Discussant: ***D**** William H. Ryan, Cardiac Surgery Specialists, Plano, TX

COMMERICAL RELATIONSHIPS: DISCUSSANT: William H. Ryan: Consultant/Advisory Board: Edwards Lifesciences, Medtronic, Inc.

Objectives: Bioprosthetic options are increasingly used for aortic valve replacement (AVR). Previous research has not assessed differences in long-term outcomes after stented bovine pericardial (BAVR) versus porcine (PAVR) AVR. We aimed to examine the effect of bioprosthetic valve choice on long-term survival after AVR.

Methods: Retrospective analysis of all isolated stented bioprosthetic AVR ± coronary artery bypass grafting (CABG) procedures at a single tertiary referral institution from 1975-2013 was conducted using a prospectively maintained IRB-approved database. Multiple valve/non-CABG cardiac procedures were excluded. AVR was classified as BAVR or PAVR. The effect of valve type on long-term survival was assessed with Kaplan-Meier (KM) analysis and Cox proportional hazard model (CPH). Sub-analyses with a CPH, stratifying by valve size (19 & 21 mm; 23 & 25 mm; 27 & 29 mm), as well as age (18-55; >55 years), assessing mortality and reoperation were also conducted.

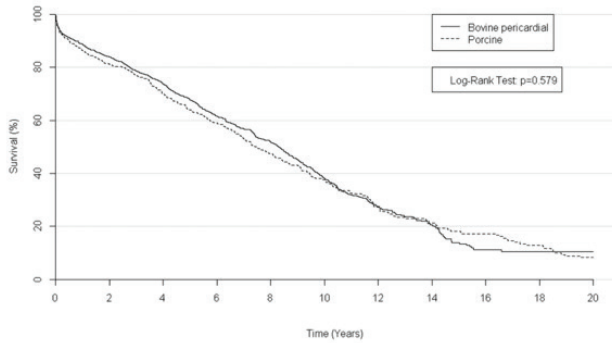
Results: N=2,063 total stented bioprosthetic AVR patients were identified, and 56.8% (n=1,171) had concomitant CABG. There were n=1,463 BAVR (70.9%) and n=600 PAVR (29.1%). Differences between the groups were found in race and type of valvular disease (Table). KM analysis (Figure; p=0.58) and CPH modeling (hazard ratio BAVR vs PAVR=1.06, p=0.59) did not reveal a significant overall long-term survival or need for reoperation difference following BAVR vs PAVR. Sub-analyses of valve size and patient age failed to show an association between valve choice and long-term survival and need for reoperation.

Conclusions: For patients undergoing AVR +/- CABG with a stented bioprosthetic valve, the choice of porcine versus bovine pericardial bioprosthesis does not appear to impact long-term survival or need for reoperation, regardless of valve size or patient age. As such, valve choice for stented bioprosthetic AVR would appear to be best guided by surgeon preference.

Patient Characteristics in Bovine vs. Porcine Stented Bioprosthetic AVR

Variable	Overall	Bovine	Porcine	P-value
Overall (N)	2,063	1,463 (70.9%)	600 (29.1%)	
Demographics				
Age	73 (66.7,78.6)	73 (66,79)	73 (67,79)	0.053
Female Sex	765 (37.1%)	545 (37.3%)	220 (36.7%)	0.833
White Race	1,748 (84.7%)	1,220 (83.4%)	528 (88%)	0.002
Ejection Fraction	50 (45,57)	50 (45,58)	50 (41,55)	0.009
Baseline Creatinine	1 (0.9,1.3)	1 (1,1)	1 (1,1)	0.169
History of Endocarditis (< 6 months)	80 (3.9%)	54 (3.7%)	26 (4.4%)	0.565
History of Smoking (within 10 years)	602 (29.4%)	434 (29.9%)	168 (28.4%)	0.537
Pre-Operative Dialysis	72 (3.5%)	57 (3.9%)	15 (2.5%)	0.156
Cerebrovascular Disease	215 (10.5%)	155 (10.6%)	60 (10.1%)	0.775
Peripheral Vascular Disease	195 (9.5%)	141 (9.7%)	54 (9.1%)	0.74
COPD -Mild/Moderate	170 (8.3%)	111 (7.6%)	59 (9.9%)	0.103
COPD -Severe	73 (3.6%)	58 (4%)	15 (2.5%)	0.138
Diabetes –Non-Insulin Dependent	484 (23.6%)	344 (23.6%)	140 (23.5%)	0.999
Diabetes –Insulin Dependent	77 (3.8%)	55 (3.8%)	22 (3.7%)	0.999
Hypertension	1,611 (78.6%)	1,160 (79.7%)	451 (75.9%)	0.065
Pre-Operative Atrial Fibrillation	323 (15.8%)	219 (15.1%)	104 (17.5%)	0.198
Pre-Operative IABP	11 (0.5%)	8 (0.6%)	3 (0.5%)	0.999
Pre-Operative Aortic Stenosis	1,751 (85.2%)	1,226 (84.1%)	525 (88.1%)	0.024
Pre-Operative Aortic Regurgitation	395 (19.7%)	296 (20.4%)	99 (17.8%)	0.227
Number of Diseased Coronary Vessels				0.641
0	971 (47.5%)	693 (47.8%)	278 (46.6%)	
1	340 (16.6%)	231 (15.9%)	109 (18.3%)	
2	309 (15.1%)	221 (15.3%)	88 (14.8%)	
3	425 (20.8%)	304 (21%)	121 (20.3%)	
CHF (NYHA Class 4)	484 (23.5%)	326 (22.3%)	158 (26.5%)	0.05
Redo sternotomy	184 (8.9%)	131 (9%)	53 (8.9%)	0.999

Long Term Survival Following Bovine Pericardial Versus Porcine AVR



23. Red Blood Cells and Mortality After Coronary Artery Bypass Surgery: Are We Really Transfusing Patients to Death?

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Authors: Gaetano Paone[1], Morley A. Herbert[4], Patricia F. Theurer[3], Gail F. Bell[3], Jaelene K. Williams[3], Donald S. Likosky[2], *Richard Prager[2]

Author Institution(s): [1]Henry Ford Hospital, Detroit, MI; [2]University of Michigan, Ann Arbor, MI; [3]MSTCVS Quality Collaborative, Ann Arbor, MI; [4]Southwest Data Consultants, Dallas, TX

Discussant: ***D****Alan M. Speir, INOVA Heart and Vascular Institute, Falls Church, VA

COMMERICAL RELATIONSHIPS: DISCUSSANT: Alan M. Speir: Consultant Advisory Board: Medtronic, Inc.

Objectives: Prior studies have implicated transfusion as a risk factor for mortality in coronary artery surgery (CABG). However, as these reports routinely demonstrate significant demographic differences between transfused and non-transfused groups, the true association between transfusion and outcome remains uncertain. In an attempt to further our understanding of the manner in which transfusion may be related to mortality, in this study we specifically analyzed the sub-group of patients who died following CABG.

Methods: 34,362 patients underwent isolated CABG between January 2008 and September 2013 and were entered into a statewide collaborative database. A total of 672 patients (2.0%) expired and form the basis for this study. Univariate analysis compared pre- and intra-operative variables, as well as post-operative outcomes between those with and without transfusion.

Results: Of the 672 deaths, 573 patients (85.3%) were transfused. Predicted risk of mortality (PROM) was 7.6% for the transfused patients vs. 3.7% for those not transfused, ($p<0.001$). Transfused patients were older, more often female, had more emergency, off-pump and re-do procedures and lower pre-op and on-bypass nadir hematocrit. Most other demographics were similar between the groups (TABLE). Post-operatively, transfused patients were ventilated longer, had more renal and multi-system organ failure, and were more likely to die of cardiac, infectious and pulmonary causes after longer ICU and overall lengths of stay.

Conclusions: While a majority of patients who expired after CABG received blood transfusion, significant differences in PROM and the post-op course leading to death between those with and without transfusion suggest the role of transfusion may be secondary to other patient-related factors. Recognizing that the relationship between transfusion and outcome after CABG remains incompletely understood, these findings are suggestive of a complex interaction of many variables.

Pre- and Intra-operative Variables

Variable	Transfused	No Blood	p-Value
Number of Patients	573	99	
STS Predicted Risk of Mortality	7.61 (6.83, 8.39)	3.66 (2.38, 4.94)	<0.001
Age (Years)	70.76 (69.9, 71.63)	67.1 (65.11, 69.09)	0.001
Males	57.94% (53.9, 61.98)	75.76% (67.32, 84.2)	<0.001
Height (cm)	167.74 (166.83, 168.65)	172.79 (170.96, 174.62)	<0.001
Weight (kg)	84.27 (82.34, 86.2)	97.96 (92.88, 103.04)	<0.001
Pre-op Hematocrit	35.57 (35.13, 36.02)	39.04 (38.04, 40.04)	<0.001
Diabetes	45.55% (41.47, 49.63)	55.56% (45.77, 65.34)	0.065
On Dialysis	9.60% (7.19, 12.01)	4.04% (0.16, 7.92)	0.071
Severe Chronic Lung Disease	14.14% (11.28, 16.99)	11.11% (4.92, 17.3)	0.871
Immunosuppressed	9.25% (6.88, 11.62)	7.07% (2.02, 12.12)	0.483
Peripheral Arterial Disease	34.21% (30.32, 38.09)	22.22% (14.03, 30.41)	0.019
Previous CABG	7.85% (5.65, 10.06)	2.02% (0, 4.79)	0.036
Ejection Fraction (%)	46.24 (45.02, 47.46)	47.74 (44.65, 50.83)	0.358
Emergent Status	15.18% (12.24, 18.12)	4.04% (0.16, 7.92)	0.002
Left Main Disease	46.60% (42.51, 50.68)	37.37% (27.84, 46.9)	0.089
Atrial Fib/Flutter	13.96% (11.12, 16.8)	15.15% (8.09, 22.21)	0.754
Pre-op Beta Blocker	82.72% (79.63, 85.82)	89.90% (83.96, 95.84)	0.103
Pre-op Aspirin	87.43% (84.72, 90.15)	85.86% (78.99, 92.72)	0.461
Off-Pump Procedure	8.90% (6.57, 11.23)	17.17% (9.74, 24.6)	0.012
CPB Lowest Hematocrit	22.37 (21.67, 23.08)	26.88 (25.45, 28.31)	<0.001

NOTES:

24. Transcatheter Aortic Valve Replacement (TAVR) vs. Off Pump Aortic Valve Bypass (AVB) With an Apico-Aortic Conduit: A Comparison of Outcomes and Hospital Economics

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Authors: *John Brown, Jack H. Boyd, Parth Patel, Amjad Syed, Joe Ladowski, Joel Corvera

Author Institution(s): Indiana University, Indianapolis, IN

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

COMMERICAL RELATIONSHIPS: DISCUSSANT: Faisal G. Bakaeen: Principal Investigator: VA Cooperative Studies Program, NHLBI; Speakers Bureau/Honoraria: AstraZenca

Objectives: TAVR is currently offered to patients who are high risk for surgical aortic valve replacement. For the past 37 years off pump AVB has been utilized in elderly patients at our center for similarly high risk patients. Although TAVR and AVB are offered to such high-risk patients, comparisons of outcomes and Hospital economics for both strategies have not been reported.

Methods: We reviewed the database of 52 AVB patients performed since 2008 with 51 TAVR cases performed since 2012. Data included demographics, hemodynamics, STS risk score, extent of coronary disease, ventricular function and follow up. Follow up was 100% in both groups. Hospital economics for both cohorts were obtained. Mean STS score for the TAVR group was 7.0% versus 17.6% for AVB group. ($p < 0.001$)

Results: Kaplin-Meier Hospital, 3-, 6-month and 1-year survival was 88, 85, 80 and 54% and 89, 77, 77 and 67% for TAVR and AVB respectively ($p=0.924$). Two TAVR patients and one AVB patient suffered from stroke. At discharge mild and moderate perivalvar and central AI were present in 31% and 16% of TAVR patients respectively; no AVB valve leaked. Trans-valvar gradients were reduced to less than 10mm Hg in both groups. Mean ICU and Hospital stay was 4.3 and 8.3 days respectively for TAVR and 6.7 and 15.6 days respectively for AVB. Median Hospital charges were $239,000 vs. $123,000 TAVR and AVB respectively. Mean payment to the Hospital was $65,000 (TAVR) vs. $64,000 (AVB) and the mean contribution margin (profit) to the Hospital was $5,000 vs. $16,000 for TAVR and AVB respectively.

Conclusions: TAVR and AVB relieve aortic stenosis and have similar and acceptable procedural mortality. AVB patients had 2.5 times the STS risk score when compared to the TAVR cohort. Hospital charges for TAVR were nearly two-fold that of AVB. Hospital reimbursement was similar but AVB had 3x the profit of TAVR. Longer follow up for the TAVR cohort will determine if survival is comparable to AVB at 1, 3 and 5 years.

NOTES:

25. An Assessment of the Optimal Time for Removal of Esophageal Stents Used in the Treatment of an Esophageal Anastomotic Leak or Perforation

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

Author Institution(s): St. Vincent Hospital, Indianapolis, IN

REGULATORY DISCLOSURE: This presentation describes the off-label use of an esophageal stent for the treatment of an esophageal perforation or intrathoracic esophageal anastomotic leak.

Objectives: The use of an esophageal stent for the treatment of a perforation or anastomotic leak has been shown to be effective and safe in selected patients. However the optimal timing for stent removal is in question as reports of complications such as migration, hemorrhage or airway occlusion are predominantly derived from long term stent use for malignant dysphagia. This purpose of this investigation was to identify a time for stent removal in patients treated for an acute perforation or anastomotic leak that resulted in sealing of the leak while minimizing the incidence of stent related complications.

Methods: Patients undergoing esophageal stent placement for the treatment of an acute perforation or intrathoracic anastomotic leak were identified from a single institution's prospectively collected database which included patients initially treated at other facilities. Excluded were patients whose leak or perforation was associated with an untreated malignancy. Patient outcomes were recorded and analyzed. Complications were segregated by stent dwell time.

Results: Over an eight year period, 162 patients underwent esophageal stent placement for an acute perforation (117) or anastomotic leak (45) at the study institution. Excluding stent migration within the first 72 hours, stent dwell times of less than two weeks for an anastomotic leak and less than four weeks for an acute perforation were associated with significantly lower complication rates (table).

Conclusions: Endoluminal esophageal stent placement is a safe and effective treatment for patients with an acute esophageal perforation or intrathoracic anastomotic leak following esophagectomy. Removal of stents at two weeks for anastomotic leak or four weeks for perforation has the potential to decrease the incidence of complications associated with stent use.

Complications of Esophageal Stent Use Segregated by Stent Dwell Time

	Anastomotic leak			Perforation		
	< 2 weeks	>2 weeks	p	< 4 weeks	> 4weeks	p
N	29	16		96	21	
Migration	4 (14%)	7 (44%)	0.04	9 (9%)	9 (43%)	0.0007
Dysphagia	5 (17%)	8 (50%)	0.04	4 (4%)	6 (29%)	0.0022
Hemorrhage	0	1 (6%)	0.4	0	2 (10%)	0.03
Fistula formation	3 (10%)	7 (44%)	0.02	4 (4%)	7 (33%)	0.0005
Difficult removal	3 (10%)	6 (38%)	0.05	5 (5%)	7 (33%)	0.001
Airway compromise	1 (3%)	2 (13%)	0.3	3 (3%)	2 (10%)	0.2

NOTES:

26. Electromagnetic Navigation Bronchoscopy Guided Methylene Blue Pleural Dye Marking for the Thoracoscopic Localization and Resection of Small Pulmonary Nodules

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Authors: Michael Reidy[1], *Arjun Pennathur[1], Valentino J. Bianco[1], William E. Gooding[2], James D. Luketich[1], Omar Awais[1]

Author Institution(s): [1]University of Pittsburgh Medical Center, Pittsburgh, PA; [2]University of Pittsburgh Cancer Institute, Pittsburgh, PA

Objectives: The National Lung Screening Trial using computed tomography (CT) has shown a decreased mortality for lung cancer and we are already seeing thoracic surgeons being referred increasing numbers of patients with pulmonary nodules, many of which are subcentimeter lesions. Obtaining definitive diagnosis in some of these small lesions is difficult. Electromagnetic navigational bronchoscopy (ENB) guided pleural methylene blue dye marking of the lesion, followed by videothoracoscopic (VATS) resection is a new technique for definitive diagnosis. The main objective of this study is to evaluate our initial experience with the ENB guided dye localization and VATS resection for diagnosis of lung lesions

Methods: Patients with newly diagnosed lung lesions underwent ENB, and the nodule with the nearest overlying pleural surface was marked with Methylene blue dye, followed by VATS resection. The primary endpoint was the rate of resection of the nodule and definitive diagnosis

Results: Thirty-one patients (men 15; women 16; median age 66 years) with 36 lesions, underwent ENB localization followed by resection (VATS 23;robotic 13) .The median size was 1 cm and the median distance from pleural surface to the center of the lesion was 1.4 cms. The index nodule was resected in all patients, and a definitive diagnosis was rendered by the pathologist in all patients (100%). There were a total of 19 malignant lesions and notably, the stage was T1N0 in 15 patients (42%). Among patients with malignant lesions, 62% underwent surgical resection with mediastinal node dissection at the same setting. The operative mortality was 0%. The median Hospital stay was three days.

Conclusions: ENB Methylene blue dye localization and VATS resection is feasible, safe and successful in the diagnosis of small lung lesions and has the potential for definitive treatment of the lung lesion. Thoracic surgeons should further investigate this modality, and incorporate this in their armamentarium.

NOTES:

27. Efficacy of Portable Ultrasound to Detect Pneumothorax Post Lung Resection

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Authors: Farah Mohammad, Arielle Hodari, Ilan Rubinfeld, Karen Byers, Keith Killu, *Zane Hammoud

Author Institution(s): Henry Ford Hospital, Detroit, MI

Objectives: The role of bedside ultrasonography in detection of pneumothorax in the acute care setting is well established. However, its role in the diagnosis of pneumothorax following chest tube removal post lung resection has yet to be elucidated. Our aim was to assess the efficacy of portable ultrasound in detection of pneumothorax following chest tube removal post lung resection.

Methods: The study was approved by the institutional review board and all patients gave informed consent prior to enrollement. A total of 76 patients were included in the study. Patients underwent bedside transthoracicultrasonography and chest radiography after an intraoperatively placed chest tube for lung resection was removed. Chest radiography was the standard in diagnosis pneumothorax post chest tube removal. Data were analyzed in R (R Development Core Team, 2013).

Results: Chest radiography detected pneumothorax in 35 out of 76 patients (46%). Ultrasonography detected pneumothorax in 32 of these patients. The sensitivity and specificity were 91% and 63% respectively. The positive and negative predictive values were 0.68 and 0.90 respectively. Only 3 patients were “false negative”, i.e. negative ultrasound but ultimately positive CXR, none of whom required further intervention.

Conclusions: Our study demonstrates that portable sonography is efficacious in the detection of pneumothorax after chest tube removal post lung resection. This suggests that sonography may replace routine CXR, thus leading to reduced overall costs and radiation exposure. Further studies are required to further refine the role of portable ultrasound post lung resection.

NOTES:

28. Resection for Primary and Metastatic Tumors of the Sternum: An Analysis of Prognostic Variables

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Authors: Usman Ahmad[1], Haoxian Yang[1], Daniel H. Buitrago[1], Manjit S. Bains[1], Nabil P. Rizk[1], James Huang[1], Prasad Adusumilli[1], Gaetano Rocco[2], *David R. Jones[1]

Author Institution(s): [1]Memorial Sloan-Kettering Cancer Center, New York, NY; [2]National Cancer Institute, Naples, Italy

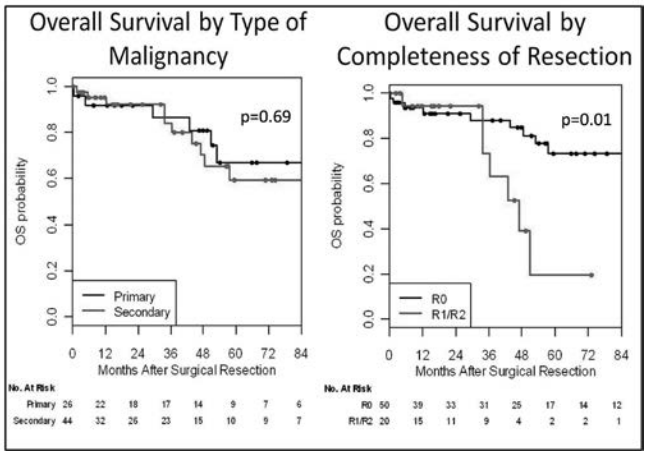
Objectives: Sternal tumors are rare and often require challenging surgical resections. We sought to evaluate the clinical outcomes and determine prognostic variables in patients with sternal tumors who underwent surgical resection.

Methods: A retrospective analysis of sternal resections for primary or secondary (metastatic or locally invasive) sternal tumors was performed for patients treated in two large cancer institutes between 1995 and 2013. Overall survival (OS) was estimated using the Kaplan-Meier method and predictors of OS were analyzed using the Cox proportional hazards model.

Results: Seventy-eight patients underwent sternal resection. Seventy patients (90%) had malignant tumors of which 26 (37%) were primary sternal, 37 (53%) were metastatic, and seven (10%) were locally invasive non-breast cancer malignancies. Isolated metastatic breast cancer was the most common sternal tumor (24, 30%), followed by primary sternal chondrosarcoma (16, 21%). Thirteen patients (17%) underwent complete, and 65 (83%) underwent partial sternal resection. Rigid reconstruction was performed in 61 (78%) and major soft tissue reconstruction in 49 (63%) cases. There were 14 (18%) grade 3 or 4 complications and no peri-operative mortality. The five-year OS was 67% for primary and 59% for secondary tumors (p=0.69). An R0 resection was associated with prolonged five-year OS (73% vs 20%) on univariate (p=0.01) as well as multivariate analysis (adjusted HR=2.98; p=0.045) (see Fig.1). On subgroup analysis, complete resection was associated with improved OS for primary sternal tumors (p=0.02).

Conclusions: Partial or complete sternal resection can achieve reasonable OS for both primary and secondary sternal tumors. An R0 resection is associated with an improved five-year OS for primary but not secondary sternal malignant tumors.

Figure 1



NOTES:

29. Lung Function Predicts Pulmonary Complications After Minimally Invasive Lobectomy

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Authors: Mark K. Ferguson, Ruoyu Zhang, Sang Mee Lee, Chris Wigfield, Wickii T. Vigneswaran

Author Institution(s): University of Chicago, Chicago, IL

Objectives: Although ppoFEV1% and ppoDLCO% have been identified as independent predictors of postoperative pulmonary complications after open lobectomy, it has been suggested that their predictive abilities may not extend to patients undergoing minimally invasive lobectomy.

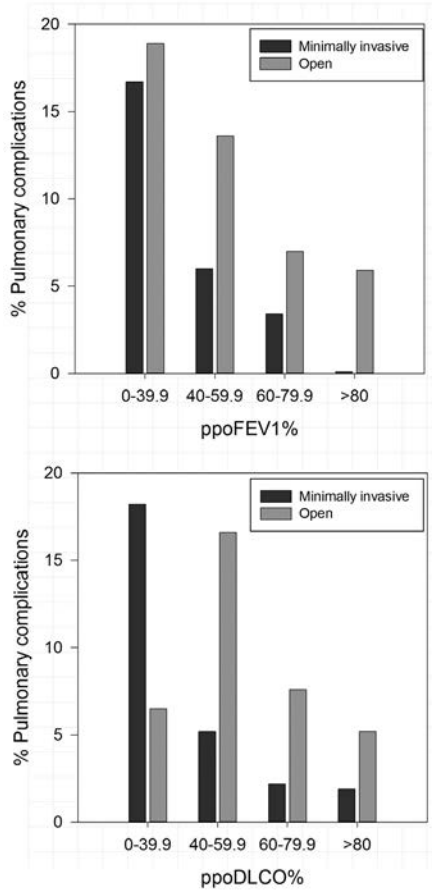
Methods: We evaluated outcomes in 805 patients undergoing isolated lobectomy via open (1994-2013; 585 patients) or minimally invasive (2007-2013; 220 patients; VATS or robotic) approaches using a prospective database. Demographic and physiologic data were extracted and compared to complications classified as pulmonary, cardiac, other, mortality, and any.

Results: Patients included 428 women and 377 men; mean age was 65.0 years. Minimally invasive patients were older (66.6 vs 64.3; p=0.006), were recent smokers less often (13.2% vs 29.9%; p<0.001), had better ppoFEV1% (71.5% vs 65.6%; p<0.001), and less often underwent induction therapy (0.5% vs 4.8%). Pulmonary and other complications were less common after minimally invasive lobectomy (3.6% vs 10.4%, p=0.0034; 8.6% vs 15.8%, p=0.0083). Death occurred in 1.4% of minimally invasive and 3.9% of open patients (p=0.075). Pulmonary complication incidence was related to predicted postop lung function for both minimally invasive and open approaches (Figure). On multivariate analysis with stratification for stage, ppoFEV1% and ppoDLCO% were predictive of pulmonary complications for both minimally invasive and open approaches (Table).

Conclusions: Decreased pain and maintained chest wall mechanics attributed to use of minimally invasive techniques for lobectomy may result in preserved lung function in the early postoperative period; this may alter the predictive ability of lung function for postoperative complications. Our results suggest that the predictive abilities of ppoFEV1% and ppoDLCO% are retained for minimally invasive lobectomy and can be used to estimate the risk of pulmonary complications.

Odds ratios for lung function related to postoperative complications after lobectomy.

	Minimally invasive			Open		
ppoFEV1%	**OR**	**95% CI**	**p value**	**OR**	**95% CI**	**p value**
Pulmonary	0.95	0.91 - 0.99	0.0297	0.97	0.96 - 0.99	0.0038
Cardiac	0.98	0.95 - 1.00	0.0243	0.99	0.97 - 1.00	0.0881
Other	1.00	0.97 - 1.02	0.7065	0.98	0.97 - 1.00	0.0172
Any	0.98	0.96 - 1.00	0.0362	0.98	0.97 - 1.00	0.0059
ppoDLCO%	**OR**	**95% CI**	**p value**	**OR**	**95% CI**	**p value**
Pulmonary	0.94	0.89 - 0.99	0.0265	0.98	0.96 - 1.00	0.0160
Cardiac	0.99	0.96 - 1.01	0.1962	1.00	0.98 - 1.01	0.5368
Other	0.97	0.94 - 1.00	0.0305	0.99	0.98 - 1.01	0.2538
Any	0.98	0.96 - 1.00	0.0250	0.99	0.98 - 1.00	0.0952



30. Survival After Sublobar Resection vs. Lobectomy for Clinical Stage IA Lung Cancer: An Analysis of Over 5,000 Patients from the National Cancer Database

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Authors: Onkar V. Khullar, Theresa Gillespie, Dana Nickleach, Yuan Liu, Kristin Higgins, Suresh Ramalingam, Joseph Lipscomb, *Felix G. Fernandez

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

Objectives: Lobectomy is the current standard of care for early stage non-small cell lung cancer (NSCLC). Recent data have suggested possible oncologic equivalence of sublobar resection. Our aim was to evaluate short and long term mortality for these two surgical treatments in patients with clinical stage IA NSCLC.

Methods: This retrospective cohort study uses the National Cancer Data Base, a joint endeavor of the Commission on Cancer of the American College of Surgeons and the American Cancer Society that includes clinical and demographic detail on patients treated at approximately 1,500 Hospitals. Patients undergoing lobectomy or sublobar resection for clinical stage Ia NSCLC from 2003-2006 were identified, as long-term survival data is available only for patients diagnosed through 2006. Primary outcomes were overall survival (OS) and 30-day mortality. To account for confounding variables, multivariable Cox proportional hazards both with and without propensity score matching approaches were utilized.

Results: A total of 13,606 patients were identified. The multivariable analysis of OS before propensity score matching is shown in the attached table. After propensity score matching, 2754 patients remained in each group. Sublobar resection was associated with better 30 day mortality (OR 0.45) but significantly worse overall survival (HR 1.5) (both $p<0.001$). Median survival was 63.3 and 88.7 months for sublobar resection and lobectomy (Figure). Additionally, sublobar resection was associated with increased likelihood of positive surgical margins (OR 2.6), and significantly lower likelihood of having more than two lymph nodes examined (OR 0.1) and nodal upstaging (OR 0.39) (all $p<0.001$).

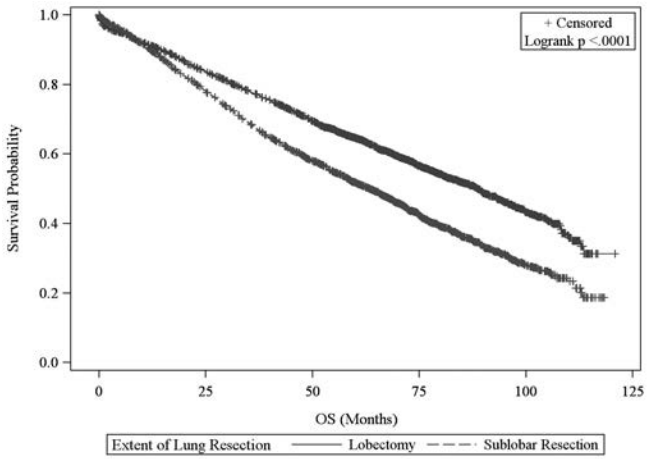
Conclusions: In this large national-level, clinically diverse sample of clinical stage IA NSCLC patients, sublobar resection was shown to have significantly worse OS compared to lobectomy. Ongoing prospective study taking into account LN upstaging and margin status is still needed.

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

Multivariate Association with Long-Term Mortality in Overall Cohort

Covariate	Level	Hazard Ratio	P-value
Extent of Surgical Resection	Sublobar Resection	1.45 (1.37-1.54)	< 0.001
	Lobectomy	--	--
Facility Type	Academic/Research Program	0.85 (0.77-0.94)	< 0.001
	Comprehensive Community Cancer Program	0.92 (0.84-1.01)	0.069
	Community Cancer Program/Other	--	--
Insurance	Not Insured	0.99 (0.76-1.31)	0.965
	Private Insurance	0.87 (0.81-0.93)	< 0.001
	Government Insurance	--	--
Income	< $30,000	1.15 (1.03-1.28)	0.010
	$30,000 - $34,999	1.20 (1.10-1.31)	< 0.001
	$35,000 - $45,999	1.06 (0.99-1.15)	0.108
	$46,000 +	--	--
Education (% adults not graduating high school)	>=29%	1.13 (1.02-1.25)	0.020
	20-28.9%	1.05 (0.96-1.14)	0.296
	14-19.9%	1.00 (0.93-1.08)	0.937
	< 14%	--	--
Charlson/Deyo Score	2+	1.47 (1.36-1.59)	<0.001
	1	1.17 (1.10-1.23)	<0.001
	0	--	--
Radiation Before Surgery	Yes	2.03 (1.36-3.04)	<0.001
	No	--	--
Size of Tumor (cm)		1.03 (1.02-1.04)	<0.001

Backward selection with an alpha level of removal of .20 was used. The following variables were removed from the model: Urban/Rural, Year of Diagnosis, and Race: White. Primary site was included in the model but did not reach statistical significance. Other variables reaching statistical significance but not shown include histology, grade, sex, and patient age.



Long-term Survival after Sublobar Resection vs Lobectomy in a Propensity Matched Cohort

31. Results of Palliation With an Initial Modified Blalock-Taussig Shunt in Infants With Single Ventricle Associated With Restrictive Pulmonary Blood Flow

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Authors: Bahaaldin Alsoufi, *Brian Kogon, Ritu Sachdeva, Brian Schlosser, Martha Clabby, William Mahle, Dennis Kim, *Kirk Kanter

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

Discussant: *Pirooz Eghtesady, St. Louis Children's Hospital, St. Louis, MO

Objectives: The modified Blalock-Taussig shunt (BTS) is the 1st palliative surgery in the multistage palliation strategy of infants with single ventricle (SV) anomalies associated with restrictive pulmonary blood flow. We report current era results from our institution.

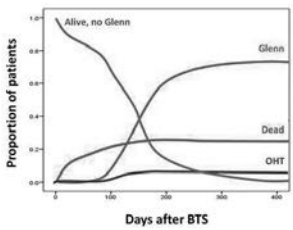
Methods: Retrospective review of SV patients who've undergone 1st stage BTS was performed (2002-12). Competing risks analyses modeled events after BTS and subsequently after Glenn and examined risk factors affecting outcomes.

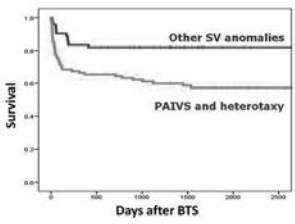
Results: 173 SV infants, median age 6 days (1-87) underwent BTS. 29 (17%) were ≤ 2.5Kg, 34 (20%) were premature ≤ 36weeks, 25 (15%) had chromosomal / extra-cardiac anomalies. Underlying pathology was pulmonary atresia and intact ventricular septum (PAIVS, n=53), tricuspid atresia (n=47), heterotaxy (n=39), other (n=34). Concomitant surgery included pulmonary artery augmentation (n=39), total anomalous pulmonary venous drainage (n=13), other (n=10).

Hospital mortality was 26 (15%). Prior to Glenn, 24 patients (14%) needed reoperations. Competing-risks analysis showed that one year after BTS, 25% have died, 71% have undergone Glenn, 4% have undergone transplantation. 5 years after Glenn, 6% have died, 63% have undergone Fontan, 31% were alive awaiting Fontan. Overall 8 year survival was 68%.

On multivariable analysis, risk factors for mortality were PAIVS or heterotaxy (HR 9.5, p=0.002), unplanned reoperation (HR 7.8, p=0.005), chromosomal / extra-cardiac anomalies (HR 12.5, p<0001) and ECMO requirement (HR 22.6, p<0.001).

Conclusions: Palliation outcomes with a BTS in SV patients trail behind the generally improved results of congenital heart surgery. Patients with genetic and extra-cardiac malformations, PAIVS or heterotaxy syndrome continue to be the most challenging and are associated with higher operative and interim mortality. Efforts to improve survival in those high risk patients would incorporate stringent perioperative care and close vigilance after discharge.





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

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32. Arterioplasty for Right Ventricular Outflow Tract Obstruction Following Arterial Switch Is a Durable Procedure

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Authors: Luke M. Wiggins, S. Ram Kumar, *Vaughn A. Starnes, *Winfield J. Wells

Author Institution(s): Children's Hospital Los Angeles, Los Angeles, CA

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

Objectives: Right ventricular outflow tract obstruction (RVOT) is the most common late complication requiring intervention following arterial switch operation (ASO). We sought to evaluate the durability of surgical management of this complication.

Methods: We retrospectively reviewed the charts of 223 consecutive patients who underwent ASO for transposition of great arteries at our institution between 2004 and 2013. Thirty-eight (17%) patients developed RVOT obstruction requiring intervention. Patient characteristics, site of stenosis, type of intervention and outcomes were analyzed. Data is presented as median with interquartile ranges.

Results: Children were diagnosed by echocardiography with significant RVOT obstruction 12.5 months (3-23.7) after ASO. 24 (63%) children underwent subsequent cardiac catheterization. Obstruction involved the supravalvar main pulmonary artery (PA) in 26 (68%), branch PA in 16 (42%), pulmonary valve in four (11%) and sub-valvar area in one (3%). Ten of 24 patients that underwent catheterization had attempted percutaneous intervention with four (40%) demonstrating significant response. Surgical repair included main PA plasty (38), extended to one or both branch PAs (22), and across the RVOT annulus (7). There was one post-operative bleeding (3%) and no Hospital or late mortality. At last follow-up 25.2 months (8.4-54.5) after RVOT reconstruction, all but three patients demonstrated no significant residual RVOT stenosis. Four (11%) patients underwent catheterization 26 months after surgery and all have had branch PA dilation and stents. One patient required re-operation for main PA stenosis.

Conclusions: Surgical management of RVOT obstruction following ASO is a highly effective and durable intervention. Our results serve as benchmark for expected outcomes in this disease process.

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33. Outcomes of ECMO in Children With Single Ventricle Physiology

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Authors: S. Ram Kumar, Antonio J. Escobar, *Vaughn A. Starnes, *Winfield J. Wells

Author Institution(s): Children's Hospital Los Angeles, Los Angeles, CA

Discussant: Gordon A. Cohen, University of California, San Francisco, CA

Objectives: Patients with single ventricle physiology (SVP) are at high risk for severe peri-operative cardiovascular compromise. Due in part to lack of outcome data with use of extracorporeal membrane oxygenation (ECMO) in this population, there is skepticism to offer ECMO to these children. We hypothesized that acceptable survival in children with SVP who require ECMO support justifies the use of ECMO in this sub-population. We proposed to ascertain clinical variables that can predict good outcome following ECMO in these patients.

Methods: The charts of children with SVP who required ECMO support at our institution between November 2000 and December 2013 were analyzed. Clinical variable and outcome parameters were analyzed using SAS 9.0. Significance was defined as $p<0.05$

Results: There were 47 patients in the cohort (40 neonates, 32 boys). Thirty-five (74%) patients had single right ventricle physiology, 37 (79%) underwent a Norwood procedure prior to placement on ECMO. Twenty-eight (60%) children were placed on ECMO immediately following the index surgery. Children were maintained on ECMO for a mean of 4±0.4 days (range 1-10 days). Thirty-three (70%) patients were successfully weaned from ECMO. Need for intervention on pulmonary blood flow whlle on ECMO was the only predictor of successful weaning from ECMO. Eight patients died a mean 28 days after successful decanulation and 25 (53%) were discharged home alive. Median follow-up after discharge is 2.2 years and 18 (36%) children are alive at last follow-up. Two (4%) patients died before Glenn, one (2%) after Glenn, 19 (40%) are proceeding to or reached Fontan circulation, and 3 (6%) were lost to follow-up.

Conclusions: Outcomes following placement on salvage ECMO in children with SVP are comparable to ECMO outcomes in children with any congenital heart defect. Patients requiring ECMO for inadequate pulmonary blood flow are most likley to be successfully weaned from ECMO.

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34. Intermediate Results of Hybrid vs. Primary Norwood Operation in Risk Stratified Cohorts

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Authors: Daniel J. Dibardino, Juliana Gomez-Arostegui, Aaron Kemp, Raveen Raviendran, Sanjeet Hegde, Eric Devaney, John Lamberti, Howaida El-Said

Author Institution(s): University of California San Diego/Rady Children's Heart Institute, San Diego, CA

Discussant: Christian Pizarro, Nemours Cardiac Center, Alfred I. duPont Hospital for Children, Wilmington, DE

Objectives: The primary management of Hypoplastic left heart syndrome (HLHS) is evolving in the United States. In 2007 we developed and evolved an algorithm for management of HLHS variants with the goal of improving outcomes in high risk patients; during implementation we have offered both hybrid and Norwood approaches to standard risk and high risk patients. The purpose of this study was comparative analysis of the intermediate results.

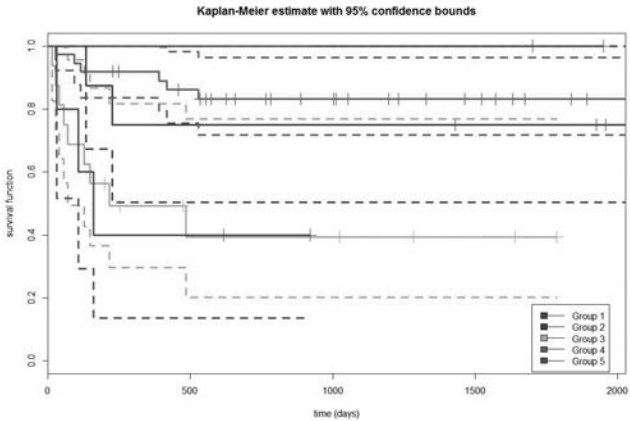
Methods: Newborns are evaluated jointly (cardiology/cardiac surgery) for high risk characteristics; birth weight <2.5kg, <35 weeks gestation, CNS abnormalities, multi-organ failure, intact/severely restrictive atrial septum, severe ventricular dysfunction and/or severe atrioventricular valve regurgitation. We prefer primary Norwood for standard and hybrid for high risk but all groups crossed over into all treatment pathways. We reviewed all consecutive patients from 2007-12, obtained follow-up and analyzed the results.

Results: Sixty-eight newborns presented (median 2.96 kg, 8 days); 29 (43%) were high-risk and 39 (57%) standard. There were 14 stage I Hospital deaths strongly associated with risk category; 3/39 standard risk (7.7%) and 11/29 high risk (38%, p=0.002, Chi-square). Table1 illustrates the five resulting treatment groups; Stage I discharge mortality and Hospital stay were highest for high risk Norwood and high risk hybrid/PGE groups while the hybrid/stent group performed relatively better (p<001, Chi-square). Actuarial survival up to five years demonstrated much poorer survival for all three high risk groups (figure 1, p=0.003, Log Rank); the high risk hybrid PGE group was equivalent to high risk Norwood.

Conclusions: While a risk stratified approach to HLHS variants with selective hybrid use improved overall stage I discharge mortality for high risk patients (compared to Norwood), the intermediate mortality of high risk patients remains much higher than those at standard risk treated by either modality.

Table 1. Stage I Hospital discharge mortality by treatment pathway; Chi square analysis indicates significant differences between the 5 resulting treatment pathways (p<0.001).

	Standard Risk Hybrid/Stent	High Risk Hyrbid/Stent	High Risk Hybrid/PGE	Standard Risk Norwood	High Risk Norwood	p value
Stage I Discharge Mortality	0/2 (0%)	1/8 (12.5%)	7/16 (44%)	3/37 (8%)	3/5 (60%)	<0.001



Kaplan-Meier survival curves with 95% confidence bounds for high risk and standard risk hybrid and Norwood palliation indicating highly significant difference in intermediate term survival (p=0.00245, Log Rank). Group 1 = standard risk hybrid stent, group 2 = high risk hybrid stent, group 3 = high risk hybrid PGE, group 4 = standard risk Norwood, group 5= high risk Norwood.

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35. Contemporary Outcomes of Surgical Repair of Total Anomalous Pulmonary Venous Connection in Patients With Heterotaxy Syndrome: An Analysis of The Society of Thoracic Surgeons (STS) Congenital Heart Surgery Database

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Authors: Muhammad S. Khan[1], Roosevelt Bryant[1], Sunghee Kim[2], Kevin D. Hill[2], Jeffrey P. Jacobs[2], Marshall L. Jacobs[2], Sara K. Pasquali[2], David L. Morales[1]

Author Institution(s): [1]Cincinnati Children's Hospital Medical Center, Cincinnati, OH; [2]Duke Clinical Research Institute, Durham, NC

Discussant: *Robert D.B. Jaquiss, Duke Children's Hospital, Durham, NC

Objectives: Total anomalous pulmonary venous connection (TAPVC) is prevalent in patients with atrio-visceral heterotaxy. While single ventricle (SV) heart defects are common in heterotaxy syndromes, the extent to which this association influences overall risk is undefined. Most reports describe small cohorts at single institutions. This study examines multi-institutional experience with TAPVC repair in infants with heterotaxy in a large clinical registry.

Methods: Patients in the STS-CHSD (2002-2012) with a diagnosis of heterotaxy syndrome who underwent TAPVC repair at age ≤ 90 days were included. Patients with missing data for key variables were excluded. Pre-operative, operative, and outcome data were described. Univariate comparisons were performed using a Chi-square test for categorical variables and Wilcoxon rank sum test for continuous variables.

Results: The cohort included 261 patients [females: 115 (44%)] from 65 centers. Median (IQR) age and weight at surgery were 7 days (3-19 days) and 3.1kg (2.7-3.5kg). Overall, 180 (69%) patients had asplenia/right atrial isomerism, 12 (5%) had polysplenia/left atrial isomerism and 167 (64%) had single ventricle (SV) diagnoses. Discharge mortality was 38%. Median postoperative length of stay was 18 days (IQR: 7-32 days). Postoperative extracorporeal membrane oxygenator support was reported for 36 (11%) patients, and 11 (4%) patients had reoperation for pulmonary vein stenosis during the same Hospital admission. Mortality was higher for patients with SV defects (SV 43% vs non-SV 30%, p=0.034) but there was no difference in other reported outcomes between SV and non-SV groups (Table).

Conclusions: TAPVC repair in heterotaxy patients carries a high risk of morbidity and mortality, particularly among single ventricle patients. These multi-institutional data serve as an important benchmark and may be useful for risk stratification and counseling.

Outcomes of repairs of TAPVC in heterotaxy patients.

Outcomes	Overall (n-261)	Single Ventricle (n=167)	Non-Single Ventricle (n=94)	p-value
Discharge Mortality - n (%)	100 (38)	72 (43)	28 (30)	0.034
Overall LOS - Median (IQR)	18 (7-32)	18 (6-33)	19 (9-30)	0.46
LOS in Survivors - Median (IQR)	23 (15-40)	25 (17-43)	22 (14-36)	0.25
Postoperative ECMO Support - n (%)	36 (14)	20 (12)	16 (17)	0.25
Reoperation for Pulmonary Vein Stenosis - n (%)	11 (4)	7 (4)	4 (4)	0.98

LOS – length of stay (days); ECMO – extracorporeal membrane oxygenation

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36. Long-term Outcome of Aortic Implantation for Patients With Anomalous Origin of the Left Coronary Artery From the Pulmonary Artery

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Authors: Michael C. Monge, Osama Eltayeb, John M. Costello, Anne E. Sarwark, Michael R. Carr, *Carl L. Backer

Author Institution(s): Ann & Robert H. Lurie Children's Hospital of Chicago, Chicago, IL

Discussant: *James Jaggers, Children's Hospital Colorado, Aurora, CO

Objectives: Since 1989 all patients with anomalous origin of the left coronary artery from the pulmonary artery (ALCAPA) at our institution have been treated with aortic implantation. The purpose of this review was to assess the late outcomes of these patients, especially regarding left ventricular (LV) function and mitral valve insufficiency.

Methods: Between 1989 and 2014, 36 patients had aortic implantation of ALCAPA. Mean age at surgery was 2.5±5.1 years, (median, 0.5 years). Operative strategy included antegrade cold blood cardioplegia, main pulmonary artery transection, aortic implantation with a large button of pulmonary artery, pulmonary reconstruction with fresh autologous pericardium, and prolonged postoperative inotropic and ventilator support. Mitral regurgitation and LV dysfunction were graded as 0-4 (0=none, 1=trivial, 2=mild, 3=moderate, 4=severe).

Results: Mean mitral regurgitation grade preoperatively was 3.0±0.8. Mean LV dysfunction score was 3.1±1.3. Mean cross-clamp and cardiopulmonary bypass times were 49.1±18 min (median, 48.5 min) and 147.5±45 min (median, 139 min), respectively. There was no operative or late mortality. Four patients had delayed sternal closure. Mean duration of ventilator support was 11±6.6 days (median, 9 days). Two patients required 3 and 6 days of postoperative extracorporeal mechanical circulatory support. Mean length of stay was 25±18 days (median 19 days.). No patient has required reoperation for supravalvar pulmonary stenosis, coronary stenosis, or mitral valve repair or replacement. Current echocardiographic follow-up shows a mean LV dysfunction score of 0.74±1.2. Mean mitral regurgitation grade is now 1.48±1.0.

Conclusions: Aortic implantation is our procedure of choice for patients with ALCAPA. No patient required mitral valve repair or transplant. There was marked improvement of mitral regurgitation grade, return to essentially normal LV function, and no mortality over a 25-year period.

NOTES:

37. Nadir Hematocrit on Bypass and Rates of Acute Kidney Injury: Does Gender Matter?

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Authors: Michelle C. Ellis[3], Theron A. Paugh[3], Timothy A. Dickinson[4], John Fuller[2], Jeffrey Chores[2], *Gaetano Paone[5], *Himanshu J. Patel[3], *Richard Prager[3], Donald S. Likosky[3], on behalf of the Michigan Society of Thoracic and Cardiovascular Surgeons Perfusion Measures and Outcomes (PERForm) Registry[1]

Author Institution(s): [1]Michigan Society of Thoracic and Cardiovascular Surgeons Perfusion Measures and Outcomes (PERForm) Registry, Ann Arbor, MI; [2]St. John Providence Health System, Detroit, MI; [3]University of Michigan, Ann Arbor, MI; [4]Specialty Care, Nashville, TN; [5]Henry Ford Hospital, Detroit, MI

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

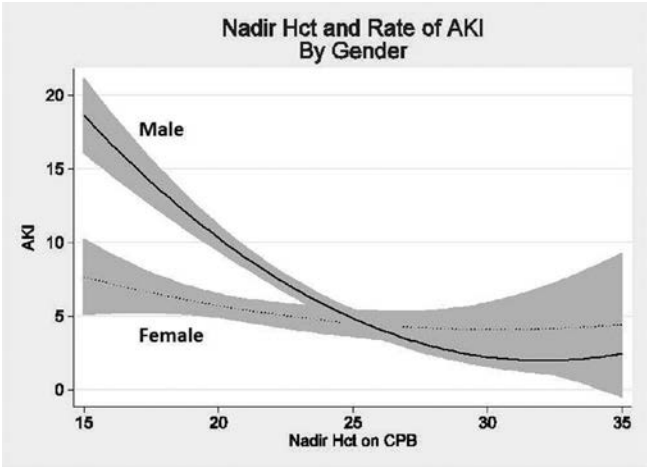
COMMERICAL RELATIONSHIPS: DISCUSSANT: Gorav Ailawadi: Consultant/Advisory Board: Edwards Lifesciences, Abbott Vascular, Mitralign; Speakers Bureau/Honoraria: St. Jude Medical, Inc., Atricure

Objectives: Reports have associated nadir hematocrit (Hct) on cardiopulmonary bypass with the occurrence of renal dysfunction. Recent literature has suggested that women, while more often exposed to lower nadir Hct, have lower risk of renal dysfunction. We assessed whether this relationship held across a large multi-center registry.

Methods: We undertook a prospective, observational study of 13,896 patients (9,434 male, 67.9%; 4,462 female, 32.1%) undergoing cardiac surgery between 2010-2013 across 22 institutions participating in the PERForm registry. We calculated crude and adjusted (age, diabetes, vascular disease, acuity, body surface area) odds ratio between nadir Hct during cardiopulmonary bypass and Stage II or III acute kidney injury (AKI), and tested the interaction of sex and nadir Hct. The predicted probability of AKI, along with 95% confidence intervals, was plotted separately for men and women.

Results: Nadir Hct<21% occurred among 17.3% of patients, although was less common among males (969, 10.3%) than females (1437, 32.2%), <0.001. AKI occurred among 5.1% of the total cohort (N=704), with no significant difference between males and females (5.0% vs. 5.3%, p=0.36). There was a significant interaction between sex and nadir Hct (p<0.001). The effect of nadir Hct on AKI was stronger among males (OR: crude 0.86, p<0.001; adj: 0.86, p<0.001) than females (OR: crude 0.96, p=0.02; adj: 0.95, p=0.01), Figure.

Conclusions: Lower nadir hematocrit was associated with an increased risk of AKI, although the effect appears to be stronger among males than females. Understanding of the mechanism(s) underlying this association remains uncertain, although these results suggest the need to limit exposure to a nadir HCT of <21 across both genders.


Nadir Hct and Rate of AKI
By Gender
AKI
20
15
10
5
0
Male
Female
15
20
25
30
35
Nadir Hct on CPB

NOTES:

38. Severe Aortic Valve Stenosis in Rural Community Practice: Under Treated and Under Referred for Definitive Management

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Author Institution(s): [1]Idaho State University, Pocatello, ID; [2]Emory University, Atlanta, GA

Discussant: ***D****Himanshu J. Patel, University of Michigan, Ann Arbor, MI

COMMERICAL RELATIONSHIPS: DISCUSSANT: Himanshu J. Patel: Principal Investigator/Co-Investigator: Medtronic, Inc., Edwards Lifesciences; Principal Investigator: W. L. Gore & Associates, Inc., Cook Medical; Ownership Interest: W. L. Gore & Associates, Inc.

Objectives: Surgical aortic valve replacement (AVR) has been shown to have excellent outcomes; however, many patients are not referred for surgical evaluation for a number of reasons. The objective of this study was to determine the management of patients with severe aortic stenosis (AS) evaluated at a rural Hospital.

Methods: 2,079 consecutive transthoracic echocardiographic examinations of adults at a rural referral center over one-year were reviewed for severe AS defined by the American College of Cardiology and American Heart Association, (ACC/AHA) . Echocardiographic data in addition to demographics were recorded.

Results: Of the 2,079 patients reviewed, 122 were found to meet criteria for severe AS (5.9%). Patients with severe AS had a mean age of 73.0 ± 15 years compared to the non-severe AS patients 63.7 ± 14 years $p<0.001$. Gender did not differ between groups (53.5% female of AS patients vs 51.6% withoUTp = 0.69). During this same time period, 58 patients were referred for surgical evaluation (47.5% of those with AS). Of the 58 patients referred for surgical evaluation 47 (81%) underwent isolated AVR, eight (14%) AVR with a concomitant procedure, three (5%) where turned down or refused surgical intervention. Overall 30-day mortality in operative patients was zero.

Conclusions: More than 50% of patients with severe AS by echocardiography are not referred for surgical evaluation because of the ordering practitioner's preference, lost to follow up, and felt to be to high risk for AVR by the ordering provider. Many of these patients may have benefited from AVR. In light of this data, this hospital has begun prospectively reviewing all echocardiograms meeting criteria for AS by ACC/AHA guidelines monthly, and these patients are evaluated in an interdisciplinary valve clinic. As technology advances, many of the patients previously felt to be too sick for surgical referral may gain significant benefit from transcatheter aortic valve replacement.

NOTES:

39. Cardiac Myxomas: A 50-year Experience With Resection and Recurrence

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Authors: Ishan Shah, *Joseph Dearani, *Richard Daly, *Rakesh Suri, *Soon Park, *Lyle Joyce, Zhuo Li, *Hartzell Schaff

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

**Discussant: ***Curtis G. Tribble, University of Virginia, Charlottesville, VA

Objectives: Myxomas are the most common cardiac tumors, but there is insufficient data regarding long term survival. We also attempt to determine a strategy to monitor for recurrence, as currently there are no fixed guidelines.

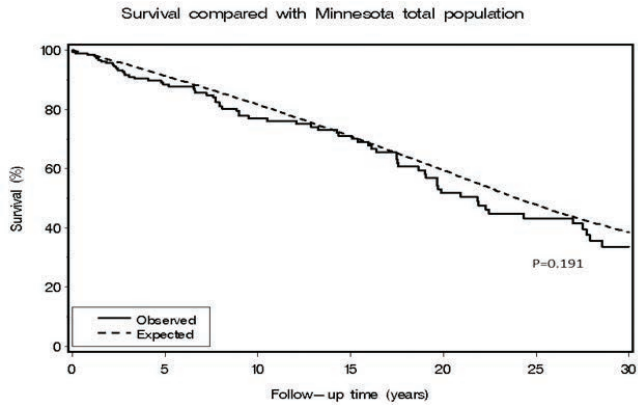
Methods: We performed a retrospective analysis of 194 patients (57.2±15.6, 62.3% males) undergoing resection of cardiac myxoma from June 1955 to June 2011. The left atrium (n=155, 80%) was the most common location, and the mean tumor size was 4.3±2.1 cm by 3.2±1.6 cm by 2.1±1.3 cm. Dyspnea(n=68) and palpitations(n=57) were the most common complaints.

Results: The tumor was accessed via the atrium in the majority of patients (n=186), with a bypass and cross clamp time of 59.1±33.4 min and 35.2 ± 21.7 min respectively. Two-third of the tumors were excised with an endocardial button (EB), while the rest were resected at the base of the stalk (BOS). Operative mortality was 0.5% with a ten-year survival of 77%, which is comparable to the age-matched general population (p= 0.191). Age was the only significant predictor of mortality (p<0.001), while there was no significant difference in survival when gender (p= 0.784), location of tumor (p= 0.087), the largest tumor dimension (p=0.257) or surgical technique (EB vs BOS, p=0.502) were considered.

Tumor recurrence was reported in 11 patients, with freedom from recurrence estimated at 92%, 91% and 86% at 10, 20 and 30 years respectively. Age at surgery (HR= 0.94, p= 0.002), maximum dimension (HR=0.58, P=0.011) and tumor localized to the ventricles (HR=7.29, p=0.013) were predictors of recurrence (Table 1).

Conclusions: Cardiac myxomas can be resected with low early mortality and excellent late survival. Tumor recurrence is more likely to occur in the first ten postoperative years especially in patients that are younger, have a smaller mass or if the tumor is in the ventricle; and these require closer monitoring.

Univariate Cox Regression Model Predicting Freedom from Recurrence		
Parameter	Hazard Ratio (95% CI)	p-value
Age	0.94 (0.91-0.98)	**0.002**
Male Gender	1.4 (0.37-5.28)	0.619
Maximum tumor dimension	0.58 (0.39-0.88)	**0.011**
Ventricular tumor	7.29 (1.53-34.67)	**0.013**
Resection with endocardial button	4.98 (0.63-39.03)	0.127



Overall survival following surgical resection of cardiac myxomas as compared to the age-matched general population

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40. A New Surgical Approach to Exclude the Left Atrial Appendage Through Right Minithoracotomy and the Transverse Sinus During a Minimally Invasive CryoCox-Maze Procedure

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Authors: ***D***Niv Ad, Paul S. Massimiano, Graciela Pritchard, Sari D. Holmes

Author Institution(s): INOVA Heart and Vascular Institute, Falls Church, VA

Discussant: *James S. Gammie, University of Maryland Medical Center, Maryland, MD

COMMERICAL RELATIONSHIPS: Niv Ad: Consultant/Advisory Board: Atricure, Estech, Medtronic, Inc.; Speaker Bureau/Honoraria: Atricure, Estech, Medtronic, Inc.

Objectives: Atrial fibrillation (AF) is associated with an increased risk for embolic stroke originating from the left atrial appendage (LAA). Recently, a new LAA epicardial clip occluder (AtriClip® by Atricure®) was introduced to clinical practice that can be applied through midsternotomy or small thoracotomy. In this report we assess the safety and efficacy of a new surgical approach to apply the Atriclip® and exclude the LAA through a right minithoractomy and the transverse sinus.

Methods: Thirty-three patients were included in this series of which 19 had the Atriclip® placed through a right minithoracotomy and the transverse sinus. Intraoperative transesophageal echocardiography (TEE) was used to exclude LAA thrombus at baseline and evaluate LAA perfusion and residual neck after the procedure. Clinical follow-up was accomplished in all patients.

Results: Mean age was 68.6±6.4 years, 96% of patients had non-paroxysmal AF with mean AF duration of 50.2±55 months, and mean LA diameter of 4.8±0.8 cm (range 3.2-6.4). In 19 patients (57%) the Atriclip® was applied using the new approach. In one of these attempts, the clip was not deployed due to severe adhesions in the transverse sinus area resulting in procedural success of 95%. The cases were nine minimally invasive mitral repairs with CryoCox-Maze III and ten minimally invasive standalone CryoCox-Maze III. Intraoperative TEE revealed no communication in all cases and a mean residual neck at the base of the LAA of 2.3mm (range 0-4). No perioperative complications related to the device application were documented. In follow-up of 10.1±7.1 months no embolic strokes were documented.

Conclusions: Management of the LAA during a minimally invasive Cox-Maze procedure performed through right minithoracotomy is challenging. This new approach is safe, very effective, and should offer a superior early and long term solution compared to the current approach of endocardial stitch closure.

NOTES:

41. Modifications to the Robotic Esophageal to Gastric Anastomosis

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Authors: *Benjamin Wei, *Douglas J. Minnich, Ayesha S. Bryant, *Robert Cerfolio

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

Objectives: The optimal manner to perform a minimally invasive anastomosis between the gastric conduit and the esophagus is unknown.

Methods: This is a retrospective review of a prospective database of 75 consecutive patients who underwent combined robotic and laparoscopic Ivor-Lewis esophageal resection for esophageal cancer. Our modified technique avoids grasping the conduit as it is delivered in the chest, anchoring the conduit to the divided azygos vein/pleural reflection posteriorly and the divided vagus nerve anteriorly to reduce tension, and performing a two-layered hand-sewn interrupted anastomosis that is buttressed by an omental flap.

Results: Between 4/2011 and 4/2014, 75 patients (61 men,median age 62) underwent robotic Ivor-Lewisesophagectomy. All had cancer, had an R0 resection and had the thoracic portion completed robotically and 71 had the stomach mobilized laparoscopically. Sixty-two patients had preoperative chemo-radiotherapy. Mean operative time was 5 hours and 49 minutes. The median number of lymph nodes resected was 24. Gastric or anastomotic problems occured in three of 16 patients (18.8%) prior to modifying our technique, compared to one of 59 patients (1.7%) afterwards. The 30-day mortality rate of our overall cohort was 4/75 (5.3%).

Conclusions: Technical modifications to the robotic two-layered hand-sewn anastomosis lower the complication rate of esophagectomy. Our experience in credentialing other surgeons in robotic surgery shows that these modifications are teachable, reproducible, and improve patient outcome.

NOTES:

42. Timely Discharge and Outpatient Management of Prolonged Air Leaks Following Lobectomy: Utilization and Cost Containment

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Authors: Ryan K. Schmocker, Ryan A. Macke, *Shahab A. Akhter, James D. Maloney, Justin D. Blasberg

Author Institution(s): University of Wisconsin School of Medicine and Public Health, Madison, WI

Objectives: Prolonged air leaks following lobectomy for lung cancer are associated with increased length of stay (LOS) and protracted resource utilization. We evaluated the safety and cost efficiency of a model favoring timely discharge and outpatient management with a portable drainage system (PDS).

Methods: We retrospectively evaluated all patients who underwent lobectomy for lung cancer at our institution between 2003 and 2014. Those discharged with a PDS met inclusion criteria for analysis. This group was compared to an internally matched lobectomy cohort (age, comorbidities, and stage) without postoperative air leaks. Study end points included resource utilization, complications following discharge, and rates of readmission.

Results: Of the 739 lobectomies performed during the study period, 74 (10%) patients with persistent air leaks were immediately discharged with a PDS after fulfilling specified postoperative milestones. Shorter LOS was observed in the study group compared to matched controls, approaching statistical significance (3.9±2.4 days vs. 4.8±1.9 days; p = 0.096). Outpatient 30-day readmission rates were similar (14.6% vs. 10.7%, p=0.45). PDS specific complications occurred in 6.9% of patients (5/74); 4.0% (3/74) required readmission for recurrent pneumothorax. PDS's were maintained for 8.9+3.7 days following hospital discharge until air leak resolution, with 678 fewer cumulative hospital days needed in the study group. A cost efficiency analysis predicted an overall savings of 602 hospital days after correction for readmission, cost of PDS, and outpatient clinic visits.

Conclusions: In patients otherwise meeting criteria for discharge, outpatient management of prolonged air leaks following timely Hospital discharge is a safe and effective management strategy, and is associated with reduced hospital costs. This model may be applicable to additional thoracic procedures associated with a protracted LOS.

NOTES:

43. Surgery for Benign Esophageal Disease: Does Surgeon Specialty Matter?

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Authors: Michael Kent, Thomas Wang, Thomas Curran, Sidhu Gangadharan, Richard Whyte

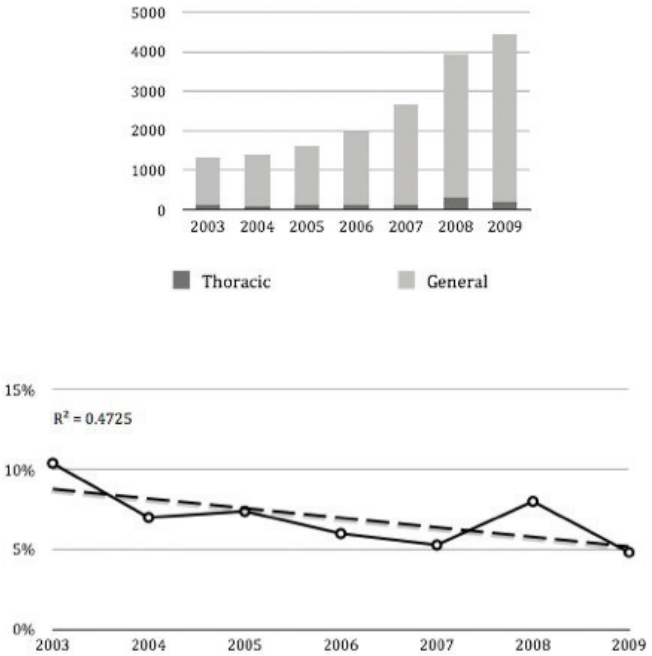
Author Institution(s): Beth Israel Deaconess Medical Center, Boston, MA

Objectives: No study has examined the proportion of cases for benign esophageal disease performed by thoracic surgeons compared to general surgeons, and whether surgeon specialty has an impact on outcomes.

Methods: Using the National Inpatient Sample and State Inpatient Database from 2003-2009, we identified patients who underwent surgery for benign esophageal disease. Surgeons were classified as general or thoracic surgeons on the basis of annual case volume, using previously published guidelines. The primary objective of this study was to document trends in case volume of procedures for achalasia, GERD and diaphragmatic hernia between thoracic and general surgeons. A secondary objective was to document the use of laparoscopy among general and thoracic surgeons.

Results: A total of 33,687 cases were identified. General surgeons performed 90.8% of these cases. Overall case volume has increased over the study period, from 4,172 cases in 2003 to 6,735 cases in 2009. The majority of growth was observed in procedures for diaphragmatic hernia (see Figure). General surgeons performed an increasing proportion of diaphragmatic hernia cases over the study period, and were more likely to perform the operation laparoscopically (46.7% vs. 28.1%, $p<.05$). Additionally, length of stay for diaphragmatic hernia cases performed by thoracic surgeons was 5 days versus 2 days for general surgeons ($p<.05$)

Conclusions: There has been a significant increase in procedures for diaphragmatic hernia from 2003-2009, with a increasing proportion of these operations performed by general surgeons. The increased utilization of laparoscopy among general surgeons may be an important factor in determining case distribution among specialties. To address this we suggest that training programs in general thoracic surgery should emphasize laparoscopic techniques for benign esophageal disease.



Diaphragmatic hernia procedures, 2003-2009. Panel A: Annual case volume by specialty, Panel B: Market share for thoracic surgeons.

NOTES:

44. Endobronchial Valves in the Treatment of Persistent Air Leaks

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Authors: John M. Hance, *Jeremiah Martin, *Timothy W. Mullett

Author Institution(s): University of Kentucky, Lexington, KY

Objectives: Endobronchial valves (EBV) are a useful tool in the management algorithm of patients with persistent air leaks. They are increasingly used in the management of post-surgical parenchymal air leaks. We report our experience which also includes the management of patients with spontaneous pneumothorax and bronchopleural fistula who are otherwise poor operative candidates.

Methods: An IRB-approved retrospective review was conducted of our single-center EBV experience. Patients were categorized as post-surgical versus medical. Data collected included demographics, indication for and number of valves placed, and chest tube duration before and after valve placement which correlated with overall resolution of air leak.

Results: A total of 14 valve placement procedures were performed. Mean age was 60 and 10 were male. Eight represented prolonged leaks managed by the surgical service, and six were medical. Indications for placement of valves in medical patients included persistent leak secondary to lung biopsy, ruptured bleb disease and pneumothorax after CPR. Surgical indications included leaks secondary to lung biopsy, lobectomy, and ruptured bleb disease. A median of two valves were placed per procedure. A post-procedure length of stay of three days was observed in the surgical group compared with 16.5 days in the medical group. Overall success rate was 75% in the surgical group and 33% in the medical group.

Conclusions: Endobronchial valves are a safe and effective tool in the management of air leaks particularly in post-surgical patients. EBV placement is useful when other interventions are contraindicated. Further studies should address EBV efficacy in non-surgical candidates given the poor success rate in this population. We suspect this is likely an indicator of increased overall pre-procedural morbidity and risk for mortality from other causes.

NOTES:

45. Concomitant Procedures Performed During Adult Congenital Heart Surgery: An Unclear Risk/Benefit Ratio?

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Authors: *Brian E. Kogon[2], Bahaaldin Alsoufi[2], Wendy Book[2], Matthew Oster[1], Alexandra Ehrlich[1]

Author Institution(s): [1]Children's Healthcare of Atlanta, Atlanta, GA; [2]Emory University School of Medicine, Atlanta, GA

Discussant: Harold M. Burkhart, Mayo Clinic, Rochester, MN

Objectives: Patients with congenital heart disease are frequently surviving into adulthood, and many of them will require surgery. Often the indications for particular aspects of the operation are unclear. Our aim is to: 1) characterize the concomitant procedures performed in adult congenital heart surgery, and 2) better define the risk involved with performing concomitant procedures during a single operation.

Methods: We retrospectively studied 458 adult patients, who underwent cardiac surgery for congenital heart disease between 2000 and 2010. Major procedures were characterized as aortic, mitral, pulmonary, tricuspid, septal defect, single ventricle, transplant, and other. We constructed logistic regression models to assess the risk for mortality, major adverse event, and prolonged length of stay.

Results: 362 operations involved a single major procedure, whereas 96 involved two or more concomitant procedures. Performing concomitant procedures increases mortality (7.3 vs 2.5%), major adverse events (29 vs 18.2%), and prolonged length of stay (29 vs 17.2%). The overall adjusted risks of performing a concomitant procedure on mortality, major adverse event, and prolonged length of stay are 4.1 (95% CI 1.3-12.5, p=0.01), 2.2 (95% CI 1.3-3.9, p=0.006), and 2.0 (95% CI 1.1-3.7, p=0.02). For those patients undergoing concomitant procedures, 71/96 (74%) involved the pulmonary valve. The adjusted risks of adding any concomitant procedure to a pulmonary valve procedure on mortality, major adverse event, and prolonged length of stay are 3.7 (95% CI 0.81-16.7, p=0.09), 2.4 (95% CI 1.1-4.1, p=0.02), and 3.1 (95% CI 1.4-6.8, p=0.006).

Conclusions: Concomitant procedures performed during adult congenital heart surgery often add significant risk to the operation. Often with unclear indications, we should be confident that the benefits outweigh the additional risk. Awareness of this risk may improve surgical decision-making and outcomes.

Patient distribution and outcomes

Concomitant procedures	Number of patients	Mortality	MAE	LOS > 7 days
Single procedure	362 (79%)	**9 (2.5%)**	**66 (18.2%)**	**62 (17.1%)**
2 concomitant	89 (19.4%)	**7 (7.9%)**	**24 (27.0%)**	**24 (27.0%)**
3 concomitant	6 (1.2%)	0	4 (66.7%)	4 (66.7%)
4 concomitant	1 (0.2%)	0	0	0
Total	458	16 (3.5%)	94 (20.5%)	90 (19.7%)

MAE - major adverse event, LOS - length of stay

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46. The Outcome of Right Ventricle to Pulmonary Artery Conduit for Biventricular Repair

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Authors: Takeshi Shinkawa, Carl Chipman, Tom Bozzay, Xinyu Tang, Jeffery Gossett, Michiaki Imamura

Author Institution(s): Arkansas Children's Hospital, Little Rock, AR

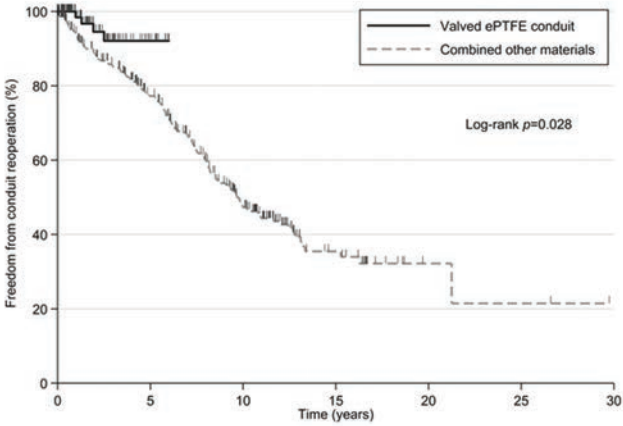
Discussant: *Paul J. Chai, Columbia University Medical Center, New York, NY

Objectives: The objective of this study was to assess the outcomes of right ventricle to pulmonary artery conduit.

Methods: This is a retrospective review of all right ventricle to pulmonary artery conduit operation for biventricular repair of congenital heart disease between 1982 and 2013 at a single institution. Major outcomes studied included patient survival and conduit survival.

Results: Four hundred seventy-six physiological right ventricle to pulmonary artery conduit operations were identified for 345 patients with 195 pulmonary homografts, 105 valved expanded polytetrafluoroethylene (ePTFE) conduits, 103 bioprosthetic valved conduit (woven fabric conduit with porcine aortic valve), 38 non-valved ePTFE tubes, and 35 others. The median age and body weight at operation were 6.7 years and 20.0kg. There were 17 early deaths, 12 late deaths, and five heart transplants during the median follow-up of 6.3 years. The actuarial survival and freedom from conduit reoperation were 90.7 % and 33.0 % at 20 years. The freedom from conduit reoperation was significantly different among conduit materials (76.8%, 92.1%, 81.9%, 80.6% 63.8% for pulmonary homograft, valved ePTFE conduit, bioprosthetic valved conduit, non-valved ePTFE tube, and others at 5 years, p=0.0001). The valved ePTFE conduit had significantly higher freedom from conduit reoperation compared to combined other materials in short-term (92.1% vs. 85.1% and 92.1% vs. 77.3% at 3 and 5 years, p=0.028). The Cox proportional hazards model also showed the significant difference in freedom from conduit reoperation between the valved ePTFE conduit and combined other materials (p=0.02), after adjusting for the potential confounding effect from era, preoperative diagnosis, conduit size, and surgical technique.

Conclusions: The valved ePTFE conduit showed excellent early outcome as right ventricle to pulmonary artery conduit for biventricular repair. A longer follow-up and a randomized study will be necessary to explore the advantages of the valved ePTFE conduit.


Valved ePTFE conduit
Combined other materials
Log-rank p=0.028
Freedom from conduit reoperation (%)
Time (years)
100
80
60
40
20
0
0
5
10
15
20
25
30

NOTES:

47. Early Outcomes of Pulmonary Valve Replacement With the Mitroflow Bovine Pericardial Bioprosthesis

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Authors: Sarah A. Schubert, *Joseph B. Clark, John L. Myers

Author Institution(s): Penn State College of Medicine, Hershey, PA

Discussant: George M. Alfieris, University Surgical Associates, L.L.P., SUNY Health Science Center, Syracuse, NY

REGULATORY DISCLOSURE: This presentation describes the off-label use of the Sorin Mitroflow Aortic Pericardial Heart Valve for pulmonary valve replacement.

Objectives: Bovine pericardial valves are often used for pulmonary valve replacement (PVR) in patients with previously repaired congenital heart disease. Attention has recently focused on the safety of the Mitroflow bovine pericardial valve following a national alert describing several cases of sudden valve failure. In response to this concern, we report our experience using the Mitroflow bioprosthesis for PVR.

Methods: IRB approval was obtained. Medical records were reviewed for all patients who underwent PVR using a Mitroflow valve at our center (2008-13).

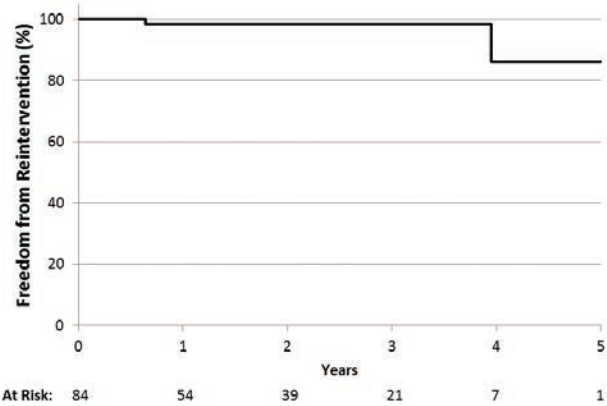
Results: The cohort included 84 patients (52 males) with a median age of 18.3 years (range 0.8-62.1) and weight of 48.4 kg (5.7-167.8); 82 patients (98%) had prior surgical repair at 16.8 years (0.4-54.4) earlier. The leading congenital diagnoses were tetralogy of Fallot (48), pulmonary atresia (17), and truncus arteriosus (9). Indications for surgery included native outflow tract insufficiency (59), valved conduit failure (20), and isolated prosthetic valve failure (5). PVR was performed using valve sizes of 19 (12), 21 (9), 23 (11), 25 (7), and 27 mm (45). Bypass and clamp times were 102 (46-305) and 64 m (0-230). Length of stay was three days (2-13). There were no Hospital deaths. Median followup was 1.7 years (0.1-5.0). Pulmonary valve insufficiency and peak gradient increased with time (Table). At latest followup, freedom from insufficiency ≥moderate was 85.7% and from peak gradient ≥50 mmHg was 93.5%. Reintervention was required in two patients: PVR (0.6 y) for endocarditis, and balloon valvuloplasty (4.0 y) then percutaneous PVR (4.2 y) for insufficiency/stenosis. Kaplan-Meier freedom from intervention at five years was 86.2% (Figure).

Conclusions: Early outcomes using the Mitroflow bioprosthesis for PVR in children and adults with repaired congenital heart disease appear acceptable and similar to reported outcomes for other tissue valve options. Valve failure due to premature structural deterioration was not observed.

Echocardiographic Assessment of Function of the Pulmonary Valve Bioprosthesis

Parameter	Postoperative	Early	Latest
Insufficiency			
Trivial or less	81 (96%)	67 (88%)	50 (65%)
Mild	3 (4%)	9 (12%)	16 (21%)
Moderate or greater	0	0	11 (14%)
Peak gradient (mmHg), mean ± sd	11.1 ± 5.7*	22.3 ± 10.6*	26.9 ± 15.7*
Time since surgery, median (range)	*n/a*	9.5 d (1-78)	1.7 y (0.1-4.6)

**p<0.001 for early v. postoperative; p=0.014 for latest v. early; p<0.001 for latest v. postoperative*



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48. Moderate Tricuspid Valve Regurgitation at the Time of Pulmonary Valve Replacement: Annuloplasty or Not?

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Authors: *Brian E. Kogon[1], Makoto Mori[1], Bahaaldin Alsoufi[1], *Kirk Kanter[1], Wendy Book[1], Matthew Oster[2]

Author Institution(s): [1]Emory University School of Medicine, Atlanta, GA; [2]Children's Healthcare of Atlanta, Atlanta, GA

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

Objectives: In adult congenital patients who have undergone prior pulmonary valve disruption, management of moderate functional tricuspid regurgitation during subsequent pulmonary valve replacement remains controversial. Our aim is to 1) analyze tricuspid valve function following pulmonary valve replacement through midterm follow-up, and 2) evaluate the benefit of concomitant tricuspid annuloplasty.

Methods: Thirty-five patients with tetralogy of Fallot or congenital pulmonary stenosis were analyzed. Pre-operative and post-operative pulmonary and tricuspid regurgitation, along with right ventricular dilation and dysfunction were scored echocardiographically (0–none, 1-mild, 2-moderate, 3-severe). Comparisons were made between those patients who underwent pulmonary valve replacement alone and those who underwent concomitant tricuspid valve annuloplasty.

Results: One month following pulmonary valve replacement, there was a significant reduction in pulmonary valve regurgitation (mean, 3 vs. 0.39, $p<0.0001$) and tricuspid valve regurgitation (mean, 2.33 vs. 1.3, $p<0.0001$), as well as significant reductions in right ventricular dilation, volume, and area. There was no difference with concomitant tricuspid annuloplasty (mean, 1.31 vs 1.29, $p=0.81$). However, at latest follow-up (mean 7.0 +/- 2.8 years), there was a significantly higher degree of tricuspid regurgitation in the concomitant annuloplasty group (mean, 1.87 vs 1.12, $p=0.005$).

Conclusions: In patients with moderate tricuspid valve regurgitation, significant improvement in tricuspid valve function and right ventricular size occurs in the first postoperative month following pulmonary valve replacement, irrespective of concomitant tricuspid valve annuloplasty. The tricuspid valve maintains competence better over the mid-term if annuloplasty is not performed.

Serial echocardiographic comparisons (mean +/- standard deviation)

		PVR alone	PVR with TV annuloplasty	p-value
Pre-op				
	PI	3.0 +/- 0	3.0 +/- 0	1
	TR	2.1 +/- 0.3	2.6 +/- 0.4	0.0009
	RV dilation	2.2 +/- 0.6	2.3 +/- 0.8	0.52
	RV dysfunction	1.4 +/- 0.8	1.9 +/- 1.0	0.11
1 month post-op				
	PI	0.4 +/- 0.8	0.4 +/- 0.5	0.51
	TR	**1.3 +/- 0.5**	**1.3 +/- 0.8**	**0.82**
	RV dilation	1.5 +/- 0.8	1.7 +/- 0.8	0.52
	RV dysfunction	1.0 +/- 0.9	1.9 +/- 0.8	0.013
Latest (7 year mean)				
	PI	0.8 +/- 0.9	0.7 +/- 1.0	0.60
	TR	**1.1 +/- 0.2**	**1.9 +/- 0.6**	**0.0047**
	RV dilation	1.5 +/- 0.2	1.8 +/- 0.37	0.37
	RV dysfunction	1.00 +/- 0.28	1.5 +/- 0.92	0.169

(PVR - pulmonary valve replacement, TV - tricuspid valve, PI - pulmonary insufficiency, TR - tricuspid regurgitation, RV - right ventricle)

NOTES:

49. Institutional Variation in Mortality After Stroke Following Cardiac Surgery: An Opportunity for Improvement

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

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

Discussant: *Andrea J. Carpenter, University of Texas, Health Science Center at San Antonio, San Antonio, TX

Objectives: Postoperative stroke remains one of the most devastating complications following cardiac surgery. Understanding the variations in stroke rates between surgical centers is unknown. This study evaluated patient risk and institutional factors on postoperative stroke following cardiac surgery.

Methods: Patient records from a multi-institutional STS certified database for cardiac operations (2001-2011) were analyzed. The relative contribution of patient- and Hospital-related factors to the likelihood of postoperative stroke was assessed by univariate and multivariate analyses.

Results: A total of 57,387 patients were included. Postoperative stroke rate was 1.5% with significant variation across Hospitals (range=0.8-2%, P<0.001). Stroke patients presented with more co-morbid disease and higher risk profiles (STS PROM 3.1% vs. 1.2%, P<0.001, Table). Mortality was expectedly higher after stroke (18% vs. 2%, P<0.001), with significant variation across Hospitals (0-35%, P<0.001). Importantly, postoperative stroke was associated with nearly double the total cost of Hospitalization ($46,395 vs. $25,254, P<0.001). After risk adjustment, individual Hospital demonstrated a strong association with likelihood for stroke (P<0.001). Furthermore, high performing Hospitals with low stroke rates performed less aortic valve operations (5-6% vs. 7-17%), more CABG operations (83-87% vs. 65-83%) and accrued longer ICU lengths of stay (48 vs. 32-43 hrs, all P<0.001).

Conclusions: Significant inter-center variation exists in postoperative stroke following cardiac surgery. Postoperative stroke remains a significant source of mortality and morbidity. Institutional practice patterns appear to confer a strong influence on postoperative stroke independent of case mix. Understanding differences between high and low performing centers is essential to improving outcomes, costs, and Hospital quality.

Factor	Stroke (n=845)	No Stroke (n=56,542)	*P*
Mean Patient Age	69 +/- 10	65 +/- 11	<0.001
Female	38%	29%	<0.001
Peripheral Arterial Disease	22%	14%	<0.001
Heart Failure	32%	17%	<0.001
Diabetes	47%	37%	<0.001
Median STS Predicted Risk of Mortality	3.5% [1.5,6.5]	1.5% [0.7,3.1]	<0.001
Operation			<0.001
AV Replacement	8.2%	7.7%	
AV Replacement + CAB	10.4%	6.6%	
CAB Only	72.4%	80.4%	
MV Repair	0.9%	1.1%	
MV Repair + CAB	1.4%	0.8%	
MV Replacement + CAB	2.7%	1.3%	
MV Replacement Only	3.9%	2.1%	

NOTES:

50. Cost Analysis of Physician Assistant Home Visit Program to Reduce Hospital Readmission

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Authors: John Nabagiez, Masood A. Shariff, Robert Carlucci, Joseph DiNatale, William Molloy, ***D***Joseph T. McGinn

Author Institution(s): Staten Island University Hospital, Staten Island, NY

Discussant: ***D****Kevin D. Accola, Cardiovascular Surgical PA, Orlando, FL

COMMERCIAL RELATIONSHIPS: Joseph T. McGinn: Speaker Bureau/Honoraria: Medtronic, Inc.
DISCUSSANT: Kevin D. Accola: Consultant: Edwards Lifesciences, CorMatrix; Speakers Bureau/Honoraria: Edwards Lifesciences, Cryolife

Objectives: A physician assistant home care (PAHC) program providing house calls was initiated to reduce Hospital readmission after adult cardiac surgery. The purpose of our study was to determine pre-PAHC and PAHC readmission rates and cost analysis of readmissions within 30 days.

Methods: One thousand seven hundred and thirty-nine consecutive patients undergoing CABG and/or valve replacement or repair surgery between September 2008 and August 2012 were reviewed retrospectively. Pre-PAHC served as a control group. Readmission diagnoses were reviewed and compared between control and PAHC group. Readmission costs were compared.

Results: Over a four-year period 1739 underwent cardiac surgery; 69.5% (N=1209) were discharged to home, 156 (12.9%) of whom were readmitted. The total readmissions of the control group (n=652) compared to the PAHC group (n=557) was 101 (15.5%) and 55 (9.9%), respectively (p=0.0044), a 36.1% reduction in readmission rate. The average cost per readmission was $40,023 in the control group and $57,441 in the PAHC group. The cost of providing home visits was calculated to be $100,000 per year. Without a reduction in readmissions rate from 15.5% to 9.9%, the PAHC group would have incurred over $1.8 million in readmission costs, for that 2 year period, to the healthcare system.

Conclusions: The PAHC program reduced the 30-day readmission rate. The cost analysis demonstrated a savings of over $1.8 million for a two-year period by reducing the readmission rate by 36%, at a cost of $100,000 per year. Therefore, home visits by a physician assistant are a cost-effective strategy to reduce post cardiac surgery readmissions.

NOTES:

51. On-pump Versus Off-pump Coronary Artery Bypass Graft Surgery Among Patients With Type 2 Diabetes

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Authors: Ashima Singh[1], *Hartzell Schaff[2], Maria M. Brooks[1], Mark Hlatky[3], Robert Frye[2], *Edward Sako[4]

Author Institution(s): [1]University of Pittsburgh, Pittsburgh, PA; [2]Mayo Clinic, Rochester, MN; [3]Stanford University, Palo Alto, CA; [4]University of Texas Health Science Center at San Antonio, San Antonio, TX

Discussant: *Jennifer S. Lawton, Washington University School of Medicine, St. Louis, MO

Objectives: This study aims to compare off-pump versus on-pump coronary artery bypass graft (CABG) surgery in terms of post procedure complications and medium-term functional and clinical outcomes in patients with Type 2 diabetes.

Methods: In the Bypass Angioplasty Revascularization Investigation 2 Diabetes (BARI 2D) trial, management strategies in diabetic patients with myocardial ischemia and coronary artery disease were studied. A subset of patients underwent CABG with the cases being done on or off-pump at the discretion of the individual centers. Data regarding postoperative complications and medium term clinical results were recorded. Using a logistic regression model, we computed a propensity score for each patient and matched those done off-pump with on-pump. Complications were compared using McNemar's test, and functional and clinical outcomes were compared using generalized linear models and Cox proportional hazard models with robust standard errors, respectively.

Results: 615 patients underwent CABG with 444 (72%) being done on pump. We obtained 153 matched pairs. Early mortality (2.6% off-pump vs 1.3% on-pump, p = 0.41) and risk of any in-Hospital complication (11.1% off-pump vs 15.7% on-pump, p = 0.25) was similar in the two groups. At a mean follow up of 4.4 years, the risk of composite outcome death, MI or stroke was significantly higher among off-pump patients. In addition, repeat revascularization was performed in 17 (11.1%) of the off pump group compared to 4 (2.6%) of those done on pump (p=0.005). There were no significant differences in the functional outcomes between the two groups.

Conclusions: In this group of patients with type 2 diabetes undergoing CABG surgery, doing the procedure off pump is associated with marginally fewer postoperative complications but an increased incidence of death, MI or stroke and need for repeat revascularization in the medium term when compared to on pump.

NOTES:

52. Surgical Embolectomy for Acute Massive and Submassive Pulmonary Embolism in a Series of 115 Patients

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Authors: Robert C. Neely, *John G. Byrne, Igor Gosev, *Lawrence H. Cohn, Quratulain Javed, James D. Rawn, *Sary F. Aranki, Samuel Z. Goldhaber, Gregory Piazza, Marzia Leacche

Author Institution(s): Brigham and Women's Hospital, Boston, MA

Discussant: ***D****Neal D. Kon, Wake Forest University School of Medicine, Winston-Salem, NC

COMMERCIAL RELATIONSHIPS: DISCUSSANT: Neal Kon: Advisory Board/Consultant: Medtronic, Inc.

Objectives: Pulmonary embolectomy is often indicated for central pulmonary embolism (PE) with hemodynamic instability, but remains controversial for hemodynamically stable patients with signs of right ventricular dysfunction. Because lytic therapy is often contraindicated post-operatively, we reviewed risk factors and outcomes of pulmonary embolectomy for stable and unstable central PE, particularly in the early post-operative period.

Methods: Between 10/99-9/13, 115 patients underwent pulmonary embolectomy for central, hemodynamically unstable PE (49/115, 43%) or hemodynamically stable (56/115, 49%) PE. Ten operations for alternate indications (right atrial mass, endocarditis) were excluded for comparison analysis, leaving N = 105 patients. Mean age was 59±13 years. 46/105(44%) had recent surgery (<5 wks): orthopedic (12/46, 25%), neurosurgery (11/46, 24%), general surgery (10/46, 22%).

Results: Preoperative demographics did not differ between groups, except for the frequency of cardiopulmonary resuscitation (CPR) in unstable 22% (11/49) vs. stable 0% (0/56)(p<0.001) groups. Operative mortality for combined groups was 6.6% (7/105); unstable 10.2% (5/49) vs. stable 3.6% (2/56) (p = 0.247). Of 11 patients requiring pre-operative CPR, four died. Six-month, one- and three-year actuarial survival for unstable PE was 75%, 68.4%, 65.8% and 92.6%, 86.7%, 80.4% for stable PE, respectively (p = 0.018).

Conclusions: This large series of pulmonary embolectomies demonstrates excellent early and late survival rates for patients with stable and unstable PE. These findings confirm pulmonary embolectomy as a successful therapeutic option for central PE, especially during the post-operative period when lytic therapy is often contraindicated.

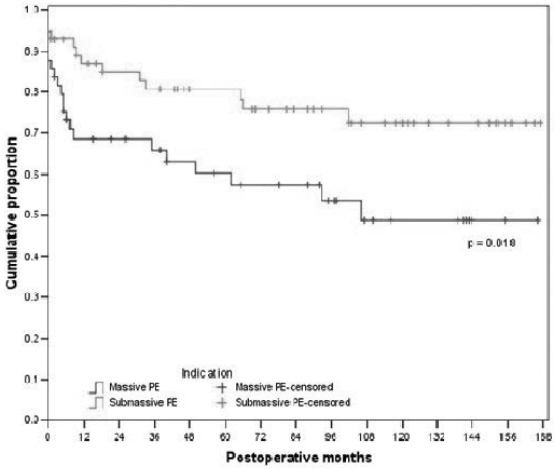

Figure 1. Kaplan Meier survival curves for massive (blue) and submassive (green) PE groups (N = 105) (p=0.018).

NOTES:

53. Re-evaluation of the Modified Ravitch Repair for Pectus Defects: Forgotten Advantages?

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Authors: *Michael H. Hines

Author Institution(s): University of Texas Medical School at Houston, Houston, TX

Objectives: The use of minimally invasive surgery does not assure similar results or less complications than more traditional open surgery. We examined our series of modified Ravitch repairs and compared the results to published results of the minimally invasive Nuss operation.

Methods: A retrospective chart review was conducted of 50 sequential patients undergoing Modified Ravitch repair of pectus excavatum (42) or carinatum (8), ages 6-40 (mean 16). Mean Haller index (excavatum) was 5.0 (range 2.9 -17). Two patients had had previous repairs as young children. Two patients had concurrent cardiac surgery. Thoracic epidurals were placed in 42 patients, contraindicated in seven, and declined by one.

Results: There were no deaths or serious complications. Mean Operative Time was 224 minutes. Length of stay was 3.4 days (2-7). No patient required transfusion. Three patients had small pneumothoraces, none requiring treatment. One patient required reoperation for a flipped bar on post-op day 1. There were no bar infections, hemothorax, seromas, empyemas or readmissions. Two patients had late mild incisional cellulitis. Epidurals were discontinued on day two, and pain controlled with ibuprofen in 49 patients, along with PRN propoxyphene in 34 and acetaminophen with codeine in four. Only six patients required hydroxycodone or oxycodone. Patients returned to school or work at 2-3 weeks, and to normal activities at 6-8 weeks, including athletics (excluding football). Bars were removed at 9-12 months.

Conclusions: While requiring a larger incision and taking longer, the modified Ravitch repair has very low morbidity, equal to or better than published reports for the Nuss, and freuqnetly without transfusion. Patients experience less pain and require less narcotics. The bar is only left in place for a year or less, (versus 3-4 years) allowing patients to return to full athletic activities much sooner, making it a viable option for many patients.

NOTES:

54. Does Thoracoscopic Surgery Decrease the Morbidity of Combined Lung and Chest Wall Resection?

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Authors: Mark Hennon, Elisabeth Dexter, Miriam Huang, John Kane, Chukwumere Nwogu, Anthony Picone, Sai Yendamuri, *Todd Demmy

Author Institution(s): Roswell Park Cancer Institute, Buffalo, NY

Objectives: Because of the historical high risk for death or major morbidity, we studied our combined lung/chest wall resection outcomes for both thoracoscopic and open approaches.

Methods: All consecutive chest wall resections between 2007 (year of our first VATS case) and 2013 at a comprehensive cancer center were tabulated retrospectively. Data were analyzed by approach type and the largest subset (T3 lung cancers) was analyzed separately. Special attention was given to the attributed causes for early major morbidity/mortality. Statistical methods used included the Kruskal-Wallis test for continuous variables, Chi-Square for categorical analysis, as well as the Kaplan-Meier method and log rank test.

Results: Of 47 chest wall resections performed, 17 (36%) were performed by VATS with no conversions. Three cases were for benign conditions and 11 for sarcoma. Thirty resections performed for primary NSCLC had VATS (15) or thoracotomy approaches (15). Patients undergoing a VATS approach were older while operative time, blood loss, and ribs resected were similar between groups (table). VATS cases had shorter ICU and Hospital length of stay but both groups had high Hospital morbidity/mortality largely from postoperative pneumonia/respiratory SIRS (n=5), CVA (n=2) and postoperative colon ischemia (n=1). Each group had a 90-day mortality of 26.7%, but the VATS group ranged in age from 73-90 years (cf. 54-74 open) with OR times from 445-720 minutes (cf. 300-428 open). Stage-matched survival curves for both approaches were superimposable (p=0.88).

Conclusions: Thoracoscopic chest wall resection is feasible, expanded case selection, and reduced prosthetic reconstruction. It did not reliably protect frail, elderly patients. Briefer, less traumatic operations may be needed for this group.

VATS vs. Open for Combined Lung and Chest Wall Resection

Variable (median)	VATS (n=15)	Open (n=15)	p-value
Age (years)	76	56	0.004
Operative Time (min)	500	420	0.191
EBL (mL)	450	600	0.261
Ribs Resected	3 (range 1-5)	3 (range 1-5)	0.127
ICU (days)	2	6	0.023
In Hospital (days)	7	14	0.001
Reconstruction with Patch	6.7%	53.3%	0.001
Neoadjuvant Chemo or ChemoRT	67%	71%	0.594
90-Day Mortality/Major Morbidity	53.3%	86.7%	0.108

NOTES:

55. A Prospective Clinical Trial of Telecytopathology for Rapid Interpretation of Specimens Obtained During Endobronchial Ultrasound (EBUS)

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Authors: Matthew Bott, Bryce James, Brian Collins, *Varun Puri, *Daniel Kreisel, *Alexander S. Krupnick, *George A. Patterson, *Stephen R. Broderick, *Bryan F. Meyers, *Traves Crabtree

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

Objectives: Cytopathologic interpretation of EBUS-FNA samples by a remote pathologist can be time-consuming and costly and an onsite cytopathologist may not always be readily available. A telecytopathology system was instituted and evaluated to examine the impact on operative time for EBUS.

Methods: A prospective study was performed of sequential patients undergoing EBUS-FNA for the evaluation of mediastinal lymphadenopathy. The control group involved transportation of specimens to the pathology lab followed by cytologic interpretation. A subsequent cohort utilized a new telecytopathology system with intra-op transmission of real-time microscopic images to a remote cytopathologist (TCP group). The primary outcome was time to confirmation of cytology results.

Results: Of 46 patients entered into the study, 23 underwent traditional analysis (Control group) while 20 were analyzed using telecytopathology (TCP group). Lung cancer was the most common malignancy in both groups (12 TCP, 12 Control). There was no difference in mean number of lymph node stations sampled (1.3 TCP vs. 1.8 Control, $p=0.76$) or needle passes made (3.8 TCP vs. 4.0 Control, $p=0.59$). (Table 1) Time to result confirmation was significantly shorter in the TCP group (19.0 vs. 46.7 minutes, $p<0.001$). A diagnostic specimen was obtained in 70% of patients in the TCP group compared with 65% in the control group ($p=0.5$). False negative rates in patients undergoing both EBUS-FNA and mediastinoscopy were similar between the two groups (0 in TCP vs. 2 in Control, $p=0.49$). Mean procedural costs (excluding cost of the telecytology system and OR time) were equivalent between the two groups ($888 TCP vs. $887 Control).

Conclusions: Telecytopathology provides rapid interpretation of EBUS-FNA samples with diagnostic accuracy comparable to traditional methods and may be the preferred model when an onsite cytopathologist is not available.

Table 1: Comparison of telecytopathology (TCP group) vs. conventional analysis (Control group) for the evaluation of specimens obtained during EBUS

	TCP group (n=20)	Control group (n=23)	p-value
Mean Age (years)	64.5	64.7	0.97
Male Gender - n (%)	12 (60)	15 (65)	0.72
Diagnostic Results – n (%)	14 (70)	15 (65)	0.50
Mean number of node stations sampled	1.30	1.83	0.76
Mean number of needle passes	3.81	4.00	0.59
Mean time from scope insertion to removal (minutes)	18.1	25.27	0.02
Mean time to results confirmation (minutes)	19.0	46.7	<0.001
Mean procedural cost	$888	$887	1.0

NOTES:

56. Does Surgical Upstaging in Resected Lung Cancer Depend on the Surgical Approach?

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Authors: *Jeremiah Martin, Eric B. Durbin, Li Chen, Tamas Gal, Angela Mahan, *Victor Ferraris, *Joseph B. Zwischenberger

Author Institution(s): University of Kentucky, Lexington, KY

Objectives: Recent reports have demonstrated that thoracoscopic lobectomy for lung cancer may be associated with lower rates of surgical upstaging. We queried a state-wide cancer registry for differences in stage migration rates and survival by surgical approach.

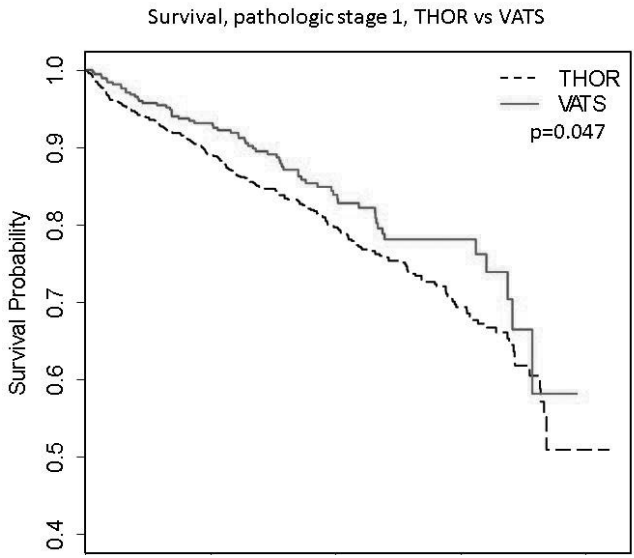
Methods: The Kentucky Cancer Registry (KCR) collects data, including centralized pathology reporting, on cancer patients treated statewide. We performed a retrospective review from 2010-2012 to examine clinical and pathologic stage. We assessed rates of stage migration and whether or not the surgical approach, thoracotomy (THOR) versus minimally invasive techniques (VATS), had an impact on final pathologic stage. Statistical significance was determined using Chi-square tests for binary outcomes and log-rank tests for survival outcomes.

Results: The KCR database from 2010 to 2012 contained information on 2593 lung cancer cases, 1928 having THOR and 665 having VATS resections (Table 1). Preoperatively, 58.2% of THOR were clinically stage 1 vs. 66.5 % VATS (p=0.0002). Of these, final pathologic stage remained stage 1 in 70.3% of THOR and 74.4% of VATS (p=0.14). The overall upstaging rate for THOR was 21.8% and 18.4% for VATS (p=0.09). A significantly different upstaging rate was seen for stage I or II tumors to stage III, occurring in 9.8% of THOR and 5% of VATS (p=0.002). Overall survival for stage 1 (graph) was better in the VATS group (p=0.047).

Conclusions: Consistent with other reports, we demonstrate a lower upstaging rate with VATS. Nevertheless, there is a survival advantage in VATS patients, most of which is realized in the first months after surgery. Although selection bias may play a role in these observed differences, the improved quality of life measures associated with VATS, may explain survival improvement despite lower surgical upstaging.

Comparison of lung cancer patients treated by thoracotomy and vats in Kentucky, 2010-2012.

		THOR n=1928	VATS n=665	p
Clinical Stage 1		1122 (58.2%)	442 (66.5%)	0.0002
Clinical Stage 1 with final Path Stage 1		723 (70.3%)	287 (74.4%)	0.1359
Any upstaging		363 (21.8%)	99 (18.4%)	0.09
Upstaged to Path III		127 (9.8%)	22 (5.1%)	0.0022
Survival	1 year	89%	93.2%	0.047
	2 year	79.7%	83.9%	



Survival of pathologic stage 1 lung cancer patients, stratified by surgical approach.

NOTES:

57. Should Single Lung Transplantation Continue to be Performed in Patients With Chronic Obstructive Pulmonary Disease (COPD)?

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Authors: Daine T. Bennett, Martin R. Zamora, *Thomas B. Reece, John D. Mitchell, Joseph C. Cleveland, *Frederick L. Grover, David A. Fullerton, Ashok Babu, Robert A. Meguid, Michael J. Weyant

Author Institution(s): University of Colorado Denver School of Medicine, Aurora, CO

Objectives: Single lung transplants (SLTx) are viewed as inferior to bilateral lung transplants (BLTx) due to perceptions that overall survival is lower for single lung transplant. We believe that subpopulations of patients exist who exhibit similar survival for SLTx and BLTx. Identifying these populations will expand the number of usable donor organs, maximizing patient life-years saved. We hypothesize that in patients with end-stage lung disease secondary to chronic obstructive pulmonary disease (COPD), SLTx and BLTx achieve comparable survival outcomes.

Methods: ≧ Based on our institution's transplant criteria, patients with COPD ≧ 55 years old are offered single lung transplantation. Cohorts of consecutive patients undergoing lung transplant for COPD between 1992-2012 were identified from our institution and from United Network of Organ Sharing (UNOS). Patients with diagnosis of alpha-1 antitrypsin deficiency and re-transplantation were excluded. Five-year survival of SLTx and BLTx were compared by Kaplan-Meier survival curves.

Results: From our institution, 239 patients with COPD meeting criteria were identified. 209 underwent SLTx, and 30 underwent BLTx. Five-year survival for SLTx (52.9±3.5%) and BLTx (56.7±10.2%) was not significantly different (p=.722) (Figure 1). The UNOS database contained 7281 patients meeting selection criteria with 4425 undergoing SLTx and 2856 undergoing BLTx. Five-year survival in the UNOS cohorts was lower for SLTx (46.4±0.8%) compared to BLTx (55.8±1.1%) (p<.001). However, five-year survival for SLTx (52.9±3.5%) from our institution was not significantly different from UNOS BLTx (55.8±1.1%) cohort (p=.488) (Figure 2).

Conclusions: Based on our institution's practices, five-year survival after SLTx for COPD is comparable to BLTx cohorts from our institution and the UNOS database. SLTx is a viable therapy. Increased utilization of SLTx may improve overall life-years saved in the COPD population due to expansion of donor lung availability.

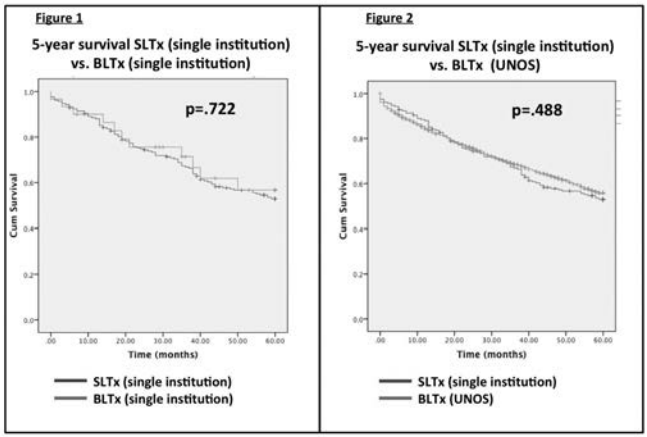

Figure 1. At our institution, 5-year survival for SLTx (52.9±3.5%) and BLTx (56.7±10.2%) was not significantly different (p=.722) in patients with COPD. Figure 2. 5-year survival for SLTx (52.9±3.5%) from our institution was not significantly different from BLTx (55.8±1.1%) from the UNOS cohort (p=.488).

NOTES:

58. Prior Sterntomy and Ventricular Assist Device Implant Do Not Adversely Impact Survival or Allograft Function Following Heart Transplant

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Authors: Ann C. Gaffey, Emily Phillips, Jessica Howard, Robert Emery, Dale Korbin, Lee Goldberg, Micheal Acker, *Y. Joseph Woo, *Pavan Atluri

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

Objectives: Orthotopic heart transplant (OHT) remains the gold standard for end-stage heart failure; however, donor availability is limited. With a median wait time of 6.6 months, the decision is often made to implant a ventricular assist device (VAD) as bridge to transplant (BTT) for medical stabilization. Furthermore, the number of patients who have had at least one prior sternotomy (PS) awaiting transplant is increasing. Previous studies have indicated reoperative sternotomy as a risk factor for compromised survival. Concerns are focused on outcomes following VAD explant or redo-sternotomy prior to OHT due to increasing operative complexity. We hypothesize that despite the greater technical difficulty outcomes would not be compromised.

Methods: We retrospectively analyzed patients who underwent OHT at our center over a five-year period (2008-2013;n=253). All patients who underwent a BTT VAD (n=72) or PS (n=65) were compared to those undergoing OHT with a virgin chest (VC, n=116). Peri-operative variables were analyzed. Short and long-term survival was studied (minimum follow up=6 mos).

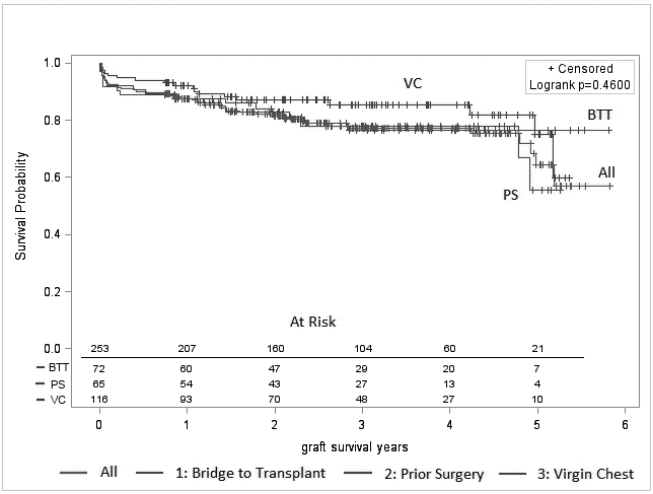
Results: Co-morbidities were similar between the groups (TABLE). There was no difference in donor ischemic time or cross clamp time; but cardiopulmonary bypass time was longer in both BTT and PS cohorts ($p<0.00001$). The blood transfusion requirement was higher in BTT and PS groups as compared to the VC cohort ($p= 0.0019$). For BTT and PS, both time to extubation ($p=0.01$) and ICU LOS ($p=0.01$). There was no difference in Hospital length of stay (0.19). Overall, there was no difference in one- or three-year survival among the groups.

Conclusions: PS or VAD as BTT does not adversely impact allograft function, Hospital length of stay, or long-term outcomes following OHT. The decision to manage a patient medically while awaiting transplant versus an LVAD BTT strategy should not be altered by concerns of subsequent complexity of OHT.

Table 1. Perioperative Characteristics Stratified by VC, BTT, or PS

Variable	VC (n=116)	BTT (n=72)	PS (n=65)	p* (anova)
Age (years)	51.2+10.7	49.1+14.9	52.21+11.9	0.23
Gender (%male)	69%	76%	77%	0.39
BMI (kg/m2)	26.5 + 4.8	28.6 + 5.3	26.6 + 5.8	0.08
Diabetes (%)	22%	43%	32%	0.01
Hypertension (%)	49%	58%	53%	0.47
Hypercholesterolemia (%)	41%	47%	51%	0.46
Renal insufficiency (%)	9%	11%	23%	0.02
Cardiopulmonary bypass time (min)	153.8 + 32.2	197.1 + 67.9	193.6 + 55.6	<0.00001
Cross-clamp time (min)	107.8 + 73.2	115.8 + 28.7	123.3 + 40.2	0.21
Allograft ischemic time (min)	202.8 + 116.4	210.7 + 50.4	193.6 + 55.6	0.85
Post-operative ejection fraction (%)	57.7 + 17.1	57.5 + 19.4	57.7 + 18.2	0.99
Post-operative blood transfusion requirement (units)	6.3 + 10.7	12.4 + 13.7	11.7 + 12.9	0.0019
Time to extubation (days)	1.9 + 2.8	5.22 + 13.0	4.22 + 6.1	0.01
ICU length of stay (days)	6.8 + 5.1	8.3 + 7.2	9.8 +7.9	0.01
Hospital length of stay (days)	27.8 + 18.4	29.6 + 22.4	33.7 + 20.4	0.19
Discharge ejection fraction (%)	69%	68%	68%	0.72
Survival at one year (%)	92%	87%	88%	0.97
Survival at three years (%)	85%	77%	78%	0.86

** The p values were determined by analysis of variance.*



NOTES:

59. Stroke After Left Ventricular Assist Device Implantation: Outcomes in the Continuous Flow Era

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Authors: Laura Harvey, Christopher Holley, Samit Roy, Peter Eckman, Monica Colvin-Adams, Kenneth Liao, Ranjit John

Author Institution(s): University of Minnesota, Minneapolis, MN

Objectives: Left ventricular assist devices (LVADs) are increasingly being used in patients with heart failure. We evaluated our single center experience to study the impact of stroke on clinical outcomes after LVAD placement.

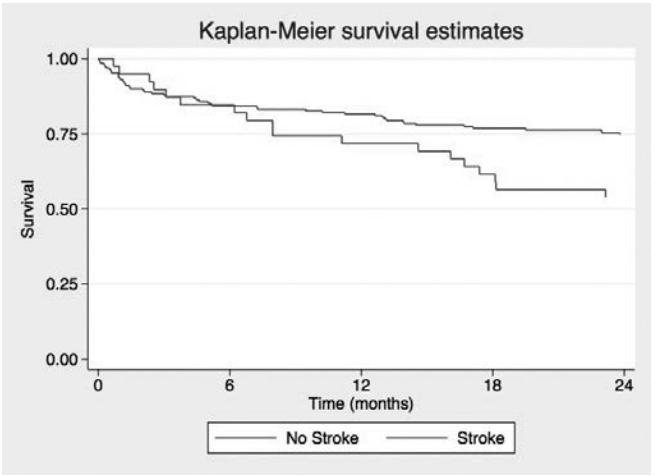
Methods: From June 2005 to June 2013, 230 patients received a HeartMate II (HM II) LVAD. Standard statistical methods including t-tests, chi-square tests and Kaplan-Meier analysis were used.

Results: Of 230 LVAD patients, 185 (80.4%) were bridge to transplant and 45 (19.6%) were destination therapy. Strokes occurred in a total of 39 patients (17%), an incidence rate of 0.064 strokes per person-year. 19 (48.7%) strokes were embolic and 20 (51.3%) were hemorrhagic. Median duration of support at the time of stroke was 146 [IQR: 34, 518] days for embolic and 240 [IQR: 76, 1188] days for hemorrhagic (p=0.23). Freedom from stroke at 6, 12, and 24 months was 92.6%, 89.6%, and 86.1% respectively. There were no significant differences in baseline demographic variables except that stroke patients had a lower incidence of coronary artery disease (p=0.004) and prior cardiac surgery (p=0.001) [Table 1]. There was a trend towards increased risk of stroke in patients with LVAD-related infections (p=0.05). The 6, 12, and 24 month survival rate in patients with a stroke was 84.6%, 71.8%, and 53.9% compared to 84.2%, 81.6%, and 74.7% respectively in patients without a stroke (log-rank p=0.0019) [Figure 1]. Over a median follow-up time of 761 days, patients who had a stroke had a mortality risk that was 2.01 times that of patients without stroke (HR=2.01; p=0.004). 30-day and 1 year mortality after stroke was 20.5% and 30.8%.

Conclusions: Stroke while on LVAD support is associated with significant mortality and occurs with increasing incidence over time. Identification of risk factors and a better understanding of the interaction between LVAD-related infections and stroke are essential to reduce the risk of stroke.

Table 1 – Patient Demographics by Stroke

N(%)	Total (N=230)	Stroke (n=39)	No Stroke (n=191)	P-value
Age (mean ± SD)	57±14	57±16	57±14	0.98
Male	185 (80.4)	29 (74.4)	156 (82.1)	0.26
Enrollment Type				0.29
DT	45 (19.6)	10 (25.6)	35 (18.3)	
BTT	185 (80.4)	29 (74.4)	156 (81.7)	
Diabetes	78 (34.2)	16 (41.0)	62 (32.8)	0.32
Hypertension	96 (42.1)	17 (43.6)	79 (41.8)	0.84
CKD	78 (34.2)	14 (35.9)	64 (33.9)	0.81
CAD	145 (63.6)	17 (43.6)	128 (67.7)	0.004
History of MI	95 (41.9)	11 (28.2)	84 (44.7)	0.058
Other CT Surgery	93 (40.8)	7 (18.0)	86 (45.5)	0.001
Tobacco Use	76 (34.4)	15 (39.5)	61 (33.3)	0.47
Infection	60 (26.1)	15 (38.5)	45 (23.6)	0.053



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60. Is There an Age Limit to Lung Transplantation?

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Authors: Sreeja Biswas Roy[1], Diana Alarcon[2], Rajat Walia[2], Kristina M. Chapple[2], Ross Bremner[2], Michael A. Smith[2]

Author Institution(s): [1]Providence Hospital and Medical Center, Southfield, MI; [2]St. Joseph's Hospital and Medical Center, Phoenix, AZ

Objectives: Lung transplant in patients age 65+ has become increasingly common. However, questions remain regarding risk vs. benefit and procedure choice. We sought to identify short and long term outcomes in older single (SLT) and bilateral (BLT) lung transplant recipients.

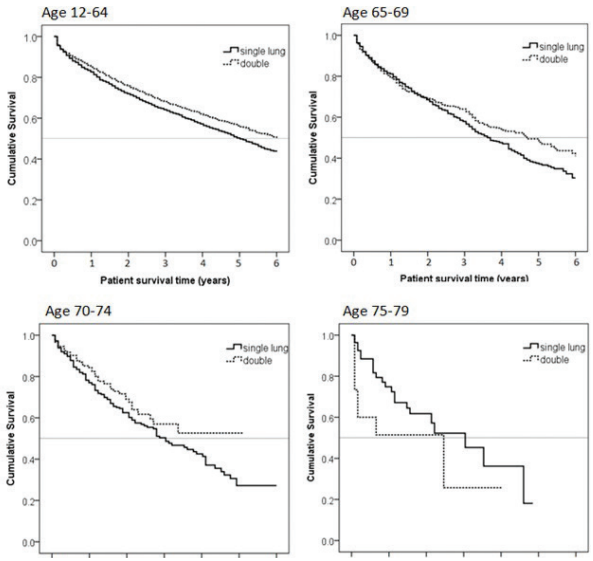
Methods: A retrospective review of UNOS data on patients who underwent lung transplant from May 2005 to December 2012 was done. Patients were allocated into age groups (12-64, 65-69, 70-74, and 75-79). Short term (30 day, 90 day, and 1-year) and long term (3 and 5-year) survival was calculated (Kaplan Meier approach) and survival distributions compared (log-rank tests).

Results: 11,776 patients (mean age=53.6 +/- 14.1 years) were transplanted: 9317(79%) 12-64, 1902(16%) 65-69, 486(4%) 70-74, and 71(1%) 75-79 years. While lung allocation scores increased, mean pulmonary artery pressures decreased with increasing age. The proportion of males increased from 56% (12-64), to 66% (64-69), 77% (70-74), and 94% (74-79). The proportion of SLTs increased from 27% (12-64), to 55% (64-69), 69% (70-74), and 79% (70-79). Short term survival was similar across all age groups and procedure types except the 75-79 group, which had lower short term survival for BLT. The 12-64 group had higher five-year survival for SLT and BLT ($p<0.001$) than all other groups. There was a long term survival advantage for BLT over SLT in this group ($p< 0.0001$). Older age groups trended to better long term survival for BLT over SLT in 65-69 ($p=0.059$) and 70-74 ($p=0.079$). While data was lacking for 5-year survival for age 75-79, their three-year survival for BLT was significantly worse.

Conclusions: Lung transplant can be offered to select older patients up to age 74 with acceptable outcomes. SLT may be preferred in this group of patients, but BLT offers acceptable long term outcomes without significant short term risk. While patients age 75+ have acceptable short term outcomes for SLT, long term outcomes for SLT and BLT are poor.

Demographics of subjects receiving lung transplantation between May 2005 to December 2012

Age Group		12-64	65-69	70-74	75-79	P value
Sample Size		9317 (79%)	1902 (16%)	486 (4%)	71 (1%)	
Male		5188 (56%)	1248 (66%)	375 (77%)	67 (94%)	<.001
Procedure						
	SLT	2549 (27%)	1051 (55%)	336 (69%)	56 (79%)	<.001
	BLT	6768 (73%)	851 (45%)	150 (31%)	15 (21%)	
Diagnostic Group						
	Restrictive	4449 (48%)	1161 (61%)	367 (76%)	61 (86%)	<.001
	Obstructive	2987 (32%)	703 (37%)	117 (24%)	10 (14%)	
	Other	1881 (20%)	38 (2.2%)	2 (0.4%)	0 (0%)	
LAS (mean±SD)		41.0±13.0	41.6±13.0	44.2±14.3	46.3±13.7	<.001
mPAP (mean±SD)		27.5±10.9	25.4±8.5	24.0±7.9	22.6±7.4	<.001



Cumulative survival rates by age and transplant type.

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61. Left Ventricular Re-training and Late Arterial Switch for D-transposition of the Great Arteries

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Authors: Naruhito Watanabe, *Richard D. Mainwaring, Sergio Carrillo, V. Mohan Reddy, Frank Hanley

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

Discussant: Jennifer Hirsch-Romano, University of Michigan, Ann Arbor, MI

Objectives: For several decades, patients with D-transposition of the great arteries underwent an atrial switch procedure. While many of these patients have continued to do well, a subset will develop profound right ventricular (RV) failure. Some patients may be candidates for left ventricular (LV) re-training and late arterial switch. The purpose of this study was to review our experience with LV re-training and late arterial switch in D-transposition.

Methods: This was a retrospective review of 32 patients with D-transposition. Thirty patients underwent a previous atrial switch and subsequently developed RV failure, while two presented late (8 months and 6 years) without prior intervention. The median age at the time of enrollment in this program was 15 years. Seven patients proceeded directly to late arterial switch due to systemic LV pressures. The remaining 25 underwent a pulmonary artery band (PAB) for LV re-training.

Results: Twenty of the 32 (63%) patients enrolled in this program were able to undergo a late arterial switch. There were four operative mortalities (20%), including one of seven who proceeded directly to late arterial switch and three of 13 who underwent LV re-training. There has been no late mortality s/p arterial switch with a median follow-up of five years. During this interval, three patients have required aortic valve replacement.

Twelve patients underwent one or more PABs without evidence of effective LV re-training. There have been two early and three late (42%) deaths in this sub-group.

Conclusions: The data demonstrate that nearly two-thirds of patients who develop RV failure s/p atrial switch may be candidates for late arterial switch. However, one-third do not show evidence of adequate re-training and remain at risk for both early and late mortality. The outcomes following arterial switch are encouraging and suggest that LV re-training and late arterial switch provides a viable option for this complex group of patients.

NOTES:

62. Equivalent Outcomes for Early and Late Complete Atrioventricular Canal Repair in the Modern Era

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Authors: Elizabeth H. Stephens, Ali N. Ibrahimiye, Halit Yerebakan, Tuba Gencol, Matthew Lippel, Betul Yilmaz, Wyman Lai, Anjali Chelliah, Amee Shah, Stephanie Levasseur, *Paul Chai, Jan Quaegebeur, Emile Bacha

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

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

Objectives: Repair of complete atrioventricular canal (CAVC) early in infancy has traditionally carried greater morbidity and mortality than repair performed later. However, an individualized anatomy-based repair may give young infants outcomes that are equivalent to older infants. The objective was to test this hypothesis by comparing outcomes between CAVC patients repaired at <3 months and those >3 months.

Methods: We retrospectively reviewed 140 patients who underwent CAVC repair at our institution 1/2005-12/2012. Repair was performed with an individualized approach: two-patch repair (n=101) for large ventricular septal defects (VSD) and modified single patch ("Australian technique," n=39) for "shallow" VSDs. The left atrioventricular (AV) valve cleft was at least partially closed with interrupted sutures. Statistics were performed using Student's t-test, Pearson chi-square test, and univariate and multivariate analysis.

Results: The average age was 25.5±3.9 weeks and 78% had Trisomy 21. Mean follow-up was 5.0±0.2 years with 100% completeness of data. There was 1 (0.7%) in-Hospital and 1 (0.7%) late mortality. The rate for left AV valve reoperation was 9%. Compared to patients >3 months, patients <3 months (n=39, 28%) had similar peri-operative courses and rate of reoperation (Table). Compared to Australian repair patients, 2-patch repair patients (n=102, 73%) were more likely to have Trisomy 21 and had longer bypass and cross-clamp times, but similar outcomes. On univariate analysis, risk factors for left AV valve reoperation included ICU stay, reintubation, preoperative kidney disease, degree of pre- and postoperative left AV valve regurgitation, and pre- and postoperative right AV regurgitation (all $p<0.05$); however none of these factors were significant on multivariate analysis.

Conclusions: Utilizing an individualized surgical approach, repair of CAVC yields reoperation and early mortality rates similar for younger infants compared to older infants.

		Repair <3mo (n=39, 28%)	Repair >3mo (n=101, 72%)	p-value	2 patch repair (n=102, 75%)	Australian repair (n=38, 28%)	p-value
Preop demographics							
	Age at repair (weeks)	8.8±0.5	31.9±5.2	<0.01*	21.7±2.8	35.6±12.1	0.11
	BSA (m^2)	0.22±0.03	0.31±0.15	0.03*	0.27±0.01	0.33±0.05	0.12
	Weight (kg)	3.6±0.7	5.8±0.4	<0.01*	4.9±0.2	6.0±1.0	0.09
	Trisomy 21	31 (80%)	78 (77%)	0.83	90 (88%)	19 (50%)	<0.01*
Preop clinical status							
	Respiratory disease	5 (14%)	9 (9%)	0.53	6 (6%)	8 (22%)	0.02*
	Preop oral cardiac meds	22 (60%)	39 (39%)	0.05	43 (43%)	18 (49%)	0.70
	Previous PA banding	0 (0%)	5 (5%)	0.32	5 (5%)	0 (0%)	0.32
Preop Echo							
	MR > 2+	0 (0%)	0 (0%)	1.0	0 (0%)	0 (0%)	1.0
	TR > 2+	0 (0%)	0 (0%)	1.0	0 (0%)	0 (0%)	1.0
	LV or RV dysfunction	2 (5%)	3 (3%)	0.63	5 (5%)	0 (0%)	0.32
Operative course							
	CPB	95.5±6.2	101.8±2.8	0.30	104.4±2.8	90.7±5.3	0.02*
	XC	59.6±3.3	65.8±1.8	0.09	67.5±1.8	57.0±2.9	<0.01*
	2-patch technique	29 (74%)	73 (72%)	1.0	NA	NA	NA
Periop course							
	Intubation time (days)	2.4±0.4	2.7±0.6	0.78	2.7±0.6	2.2±0.6	0.59
	LOS ICU (days)	6.7±1.3	8.0±2.1	0.72	7.1±1.0	9.0±4.9	0.05
	LOS Hospital (days)	21.7±3.6	20.0±5.3	0.84	18.8±4.1	24.7±9.7	0.06
Periop complications							
	Reintubation	1 (3%)	7 (7%)	0.45	6 (6%)	2 (5%)	1.0
Post op Echo							
	MR > 2+	0 (0%)	1 (1%)	1.0	0 (0%)	1 (3%)	0.28
	TR > 2+	0 (0%)	1 (1%)	1.0	1 (1%)	0 (0%)	1.0
	LV or RV dysfunction	8 (21%)	23 (23%)	1.0	25 (25%)	6 (16%)	0.36
Outcomes							
	In-hospital mortality	1 (3%)	0 (0%)	0.28	1 (1%)	0 (0%)	1.0
	Mortality	2 (5%)	0 (0%)	0.08	2 (2%)	0 (0%)	1.0
	PPM	1 (3%)	3 (3%)	1.0	4 (4%)	0 (0%)	0.58
	Any Reop	7 (18%)	16 (16%)	0.80	19 (19%)	4 (11%)	0.32
	Reop L AV valve	4 (10%)	9 (9%)	0.76	10 (10%)	3 (8%)	1.0
	Length of f/u (years)	5.3±0.4	5.0±0.2	0.48	5.3±0.2	4.4±0.4	0.04*

**indicates statistically significant differences. Data is presented as mean ± standard error. When appropriate the number of patients is listed for each parameter followed by % of cohort in parentheses. Preop=preoperative, BSA=body surface area, mo=months, PDA=patent ductus arteriosus, mech=mechanical, PA=pulmonary artery, MR=mitral regurgitation, TR=tricuspid regurgitation, PR=pulmonic regurgitation, AR=aortic regurgitation, RV=right ventricle, LV=left ventricle, CPB=cardiopulmonary bypass, XC=cross clamp, LOS=length of stay, ICU=intensive care unit, periop=perioperative, trach=tracheostomy, Afib=atrial fibrillation, post op=post-operative, PPM=permanent pacemaker, reop=reoperation, L AV=left atrioventricular, f/u=follow-up.*

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63. Aortic Valve Leaflet Morphology Is Associated With the Patterns of Aortic Dilation and Valve Dysfunction in Young Patients With Bicuspid Aortic Valves

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Authors: Mark Ruzmetov, Jitendra J. Shah, *Randall S. Fortuna, *Karl F. Welke

Author Institution(s): Children's Hospital of Illinois, Peoria, IL

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

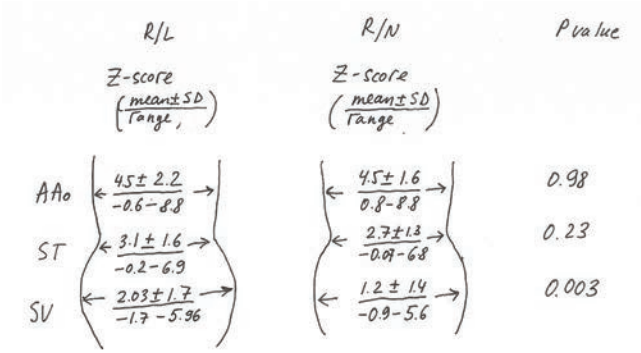
Objectives: Dilation of the aorta is a frequent complication in patients with bicuspid aortic valve (BAV). The aim of this study was to determine the relationship between the sub-type of leaflet fusion, right and non-coronary leaflets (R/N) versus right and left leaflets (R/L) and the patterns of aortic dilation and valve dysfunction in young patients with BAV.

Methods: We performed a retrospective review of 511patients who presented with BAV between 1994 and 2014. Of these patients, 124 (24%) had aortic dilation (Z score >2) by echocardiogram. For each patient, the most recent study or the last study before intervention was reviewed.

Results: Median patient age was 15 years (range 0-40) with patients with R/N being younger (Table). R/N was the most prevalent subtype (R/N,n=74,60% vs. R/L,n=50,40%). Dilation of the ascending aorta (AA) was seen more often in patients with R/N (R/N,88% vs. R/L,68%;p=0.004) whereas the prevalence of dilation of the sinuses of Valsalva(SV) was significantly higher in patients with R/L (R/L,46% vs. R/N,20%;p=0.01). The magnitude of dilation differed as well. The Z value of the SV was significantly higher in patients with R/L (R/L,2.03 vs. R/N,1.2;p=0.003) while the z values of the AA and sinotubular junction were similar between the groups (Figure). Patients with R/N were more likely to have AI and within the R/N group, patients with AI had a greater degree of AA dilation (p=0.003).

Conclusions: Our study suggests that in young patients with BAV and aortic dilation, aortic valve morphology may be associated with the patterns of aortic dilation and valve dysfunction. Patients with R/N fusion were more likely to have AA dilation, while patients with R/L fusion were more likely to have dilation of the aortic root. In addition, patients with R/N fusion presented at a younger age and were more likely to have AI. Recognition of these differences may eventually be helpful for patient counseling and the planning of follow-up.

	R/L(n=50)	R/N(n=74)	PValue
age(yrs)	17.8+10	14.4+8.2	0.04
z value of dilated aorta	5.2+1.5	4.7+1.4	0.08
AS>moderate	20(40%)	38(51%)	0.18
Peak gradient on aortic valve	64+27	54+25	0.15
AI>moderate	10(20%)	26(35%)	0.004
Grade of AI	0.93+1.4	1.6+1.4	0.01
CoA	21(42%)	13(18%)	0.004



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64. The Supported (Ross Ungerleider) Modified Ross Operation: Early Outcomes and Intermediate Follow Up

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Authors: Roni Jacobsen, Michael Earing, Garrick Hill, Michael Barnes, *James Tweddell

Author Institution(s): Medical College of Wisconsin/Children's Hospital of Wisconsin, Milwaukee, WI

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

Objectives: Since 2006 the Supported "Ross Modified" Ross (RMR) has been the preferred surgical approach for adolescent and adult patients at our center. A Sinus of Valsalva graft is used to support the neoaortic root. We compared outcomes following the RMR technique to the Ross procedure using the aortic root replacement technique (ARR).

Methods: From 1992-2013, 89 patients underwent a Ross procedure. Of these, based on age and size, 40 patients were considered candidates for the RMR procedure.

Results: For the 40 patients (75% male), median age at surgery was 15.4 years (range 11-32 years). There were 29 patients (72%) who underwent the RMR and the remaining 11 patients (28%) underwent the ARR. At time of Ross, indication for surgery was regurgitation (47.5%), stenosis (10%), and mixed (42.5%). There was one early death. The mean follow up was two years (range 1-12 years). At last follow up, patients in the RMR cohort had a smaller neoaortic root index ($p<0.0004$), smaller neoaortic root z-score ($p<0.0012$), and were less likely to have neoaortic valve regurgitation (3% vs 30%, $p<0.01$). Overall, four patients (40%) in the ARR cohort had required reintervention, including three directed at the neoaortic root. One patient in the RMR cohort has required reintervention for revision of the right coronary artery.

Conclusions: At intermediate follow up, patients who underwent the RMR technique were less likely to have neoaortic root dilation, neoaortic valve regurgitation, or reintervention compared to patients who underwent the Ross procedure using the ARR technique.

NOTES:

65. Osler Almon Abbott: The Man, The Award and His Legacy

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Authors: ***D****Daniel L. Miller, *Joseph I. Miller, Jr., *Kamal A. Mansour

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

COMMERICAL RELATIONSHIPS: Daniel Miller: Thoracic Surgery Advisory Board: Ethicon Endo-Surgery, Inc., Davol, A Bard Company

Osler Almon Abbott was born in Hamilton, Ontario on June 6, 1912. He graduated from Princeton University in 1933 and John Hopkins School of Medicine in 1937. His internship was at McGill University in Montreal, Canada in the Department of Medicine. He spent six years in general surgery residency at Cincinnati General Hospital in Cincinnati, Ohio and one year in Thoracic Surgery at Washington University in St. Louis under Dr. Evarts Graham. He served as Captain in the Army and was Chief of the Orthopedic Surgery at Fort Knox, Kentucky. Dr. Abbott was recruited to Emory University in Atlanta, Georgia in 1945 to start the Thoracic and Cardiovascular Surgical Service. Dr. Abbott was one of the founding members of the Emory Clinic in 1953 and initiated the Thoracic Surgery residency program at Emory in 1963. Dr. Abbott published 52 papers and wrote three book chapters over his career and retired in 1971. He passed away on November 2, 1976 and is buried in Lexington, Kentucky. Dr. Abbott was the nephew of Sir William Osler, who was one of the founders of John Hopkins School of Medicine and Regis professor of Medicine at Oxford.

The Osler Abbott Award (OAA) was established in 1960 and has been awarded annually to that member of the STSA who excels in the art of discussionship. It was named for Dr. Abbott, who in 1960, discussed 26 consecutive papers of 42 that were presented at the 1960 AATS meeting in Miami Beach, Florida. Because of this incredible academic accomplishment and showmanship, a Secret committee at the 1960 STSA meeting in Nassau, Bahamas developed the OAA. The first recipient of the OAA was Dr. Joseph Peabody in 1960. 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 OAA of the STSA are: 1) to focus on the importance of open, frank, and candid discussion in the spirit and substance of the STSA and, in this way, to encourage more objective and active participation by all members attending the annual meeting and 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 STSA. Dr. Abbott, himself, was awarded the OAA in 1967.

Building on Dr. Abbott's foundation for Thoracic Surgery excellence at Emory, Dr. Charles R. Hatcher Jr., former STSA President, hired Dr. Kamal A. Mansour in 1968, who trained under Dr. Abbott. Dr. Mansour was the backbone of the General Thoracic Surgery (GTS) at Emory for over 45 years. Dr. Mansour won the OAA in 1991. Dr. Joseph I. Miller, Jr. joined Emory in 1974 and became the chief of GTS in 1984. Dr Miller was STSA President in 2003. In 2002, Dr. Daniel L. Miller joined Emory and became Chief of GTS in 2006 and was named the first Kamal A. Mansour Professor of Thoracic Surgery in 2007. Dr. Vinod H. Thourani, current attending and prior CT Surgery resident at Emory won the OAA in 2010. Dr. Miller won the OAA in 2013. Dr. Abbott's legacy is robust at Emory and in the STSA today.

NOTES:

66. One Hundred Safe Transports on Extracorporeal Life Support to a Regional Extracorporeal Membrane Oxygenation Center

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Authors: Mauer Biscotti[1], Darryl Abrams[1], Cara Agerstrand[1], *Joshua Sonett[1], Linda Mongero[2], *Hiroo Takayama[1], ***D***Daniel Brodie[1], *Matthew Bacchetta[1]

Author Institution(s): [1]Columbia University Medical Center, New York, NY; [2]New York Presbyterian Hospital, New York, NY

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

COMMERICAL RELATIONSHIPS: Daniel Brodie: Research Support: Maquet Cardiovascular; Consultant/Advisory Board: ALung Technologies

DISCUSSANT: Joseph B. Zwischenberger: Ownership Interest: Avalon, Maquett

Objectives: This report characterizes the first 100 consecutive adult extracorporeal membrane oxygenation (ECMO) transports at our institution. Extracorporeal life support technology has gained acceptance as a salvage mode for patients in respiratory or cardiac failure. Patients who are sick enough to require ECMO support are often too unstable for transfer to a Hospital with ECMO capabilities. We highlight the progressive development of an ECMO transport team and the manner in which it provides reliable transport with excellent outcomes.

Methods: All data was collected retrospectively from our Hospital's electronic medical record. Patient outcomes are reported through April 2, 2014.

Results: Our institution began an ECMO transport program in 2008 with the initial phase involving transport of highly selected patients over short distances. With experience we refined our intake and evaluation process. We also consolidated care for ECMO patients into two intensive care units and developed a dedicated ECMO intensivist position. As the program has matured patient selection has become more inclusive and we have extended our capabilities to include interstate and international transport. All 100 patients were successfully placed on ECMO and transported to our center. Seventy-nine patients were placed on venovenous ECMO, 19 on venoarterial ECMO, and 2 on venovenous arterial ECMO. There was one complication with no adverse effect to the patient, and there were no intra-transport power failures or equipment malfunctions. The median transport distance was 16 miles and ranged from 2.5 to 7084 miles. Three transports were via fixed wing aircraft with the remainder via ambulance.

Conclusions: ECMO transport can be performed safely and reliably with excellent outcomes with a dedicated team that maintains stringent adherence to well-designed management protocols.

ECMO Patient Outcomes

	No. (%) or Mean (±SD)	Range
Transportation on ECMO	n=100	
Successful Cannulation at OSH	83	
Safe Transport	100	
Device or Mechanical Failure during transport	1*	
Median Distance traveled (miles)	16	2.5-7084
Mode of Transportation		
Ambulance	97	
FIxed wing aircraft	3	
ECMO Data		
Pre-ECMO PaO2: FiO2 ratio	55.4 ± 14.3	
APACHE II Score	29.2 ± 6.0	
Intubation to ECMO (days)	3.0 ± 4.1	
ECMO Run (days)	7	1-64
Initial Blood Flow	4.23	1.5-6.5
Survival Figures (all patients)	n=100	
To decannulation	81	
30 day	71	

**Decannulation prior to leaving OSH with successful recannulation*

APACHE, Acute Physiology and Chronic Health Evaluation; ECMO, Extracorporeal Membrane Oxgenation; OSH, Outside Hospital

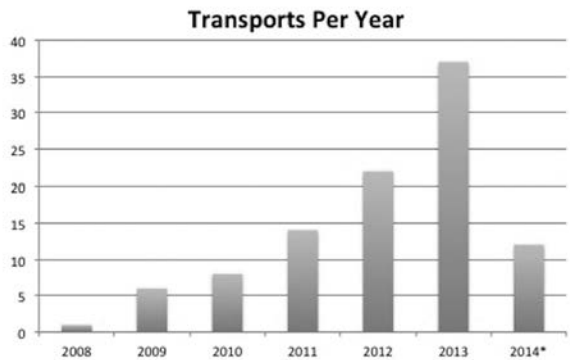

*Figure 1. Transports per year *Through April 2, 2014*

NOTES:

67. Survival in Patients With Continuous-flow Left Ventricular Assist Devices on the Waiting List and Marginal Donor Heart Transplantation Recipients: A UNOS Database Analysis

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Authors: Erin Schumer, Mickey Ising, Jaimin Trivedi, *Mark Slaughter, Allen Cheng

Author Institution(s): University of Louisville, Louisville, KY

Discussant: *James K. Kirklin, University of Alabama, Birmingham, AL

Objectives: The shortage of donor hearts has limited cardiac transplantation as a treatment for end-stage heart failure (HF), leading to the increased use of left ventricular assist devices (LVADs) as bridge-to-transplant (BTT) and marginal donor hearts. While the use of LVADs and marginal donor hearts has expanded treatment options, outcomes have been mixed. This study examines differences in wait list survival of patients with continuous flow LVADs and post-transplantation survival of marginal donor heart recipients.

Methods: The United Network of Organ Sharing database was retrospectively queried from January 2005 to June 2013 to identify adult patients listed for heart transplant. Marginal donor criteria included age >55 years old, hepatitis C positive, cocaine use, ejection fraction <45%, and donor:recipient body mass index greater (BMI) mismatch of 20%. Wait list survival of patients with continuous flow LVADs and post-transplant survival of marginal donor heart recipients were compared using Kaplan-Meier analysis, and was the primary endpoint.

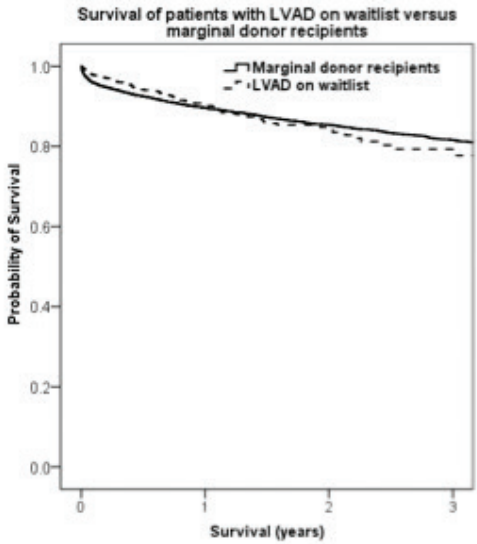
Results: A total of 20,195 patients were listed for heart transplant during this time period of which 2561 patients received LVAD support and 4737 patients received a marginal donor heart. At time of LVAD implantation or marginal donor transplant, groups differed significantly for gender, BMI, diabetes, and creatinine (Table 1). The 30-day, 1-year, and 2-year post-transplant survival was 97%, 89%, and 85%, respectively, for recipients with marginal donor hearts and 96% , 89% and 85%, respectively, for patients with LVAD support on the waiting list (p=0.2) (Figure 1).

Conclusions: There was no significant difference in survival between patients with LVAD support as BTT and recipients with marginal donor hearts. These results may suggest clinical benefits to using LVAD support as a bridge to an optimal donor heart as opposed to transplantation with a marginal heart.

Characteristics of LVAD and marginal donor group

	LVAD Group (n=2561)	Marginal Donor Group (n=4737)	P Value
Age (years)	52.7±12.1	52.5±12.9	0.560
Gender (male)	2046 (79.9)	3348 (70.7)	<0.001
BMI	27.8±5.0	26.5±5.3	<0.001
Diabetes	802 (31.3)	1250 (26.4)	<0.001
UNOS Status IA	848 (33.1)	1878 (39.6)	<0.001
PAP (mmHg)	28.9±11.1	28.9±9.9	0.987
Creatinine	1.3±0.9	1.4±0.8	0.002

Mean ± standard deviation or N (%). BMI = body mass index, UNOS = United Network of Organ Sharing, PAP = mean pulmonary arterial pressure



NOTES:

68. Modified Single Patch: Are We Still Worried About Subaortic Stenosis?

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Authors: *Carl L. Backer, Osama Eltayeb, Michael C. Monge, Katherine Wurlitzer, Lindsay H. Boles, Anne E. Sarwark, Joshua D. Robinson

Author Institution(s): Ann & Robert H. Lurie Children's Hospital of Chicago, Chicago, IL

Discussant: *Jorge D. Salazar, University of Mississippi School of Medicine, Jackson, MS

Objectives: When the modified single patch technique for atrioventricular septal defect (AVSD) repair was introduced by Dr. Benson Wilcox, there was concern that these patients might be at risk for late subaortic stenosis and left ventricular outflow tract obstruction (LVOTO). The purpose of this review was to evaluate our modified single patch population for LVOTO in the postoperative period.

Methods: Between January 2000 and 2013, 77 infants underwent AVSD repair with a modified single patch technique. Trisomy 21 was present in 57 of the 77 patients (74%). Mean age at surgery was 0.4±0.2 years, median age was 0.37 years, and median weight was 5 kg. Eight patients had a prior coarctation of the aorta repair via left thoracotomy.

Results: There was one early death at four months post-op (liver failure). The median Hospital stay was ten days. No patient required a pacemaker. The mean and median follow-up time is 4.6 and 3.7 years. Only two patients (2.5%) required reoperation for LVOTO; both had repair of coarctation of the aorta as newborns. The first patient developed a discrete fibrous subaortic membrane and required resection at three and seven years post-repair. The other patient had LVOTO from accessory chordae of the left atrioventricular valve and required mitral valve replacement 5 months post-repair. Three other patients (all with prior coarctation repair) have an unchanged LVOTO gradient of 10-15 mmHg, maximum follow-up is ten years.

Conclusions: At intermediate term follow-up, LVOTO does not appear to be a significant postoperative issue after modified single patch repair of AVSD. Coarctation of the aorta was the most significant predictor of late LVOTO post-repair of atrioventricular septal defect.

NOTES:

69. Outcomes of Heart Transplantation in Children With Congenital Heart Disease

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Authors: Bahaaldin Alsoufi, Shriprasad Deshpande, *Brian Kogon, William Mahle, Robert Vincent, *Kirk Kanter

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

Discussant: *Kristine J. Guleserian, Children's Medical Center/UT Southwestern Medical Center, Dallas, TX

Objectives: Heart transplantation (HT) in children with congenital heart disease (CHD) has been associated with inferior outcomes owing to several anatomic and physiologic challenges. We report our experience with pediatric HT for CHD.

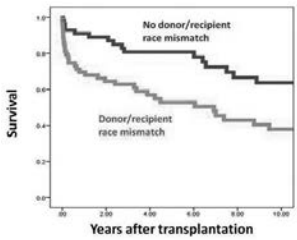
Methods: 120 CHD patients underwent HT (1988-2013). Effects of multiple demographic, clinical, anatomic, operative and donor variables on outcomes were examined.

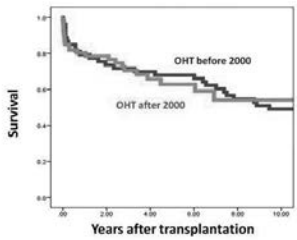
Results: There were 74 males (62%). Median age was 3.6years (6days-18.7years). 82(68%) had single ventricle and 38(32%) had two ventricle anomalies. 16(13%) had primary HT while 104(87%) had prior surgical repair or palliation including Fontan in 30(25%).

On competing risks analysis: 10 years following HT, 42% have died, 17% have undergone retransplantation and 41% were alive free from retransplantation. There was no survival improvement between earlier (<2000) and later (>2000) era in CHD patients: 1 year 79% vs. 80% (p=0.98) and 10 year 49% vs. 54% (p=0.95), unlike contemporaneous non-CHD patients who had improved outcomes in recent era: 1 year 82% vs. 95% (p=0.02) and 10 year 56% vs. 67% (p=0.12).

Survival was not affected by age groups (p=1.00), gender (p=0.50), presence of high panel reactive antibody (p=0.40), prior cardiac surgery (p=0.76), anatomy (p=0.49), Fontan (p=0.90), pulmonary augmentation (p=0.94). On multi-variable analysis, the only factor affecting survival was donor/recipient race mismatch (HR 5.8, p=0.016).

Conclusions: Disappointingly, HT outcomes in CHD children have not improved and survival gap between CHD and non-CHD patients have increased. Interestingly, survival was not affected by single ventricle, Fontan, or high PRA. Strategies to improve outcomes in CHD patients might need to address patient selection criteria, transplantation timing, pre-transplant and post-transplant care. The effect of donor/recipient race mismatch on survival warrants further investigation and might impact organ allocation algorithms or immune-suppression management.





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

NOTES:

70. Is Interest in a Cardiothoracic Surgical Career Maintained After Scholarship Awards to Medical Students? Long-Term Results From a Single Institution

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Authors: Kanika Trehan, Xun Zhou, *Stephen C. Yang

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

Discussant: *Curtis G. Tribble, University of Virginia, Charlottesville, VA

Objectives: Several award opportunities currently exist for medical students to facilitate early experience and exposure to cardiothoracic surgery (CTS). Our current study reviews long-term interest outcomes of these students who were given both institutional and national support to formally participate in CTS clinical and research activities.

Methods: Students who were selected following their first or second year of medical school for clinical and research support formed the study cohort. Outcomes are kept in a prospective database from the Division of Thoracic Surgery. Sources of support came from the American Association for Thoracic Surgery (AATS), Society of Thoracic Surgeons (STS), Southern Thoracic Surgical Association (STSA), and a private family donor. An update on their current status and CTS interest is performed annually. The clinical and research experience varied from 4-8 weeks, while the national society exposure occurred during the annual meeting.

Results: Since 1999, 45 students received formal support. Sources included the AATS (8, 18%), STS (2, 4%), STSA (1, 2%), and private donation (34, 76%). The median follow-up of graduated students is seven years. Of the 14 (31%) with current CTS interest, two are faculty, seven are planning to apply to traditional CTS training, one is in an integrated six-year program, and the remaining four are still in medical school but planning a CTS career still. Twelve (27%) have entered another surgical specialty. Academic productivity included 12 national presentations, 11 manuscripts, and 2 national awards.

Conclusions: Approximately 1/3 of students who received institutional or national awards for CTS experience during medical school have maintained their interest over time. Although long-term data following these relatively brief CTS experience programs is scarce, it remains critical to continue these mentoring relationships over time with these students in guiding their career choices.

NOTES:

71. Functional Tricuspid Regurgitation Repair Solved: Undersized Rigid Annuloplasty Insertion Assures Effective and Durable Repair

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Authors: Mehrdad Ghoreishi, Faisal H. Cheema, Mary Laschinger, Murtaza Y. Dawood, Charlie Evans, Nathaniel Foster, Xiayang Diao, Bradley S. Taylor, *Bartley P. Griffith, *James S. Gammie

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

Discussant: *John M. Stulak, Mayo Clinic, Rochester, MN

Objectives: Previous clinical experiences have demonstrated high early and late recurrence rates after repair of functional tricuspid regurgitation (TR). We investigated the results of functional TR repair using a systematic approach that emphasized the implantation of aggressively undersized rigid annuloplasty rings.

Methods: From January 2007 to December 2013, 255 consecutive patients with functional tricuspid regurgitation underwent undersized rigid three-dimensional annuloplasty ring (Size 26 or 28 mm) implantation at our institution. All patients had pre-discharge echocardiography in a core echocardiography laboratory. Follow-up echocardiography was available for 82% (175/214) of surviving patients. The mean time to echocardiographic follow-up was 22 months.

Results: Mean age was 65 ± 14 years and 67% were female. 51% (129/255) had atrial fibrillation and 44% (113/255) were in New York Heart Association (NYHA) functional class III or IV. Mean left ventricular ejection fraction was 50±14% and the mean systolic pulmonary artery pressure (sPAP) was 42±16 mm Hg. There was a history of cardiac operation in 19.6% (50/255) of patients. Concomitant operations included coronary artery bypass grafting in 22% (56/255), mitral valve procedure in 88% (224/255), aortic valve procedure in 11% (29/255), and CryoMaze procedure in 25% (64/255). Highest grade of preoperative TR was moderate in 33% (85/255) and > moderate in 67% (170/255). Perioperative mortality rate was 7.5 % (19/255). On predischarge echocardiography, TR grade was none or mild in 96% (245/255), moderate in 2% (6/255), and > moderate in 2% (4/255). The mean TV gradient at discharge was 3.7 ± 2.1. During follow-up, TR grade was none or mild in 85.1% (149/175), moderate in 9.7% (17/175), and > moderate in 5.1 % (9/175).

No patient required TV reoperation.

Conclusions: Undersized rigid annuloplasty rings assure effective and durable treatment of functional tricuspid regurgitation.

NOTES:

72. Super-charged Pedicled Jejunal Interposition Performance Compares Favorably to a Gastric Conduit After Esophagectomy

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Authors: Elizabeth Stephens[1], Puja Gaur[3], Kathleen Hotze[3], Arlene Correa[4], *Min Kim[3], *Shanda Blackmon[2]

Author Institution(s): [1]Columbia University, New York, NY; [2]Mayo Clinic, Rochester, MN; [3]The Methodist Hospital, Houston, TX; [4]MD Anderson Cancer Center, Houston, TX

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

Objectives: A variety of conduits can be used for esophageal reconstruction. The objective of this study was to determine the performance of a super-charged pedicled jejunal (SPJ) interposition conduit compared to a gastric conduit in terms of postoperative functional outcome.

Methods: We prospectively evaluated patients who underwent esophageal reconstruction between 1/1/2009 to 12/31/2013, collecting demographics, operation, and clinical outcomes. Patients were asked to rate their outcomes at multiple intervals beginning at least one month after reconstruction using a 5-point Likert scale for the following variables: reflux, dumping, dysphagia, stricture, and Zubrod score. A 10-point scale was used to grade postoperative pain. Esophagrams determined a conduit emptying score. Statistical analysis was performed using Mann-Whitney utest and Fisher's Exact Test for crosstabs.

Results: 45 of the 94 esophageal reconstruction patients (48%) were alive, had either a gastric conduit or SPJ reconstruction, and consented to perform the questionnaire. The mean age was 60.6±12.5 years and 69% were male. The majority of patients had cancer (87%). Details regarding surgical technique and peri-operative complications for the two groups are shown in the Table. Average time after surgery for conduit assessment was 15±13 months for the gastric conduit group and 17±12 months for the SPJ group. There were no significant differences in terms of reflux, dumping, dysphagia, stricture, or Zubrod score, between the two groups, however SPJ patients had a longer length of stay and higher pain score. Three patients (10%) in the gastric conduit group and one patient (7%) in the SPJ group required reoperation.

Conclusions: Super-charged pedicled jejunal (SPJ) interposition performance compares favorably to a gastric conduit after esophagectomy. The utility of a standardized conduit assessment to guide postoperative evaluation and intervention is established.

		Gastric Conduit (n=31, 69%)	SPJ (n=14, 31%)	p value
Male		23 (74%)	8 (57%)	NS
Age (years)		63±10	55±15	0.037
Underlying Etiology:				NS
	Cancer	26 (84%)	13 (93%)	
	Benign Disease	5 (16%)	1 (7%)	
Type of Resection:				0.008
	Oncologic Resection for Adenocarcinoma	20 (65%)	6 (43%)	
	Resection for Benign Disease	2 (7%)	0 (0%)	
	Previous resection	1 (3%)	7 (50%)	
Location of Anastomosis:				<0.001
	Neck	7 (23%)	14 (100%)	
	Intrathoracic	24 (77%)	0 (0%)	
Anastomosis technique:				0.02
	Hand sewn anastomosis	1 (3%)	2 (14%)	
	Stapled side-to-side anastomosis	13 (42%)	12 (86%)	
	Circular stapled anastomosis	17 (55%)	0 (0%)	
Surgical Complications:		15 (48%)	7 (50%)	NS
	Pneumonia	7 (23%)	3 (21%)	
	Afib	4 (13%)	1 (7%)	
	Renal failure	1 (3%)	1 (7%)	
	Respiratory failure	3 (10%)	1 (7%)	
	UTI	1 (3%)	0 (0%)	
	DVT	1 (3%)	1 (7%)	
Length of stay (days)		10±4	17±15	0.04
30 day mortality		0 (0%)	0 (0%)	NS
Leak within 60 days		7 (23%)	4 (29%)	NS
Reoperation		3 (10%)	1 (7%)	NS
Death at last follow-up		2 (7%)	2 (14%)	NS
Length of follow-up (months)		14±11	22±14	NS
Conduit Functional Assessment:				
	Months after surgery assessed	15±13	17±12	NS
	Reflux (yes or no)	18 (58%)	5 (36%)	NS
	Average Reflux Score (0-5)	1.7±1.9	0.71±1.3	NS
	Dumping (yes or no)	15 (50%)	8 (57%)	NS
	Average Dumping Score (0-5)	0.97±1.2	0.93±1.1	NS
	Dysphagia (yes or no)	15 (50%)	8 (57%)	NS
	Average Dysphagia Score (0-5)	0.60±0.72	0.79±0.89	NS
	Stricture (yes or no)	7 (26%)	2 (15%)	NS
	Average Stricture Score (0-5)	0.70±1.4	0.38±0.96	NS
	Average Conduit Emptying Score (0-5)	0.46±0.93	0.38±0.96	NS
	Average Zubrod Score (0-5)	0.84±0.64	1.2±0.8	NS
	Average Pain score (0-10)	2.4±2.4	7.0±3.2	NS

The number of patients is listed for each parameter followed by % of patients who answered that particular question is given in parentheses. Mean ± standard deviation listed where appropriate. For conduit functional status parameters, the scale is listed in parentheses. Afib=atrial fibrillation, NS=not statistically significant, UTI=urinary tract infection, DVT=deep vein thrombosis. Average scores included the average of all patients in the conduit group using the worst score each patient reported during questionnaire period.

NOTES:

73. Age-related Outcomes of the Ross Procedure over Twenty Years

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Authors: Neeraj Bansal[1], S. Ram Kumar[1], Craig J. Baker[1], Ruth Lemus[2], *Winfield J. Wells[1], *Vaughn A. Starnes[1]

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

Discussant: *Edward L. Bove, University of Michigan, Ann Arbor, MI

Objectives: The Ross procedure is an alternative in patients with aortic valve disease not amenable to repair. Long-term follow-up after a Ross procedure has demonstrated the need for autograft (LVOT) and homograft (RVOT) re-intervention. We sought to assess the age-stratified outcomes of LVOT and RVOT following Ross procedure over a twenty-year time-period.

Methods: We performed a retrospective review of 304 consecutive patients operated on between 1992 and 2012, aged 4 days to 70 years, stratified by age - less than 1 (n=40), 1-10 (n=85), 10-20 (n=84), 20-40 (n=59), and over 40 yrs (n=36). Median follow-up was 8.2 years (3 mos - 19.2 yrs). Primary endpoints were survival, and freedom from re-intervention in LVOT and RVOT.

Results: 173 (57%) patients had prior intervention on their aortic valve. 94 (31%) had isolated regurgitation (AI), 90 (30%) stenosis and 120 (39%) mixed lesion. There were 103 concomitant procedures (58 on LVOT, 25 on aorta, 13 on mitral valve). Thirty-day morbidity was 15.5%, in-Hospital mortality varied with age (Table 1). Need for emergent surgery and concomitant mitral valve intervention ($p<0.05$) predicted mortality in infants. Age was inversely related to need for LVOT re-intervention ($p<0.05$), but directly related to RVOT re-intervention ($p < 0.01$, Table 1). Wrapping of autograft in a dacron tube in patients over ten years of age improved seven-year freedom from re-intervention on LVOT from 81% to 91% ($p<0.001$). At last follow-up, AI was mild or less in 272 (94%) patients, and heart function was normal in 280 (97%).

Conclusions: The Ross Procedure is a safe, effective and coumadin-free alternative for aortic valve replacement across all age groups. Long-term survival and preservation of heart function are more favorable compared to published outcomes for prosthetic valves. Autograft durability can be improved in patients over ten years of age by using a Dacron wrap.

In-Hospital mortality, survival and freedom from re-intervention at 10 years stratified by age

Age range	In-hospital mortality	Survival (%, mean ± 95% CI)	Freedom from LVOT re-intervention (%, mean ± 95% CI)	Freedom from RVOT re-intervention (%, mean ± 95% CI)
Total	12 (3.9%)	92 ± 2.8	78 ± 10.1	75 ± 9.2
0-1	10 (25%)	71 ±14.6	94 ±8	45 ±18
1-10	0	98 ±2.4	82 ± 6.2	72 ±8
10-20	1 (1.1%)	97 ± 1.8	76 ± 9.8	85 ± 7
20-40	0	100	77 ± 11.1	98 ± 7.4
>40	1 (2.8%)	90 ± 5.4	73 ±5.4	97 ± 6.8

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

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, BVI	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, PR	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, PR	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	John W. Hammon	Robert J. Cerfolio
2009—Marco Island, FL	Michael J. Mack	Robert J. Cerfolio
2010—Orlando, FL	Keith S. Naunheim	Robert J. Cerfolio
2011—San Antonio, TX	Joseph S. Coselli	David R. Jones
2012—Naples, FL	Walter H. Merrill	David R. Jones
2013—Scottsdale, AZ	Robert J. Cerfolio	David R. Jones
2014—Tucson, AZ	Richard L. Prager	David R. Jones

* Deceased

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 previous Annual Meeting of the Association. 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.

CLIFFORD VAN METER PRESIDENT'S AWARD RECIPIENTS

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, North 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

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.

CAROLYN REED PRESIDENT'S AWARD RECEIPIENTS

2013—R. Douglas Adams	Merrillville, Indiana

CONGENITAL HEART SURGERY PRESIDENT'S AWARD

The Congenital President's Award was established in 2013 to recognize the best congenital heart surgery scientific paper delivered at the STSA Annual Meeting. 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.

CONGENITAL HEART SURGERY PRESIDENT'S AWARD RECEIPIENTS

2013—Vincent K.H. Tam	Fort Worth, Texas

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 created the Tiki Award.

This award is given to the person who presents a slide at the annual meeting that 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.

TIKI AWARD RECIPIENTS

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

AWARDS

1987—Steven Gundry	Baltimore, Maryland
1988—Harvey I. Pass	Bethesda, Maryland
1989—Duke E. Cameron	Baltimore, Maryland
1990—Richard E. Clark	Pittsburgh, Pennsylvania
1991—William H. Coltharp	Nashville, Tennessee
1992—Joseph S. Coselli	Houston, Texas
1993—Benson R. Wilcox	Chapel Hill, North Carolina
1994—P. Michael McFadden	New Orleans, Louisiana
1995—Carolyn E. Reed	Charleston, South Carolina
1996—John L. Ochsner	New Orleans, Louisiana
1997—Clifford H. Van Meter, Jr.	New Orleans, Louisiana
1998—John D. Oswalt	Austin, Texas
1999—W. Randolph Chitwood	Greenville, North Carolina
2000—Ross M. Ungerleider	Portland, Oregon
2001—Neal D. Kon	Winston-Salem, North 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 Calhoon	Houston, Texas
2012—Vinay Badhwar	Pittsburgh, Pennsylvania
2013—Lorraine Cerfolio	Birmingham, Alabama

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.

OSLER ABBOTT AWARD RECIPIENTS

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	St. Petersburg, Florida
2012—Duke E. Cameron	Baltimore, Maryland
2013—Daniel L. Miller	Marietta, Georgia

KENT TRINKLE EDUCATION LECTURESHIP

The Kent Trinkle Educational Lectureship is dedicated to J. Kent Trinkle, (STSA President, 1981-82) for his contributions 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. Cooper	St. Louis, Missouri
2002—W. Steves Ring	Dallas, Texas
2003—Walter G. Wolfe	Durham, North Carolina
2004—Joseph Coselli	Houston, Texas
2005—Neal Kon	Winston-Salem, North Carolina
2006—Joe B. Putnam, Jr.	Nashville, Tennessee
2007—Walter H. Merrill	Cincinnati, Ohio
2008—Curt Tribble	Gainesville, Florida
2009—Irving L. Kron	Charlottesville, Virginia
2010—Michael R. Mill	Chapel Hill, North Carolina
2011—John H. Calhoon	Houston, Texas
2012—Bartley P. Griffith	Baltimore, Maryland
2013—Michael Argenziano	New York, New York
2014—Mark S. Slaughter	Louisville, Kentucky

HAROLD URSCHEL HISTORY LECTURESHIP

The Harold Urschel History Lectureship is dedicated to long-time STSA member and contributor, Harold C. Urschel, Jr., MD (STSA President, 1978-79; 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

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, MD.

Dr. Seiler's many contributions to STSA included serving as Secretary for 15 years and presenting on numerous topics at Annual Meetings.

HAWLEY H. SEILER RESIDENTS COMPETITION AWARD WINNERS

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

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 Awards Dinner & Dance.

MAVROUDIS-URSCHEL AWARD RECIPIENTS

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

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.

STSA INSPIRATION AWARD RECIPIENTS

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

JAMES W. BROOKS MEDICAL STUDENT SCHOLARSHIP

The STSA James W. Brooks Medical Student Scholarship was established in 2010 to pay tribute to Jim Brooks, MD, 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, 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 a promising medical student to become a great CT surgeon, 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

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, MD	Baltimore, Maryland

EXHIBITORS*

*CONFIRMED AS OF SEPTEMBER 24, 2014

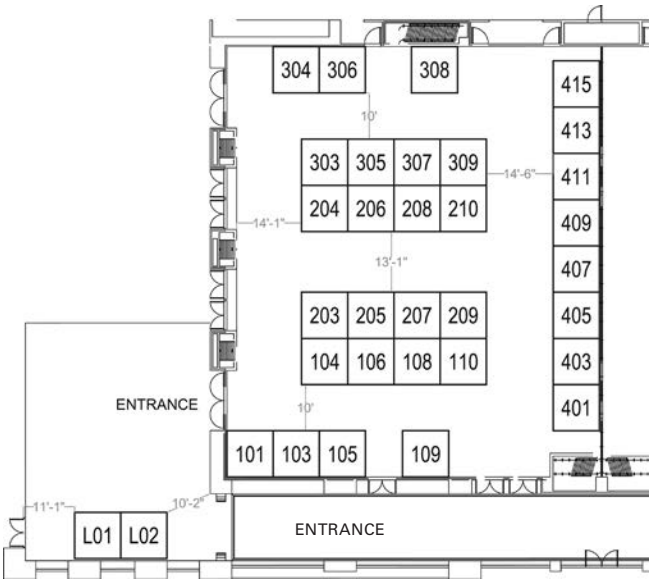
EXHIBIT HOURS AND FLOOR PLAN

EXHIBIT HOURS

THURSDAY, NOVEMBER 6
Exhibits Open 12:00 pm – 4:00 pm

FRIDAY, NOVEMBER 7
Exhibits Open 6:45 am – 11:30 am
1:00 pm – 4:00 pm

- Exhibit Hall is located in the in Tucson Ballroom A–E
- All coffee breaks scheduled during exhibit hours are in the exhibit area
- Complimentary coffee and pastries will be served



Acute Innovations **Booth: 204**
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Hillsboro, OR 97124
ACUTE Innovations® provides innovative solutions for challenging thoracic procedures. Come learn about our new launch products: AcuTie® II sternum closure system and the RibLoc® U Plus chest wall plating system.

Admedus Corp. **Booth 405**
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Minneapolis, MN 55437
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ATMOS, Inc. **Booth: 208**
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Atmos offers the S201 Digital Chest Drainage System. Our advanced system allows for patient mobility while maintaining suction, quantifies the flow in L/min, records the patient's therapy up to 12 days, requires less nursing intervention and ultimately a reduction in length of stay for the patient.

AtriCure, Inc. **Booth: 112**
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AtriCure is intent on reducing the Afib epidemic. We're a leading Afib solutions partner with the only FDA–approved surgical treatment for Afib and significant investment in science, education and innovation.

CryoLife **Booth: 401**
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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 enhanced sealants and hemostatic products to complement surgical techniques across thoracic, cardiovascular, and other surgical specialties. This franchise is committed to serving our surgeons and clinicians by leveraging unique & proprietary materials science and continuing BARD's focus on improving clinical outcomes.

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Edwards Lifesciences **Booth: 104**
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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. Additional company information can be found at www.edwards.com.

Genesee BioMedical, Inc. **Booth: 207**
700 W Mississippi Ave Unit D5
Denver, CO 80223
Genesee BioMedical, Inc. provides unique devices for cardiothoracic surgery including sternal/thoracic valve retractors for adult, adult congenital/pediatric surgery and aortic valve repair. Denver, CO USA www.geneseebiomedical.com

HeartWare, Inc. **Booth: 305**
500 Old Connecticut Path
Framingham, MA 01701
HeartWare, Inc. designs and develops miniaturized mechanical circulatory support systems for the treatment of advanced heart failure. The HeartWare® Ventricular Assist System is commercially available in Europe and is the subject of a US IDE trial.

Intuitive Surgical **Booth: 209–211**
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.

KLS–Martin **Booth: 212**
PO Box 16369
Jacksonville, FL 32245
KLS–Martin, a responsive company, is focused on the development of innovative products for oral, plastic and craniomaxillofacial surgery. New product developments in our titanium osteosynthesis plating systems allow these products to be used for rapid sternal fixation and reconstruction.

LifeNet Health **Booth: 407**
1864 Concert Drive
Virginia Beach, VA 23453
LifeNet Health helps save lives and restore health for thousands of patients each year. We are the world's most trusted provider of transplant solutions, from organ procurement to new innovations in bio–implant technologies and cellular therapies—a leader in the field of regenerative medicine, while always honoring the donors and healthcare professionals that allow the healing process.

EXHIBITORS

Medistim **Booth: 101**
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 and a 15 MHz ultrasound probe, specifically designed for epiaortic and epicardial imaging.

Medtronic, Inc. **Booth: L01**
710 Medtronic Pkwy
Minneapolis, MN 55432
At Medtronic, we're committed to Innovating for Life. Find Opportunity in Change and consider Medtronic's intuitive solutions for the treatment of structural heart disease including: tissue, mechanical and transcatheter valves; irrigated RF and cryo surgical ablation devices; and OPCAB, MICS CABG, cannulae and perfusion products.

Myriad Genetics **Booth: 409**
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Salt Lake City, UT 84018
Myriad Genetics is a leading molecular diagnostic company dedicated to making a difference in patient's lives through the discovery and commercialization of transformative tests to assess a person's risk of developing disease.

On–X Life Technologies **Booth: 106**
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Austin, TX 78752
On–X® Heart Valves: Patented natural design and On–X® Carbon offer reduced turbulence in a mechanical valve to rival the clinical and hemodynamic performance of bioprostheses. FDA IDE approved PROACT (Prospective Randomized On–X® Anticoagulation Clinical Trial) is in process. Chord– X PTFE suture is available for mitral valve repair.

rEVO Biological **Booth: 303**
175 Crossing Blvd
Framingham, MA 01702
rEVO Biologics is a commercial-stage biopharmaceutical company focused on developing and commercializing of therapeutics for unmet medical needs. rEVO's lead product, ATryn, is the first and only plasma-free antithrombin concentrate.

Scanlan International, Inc. **Booth: 109**
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/MICS instruments, single–use and instrument care products.

Sorin Group **Booth: 109**
14401 W 65th Way
Arvada, CO 80004
Sorin Group is a world leader in the treatment of cardiovascular diseases. Our innovative product portfolio includes aortic and mitral valve replacement and repair, perfusion equipment, cannulae and MICS instruments. For more information visit our web site at www.sorin.com.

Spiration **Booth: 307**
6675 185 Avenue N.E.
Redmond, WA 98052
The Spiration® Valve System has a humanitarian device approval in the U.S. to control specific postoperative 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: L02**
6300 Bee Cave Rd, Bldg 2 – Ste 100
Austin, TX 78746
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: 110**
1992 E Silverlake Rd
Tucson, AZ 85713
The SynCardia temporary Total Artificial Heart is the only FDA, Health Canada and CE approved TAH–t. It is approved as a bridge to transplant for patients dying from end–stage biventricular failure.

Terumo Cardiovascular Systems **Booth: 205**
6200 Jackson Rd
Ann Arbor, MI 48103
Whether surgical or interventional, disposable, or implantable, common–place or custom, Terumo products are used daily in a wide range of cardiac and vascular procedures. Terumo Cardiovascular Group develops, manufactures and distributes products for surgical teams, including cardiopulmonary bypass and intraoperative monitoring, endoscopic vein harvesting, and vascular grafts.

Thoratec **Booth: 203**
6035 Stoneridge Dr
Pleasanton, CA 94588
Thoratec is the world leader in mechanical circulatory support with the broadest product portfolio to treat the full range of clinical needs for patients suffering from advanced heart failure.

Vitalcor, Inc. **Booth: 108**
100 E. Chestnut Ave
Westmont, IL 60559
Gemini Plus headlight & Camera with LED light source. Latex Free Coronary Artery Balloon Canulae with self-inflating Balloon. Axiom Wound Drains. Reusable Bulldog Clamp. Titanium and stainless steel specialty instruments and retractors.

Wexler Surgical **Booth: 105**
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 1, 2013)

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 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. There is no fee for Student Members; however, Student Members must renew their membership annually.

SECTION 2. 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 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. 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. 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. 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 61st Annual Meeting. Unless otherwise noted, these STSA leaders have no relevant commercial relationships to disclose.

Kevin Accola: *Brooks Scholarship Committee*
COMMERCIAL RELATIONSHIPS: Consultant: Edwards Lifesciences, CorMatrix; Speaker: Edwards Lifesciences, CryoLife

John H. Calhoon: *President Elect*

Robert J. Cerfolio: *Council Chair, Program Committee, Postgraduate Committee*
COMMERCIAL RELATIONSHIPS: Speakers Bureau/Honoraria: Intuitive Surgical, Inc.; Ownership Interest/Author: Super Performing at Work and at Home: The Athleticism of Surgery and Life

Paul J. Chai: *Postgraduate Committee*

Joseph A. Dearani: *Brooks Scholarship Committee*

Melanie A. Edwards: *Program Committee Chair, CME Committee*

Andrew C. Fiore: C*ouncilor*

Richard K. Freeman: *CME Director, Program Committee, Postgraduate Committee, CME Committee*

David Tyler Greenfield: *Brooks Scholarship Committee*

John A. Howington: *Postgraduate Committee*
COMMERCIAL RELATIONSHIPS: Thoracic Advisory Board: Ethicon Endo-Surgery

Charles B. Huddleston: *Program Committee*

Jeffrey P. Jacobs: *Vice President, Program Committee*

David R. Jones: *Secretary/Treasurer, Program Committee, Postgraduate Committee*

Robert B. Lee: *Postgraduate Committee Chair, CME Committee*

Scott A. LeMaire: *Postgraduate Committee*
COMMERCIAL RELATIONSHIPS: Clinical Trial Investigator: Medtronic, Inc., GlaxoSmithKline, W.L. Gore & Associates, Cook Medical, Inc., Edwards Lifesciences; Consultant: Medtronic, Inc.

M. Blair Marshall: *Brooks Scholarship Committee*
COMMERCIAL RELATIONSHIPS: Consultant: Ethicon Endo–Surgery; Editor: Thoracic Surgery Clinics, Elsevier; Advisory Board: ClinicalKey, Elsevier; Patent PND: Suture Training Model

Daniel L. Miller: *Secretary/Treasurer-Elect, Program Committee, Postgraduate Committee*

Himanshu J. Patel: *Program Committee*
COMMERCIAL RELATIONSHIPS: Consultant/Patent Holder: W.L. Gore & Associates, Inc.

Richard L. Prager: *President, Postgraduate Committee, Program Committee*

Jorge D. Salazar: *Program Committee Chair, CME Committee*

Marcus G. Williams: *Postgraduate Committee Chair, CME Committee*

Thomas C. Wozniak: *Postgraduate Committee*

Stephen C. Yang: *Program 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 61st Annual Meeting. Unless otherwise noted, the abstract reviewers have no relevant commercial relationships.

Gorav Ailawadi
COMMERCIAL RELATIONSHIPS: Consultant/Advisory Board: Edwards Lifesciences, Abbott Vascular, Mitralign; Speakers Bureau/Honoraria: St. Jude Medical, Inc., Atricure

Shahab A. Akhter

Vinay Badhwar

Faisal G. Bakaeen

J. Michael DiMaio

Anthony E. Estrera

Andrew C. Fiore

Kristopher M. George

Emmett Dean McKenzie

Charles Patrick Murrah

J. Scott Rankin
COMMERCIAL RELATIONSHIPS: Ownership Interest: BioStable Science and Engineering, Inc.

Mark S. Slaughter
COMMERCIAL RELATIONSHIPS: Principal Investigator: HeartWare, Inc.

Betty C. Tong

Nirmal Veeramachaneni

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 5, 2014

SURGICAL MOTION PICTURES
Moderator Commercial Relationships
Melanie A. Edwards, Nothing to Disclose
Jorge D. Salazar, Nothing to Disclose

1V. *Repair of Simple Bicuspid Valve Defects Using Geometric Ring Annuloplasty*
COMMERCIAL RELATIONSHIPS: Domenico Mazzitelli: Consultant/Advisory Board: BioStable Science and Engineering Inc.; **J. Scott Rankin**: Consultant/Advisory Board: BioStable Science and Engineering Inc.
REGULATORY DISCLOSURE: This presentation describes the HAART 200 Bicuspid Aortic Annuloplasty Ring, which has an FDA approval status of Investigational.

7V. *VATS Lobectomy in a Patient on Clopidogrel*
COMMERCIAL RELATIONSHIPS: Daniel L. Miller: Consultant/Advisory Board: Ethicon Endo-Surgery, Inc., Davol-Bard, Inc.

9V. *Percutaneous Transfemoral Closure of a Pseudoaneurysm at the Left Ventricular Apical Access Site for Transcatheter Aortic Valve Implantation*
COMMERCIAL RELATIONSHIPS: Charles T. Klodell: Principal Investigator Edwards Partner III Trial: Edwards Lifesciences; **Thomas M. Beaver:** Investigator and Research Support for Edwards PARTNER II Clinical Trial: Edwards Lifesciences
REGULATORY DISCLOSURE: This presentation illustrates an off-label use of Amplatzer™ muscular VSD occluder (St. Jude Medical, St. Paul, MN) for closure of a left ventricular pseudoaneurysm.

THURSDAY, NOVEMBER 6, 2014
POSTGRADUATE PROGRAM

General Session
Moderator Commercial Relationships
Robert B. Lee, Nothing to Disclose
Marcus G. Williams, Nothing to Disclose

Adult Cardiac Case Presentation & Expert Panel: Current Management and Blood Utilization in Adult Cardiac Surgery
COMMERCIAL RELATIONSHIPS: Victor A. Ferraris: Speakers Bureau/Honoraria: Baxter Healthcare; Consultant/Advisory Board: Haemonetics, NovoNordisk; **Alan M. Speir:** Consultant Advisory Board: Medtronic, Inc.

General Thoracic Case Presentation & Expert Panel: Lung Cancer Screening at Academic and Non-academic Institutions
COMMERCIAL RELATIONSHIPS: Richard K. Freeman: Consultant/ Advisory Board: Covidien

Critical Care Case Presentation & Expert Panel: ECMO & Your Hospital
COMMERCIAL RELATIONSHIPS: Joseph B. Zwischenberger: Ownership Interest: Avalon, Maquet

ADULT CARDIAC BREAKOUT

Moderator Commercial Relationships
Scott A. LeMaire, Clinical Trial Investigator: Medtronic, Inc., GlaxoSmithKline, W.L. Gore & Associates, Cook Medical, Inc., Edwards Lifesciences; Consultant: Medtronic, Inc.
J. Michael DiMaio, Nothing to Disclose

TAVR 2014 Update
COMMERCIAL RELATIONSHIPS: Michael J. Reardon: Consultant/ Advisory Board: Medtronic, Inc.

Current Management of Type A and B Acute Dissection
REGULATORY DISCLOSURE: This presentation addresses the off-label use of Thoracic Endografts for treatment of Acute Type B Aortic Dissection.

GENERAL THORACIC BREAKOUT

Moderator Commercial Relationships
Richard K. Freeman, Consultant/Advisory Board: Covidien
Stephen C. Yang, Nothing to Disclose

SBT vs. Sublobar Resection for One-centimeter Lesions
COMMERCIAL RELATIONSHIPS: Traves D. Crabtree: Consultant/ Advisory Board: Ethicon Endo-Surgery

CONGENITAL BREAKOUT
Moderator Commercial Relationships
Paul J. Chai, Nothing to Disclose
Jorge D. Salazar, Nothing to Disclose

Biventricular Repair in Borderline Hearts
REGULATORY DISCLOSURE: This presentation addresses the off-label use of Melody Valve.

GENERAL SESSION
Moderator Commercial Relationships
Richard H. Feins, Research Grant/Principal Investigator: AHRQ, Teleflex; Ownership Interest: KindHeart (Equity shareholder and medical advisor to company producing cardiothoracic simulators)
Richard L. Prager, Nothing to Disclose

ETHICS DEBATE
Moderator Commercial Relationships
Robert M. Sade, Nothing to Disclose

THURSDAY NOVEMBER 6, 2014
FIRST SCIENTIFIC SESSION

Moderator Commercial Relationships
David R. Jones, Nothing to Disclose
Richard L. Prager, Nothing to Disclose

4. *When the Ross Is Not an Option: Systemic Semilunar Valve Replacement in the Pediatric/Young Adult Population Using a Porcine Full-root Bioprosthesis*
COMMERCIAL RELATIONSHIPS: DISCUSSANT: John W. Brown: Ownership Interest/Board of Directors: Correx, Inc.; Speakers Bureau/ Honoraria: Cryolife, Inc., Medtronic, Inc.

5. *The Impact of Video-assisted Thoracoscopic Surgery on Payment, Healthcare Utilization, and Workplace Absenteeism for Patients Undergoing Lung Resection*
COMMERCIAL RELATIONSHIPS: Thomas J. Watson: Consultant/ Advisory Board: Covidien; **Jiejing Qiu:** Employment/Senior Research Associate: Covidien, Inc.
DISCUSSANT: Betty C. Tong: Consultant/Advisory Board: W.L. Gore & Associates, Inc.

6. *The Impact of Transcatheter Aortic Valve Replacement on Surgical AVR in Michigan*
COMMERCIAL RELATIONSHIPS: DISCUSSANT: Michael J. Reardon: Consultant/Advisory Board: Medtronic, Inc.

10. *Contemporary Results of Open Surgical Repair in Patients With Marfan Syndrome and Distal Aortic Dissection in the Endovascular Era*
COMMERCIAL RELATIONSHIPS: Joseph S. Coselli: Royalties/ Consultant/Advisory Board: Vascutek Ltd., a Terumo Company
DISCUSSANT: G. Chad Hughes: Consultant/Advisory Board: W.L. Gore & Associates, Inc., Medtronic, Inc., Vascutek Terumo; Speakers Bureau/Honoraria: W.L. Gore & Associates, Inc., Medtronic Vascular, Vascutek Terumo

FRIDAY, NOVEMBER 7, 2014

BASIC SCIENCE FORUM

Moderator Commercial Relationships
John S. Ikonomidis, Nothing to Disclose
Christine L. Lau, Nothing to Disclose

1B. *Pulsatile Flow Does Not Improve Function During Prolonged Ex Vivo Lung Perfusion*
COMMERCIAL RELATIONSHIPS: DISCUSSANT: Michael J. Weyant: Principal Investigator: XVIVO, Inc.

2B. *Circulating Tumor Cells From 4D Model Has Increased Activator Protein-1 Expression Compared to Primary Tumor*
COMMERCIAL RELATIONSHIPS: Min P. Kim: Speaker Bureau/ Honoraria: Ethicon Endo-Surgery, Inc.

4B. *Pediatric End-stage Failing Hearts Demonstrate Increased Cardiac Stem Cells*
COMMERCIAL RELATIONSHIPS: DISCUSSANT: John E. Mayer: Consultant/Advisory Board: Medtronic, Inc. (Serve on Data Safety and Monitoring Board for Native Transcatheter Pulmonary Valve)

5B. *Timing of Adding Blood to Prime Affects Inflammatory Response to Neonatal Cardiopulmonary Bypass*
COMMERCIAL RELATIONSHIPS: Benjamin S. Schmidt: Research Support: Medtronic, Inc.; **Magan R. Lane:** Research Support: Medtronic, Inc.; **Vanessa M. DiPasquale:** Research Support: Medtronic, Inc.; **Lori P. Graf:** Research Support: Medtronic, Inc.; **Yoshio Ootaki:** Research Support: Medtronic, Inc.; **James E. Jordan:** Research Support: Medtronic, Inc.; **Ross M. Ungerleider:** Research Support: Medtronic, Inc.

SECOND SCIENTIFIC SESSION

Moderator Commercial Relationships
Melanie A. Edwards, Nothing to Disclose
Jorge D. Salazar, Nothing to Disclose

13. *A Community-based Multi-disciplinary CT Screening Program Improves Lung Cancer Survival*
COMMERCIAL RELATIONSHIPS: Daniel L. Miller: Consultant/Advisory Board: Ethicon Endo-Surgery, Inc., Bard-Davol, Inc.

16. *Longitudinal Trends in Morbidity and Mortality With Introduction of Robotic Assisted Thoracic Surgical Procedures at a Major Academic Cancer Center*
COMMERCIAL RELATIONSHIPS: DISCUSSANT: Mark W. Onaitis: Speakers Bureau/Honoraria: Intuitive Surgical, Inc.

17. *Variation in Outcomes for Risk-adjusted Pediatric and Congenital Cardiac Operations: An Analysis of the Society of Thoracic Surgeons (STS) Congenital Heart Surgery Database*
COMMERCIAL RELATIONSHIPS: DISCUSSANT: Frederick L. Grover: Consultant/Advisory Board: Somalution

GENERAL SESSION

Kent Trinkle Education Lectureship: The University of Louisville and the Mason Dixon Line: Re-establishing Ties With the STSA
COMMERICAL RELATIONSHIPS: Mark S. Slaughter: Research Support/Principal Investigator: HeartWare, Inc.; Consultant/Advisory Board: Carmat, SCR

THIRD SCIENTIFIC SESSION A

ADULT CARDIAC BREAKOUT
Moderator Commercial Relationships
Gorav Ailawadi, Consultant/Advisory Board: Edwards Lifesciences, Abbott Vascular, Mitralign; Speakers Bureau/Honoraria: St. Jude Medical, Inc., Atricure
Himanshu J. Patel, Principal Investigator/Co-Investigator: Medtronic, Inc., Edwards Lifesciences; Principal Investigator: W. L. Gore & Associates, Inc., Cook Medical; Ownership Interest: W. L. Gore & Associates, Inc.

19. *Retrograde Ascending Aortic Dissection After TEVAR for Distal Aortic Dissection and Zone 0 Landing: Association, Risk Factors, and True Incidence*
COMMERICAL RELATIONSHIPS: Ourania Preventza: Consultant: Medtronic, Inc.; Speaker Bureau/Honoraria: Cook Medical, Inc., W.L. Gore & Associates, Inc.; **Joseph S. Coselli:** Consultant/Advisory Board: Medtronic, Inc., St. Jude Medical, Inc. Terumo, Vascutek, W.L. Gore & Associates, Inc.; Speakers Bureau/Honoraria: Terumo, Vascutek
REGULATORY DISCLOSURES: This presentation describes the off-label use of Gore Thoracic Stent graft for various thoracic aortic pathologies of the arch and of the descending thoracic aorta. This stent graft is approved by the FDA for some of the pathologies described in the abstract. This presentation describes the off-label use of Cook TX-2 Thoracic Stent graft for various thoracic aortic pathologies of the arch and of the descending thoracic aorta. This stent graft is approved by the FDA for some of the pathologies described in the abstract. This presentation describes the off-label use of the Medtronic Thoracic Endograft, which is FDA approved.

20. *Short- and Mid-term Outcomes in Transcatheter Aortic Valve Replacement in Ninety-five Nonagenarians: Comparison of Transfemoral and Alternative Access Procedures*
COMMERICAL RELATIONSHIPS: Vinod Thourani: Consultant/Advisory Board: Edwards Lifesciences, Sorin, St. Jude Medical, Inc., DirectFlow; Co-founder/Ownership Interest: Apica

22. *Long-term Survival Following Bovine Pericardial Versus Porcine Stented Bioprosthetic Aortic Valve Replacement: Does Valve Choice Matter?*
COMMERICAL RELATIONSHIPS: DISCUSSANT: William H. Ryan: Consultant/Advisory Board: Edwards Lifesciences, Medtronic, Inc.

23. *Red Blood Cells and Mortality After Coronary Artery Bypass Surgery: Are We Really Transfusing Patients to Death?*
COMMERICAL RELATIONSHIPS: DISCUSSANT: Alan M. Speir: Consultant Advisory Board: Medtronic, Inc.

24. *Transcatheter Aortic Valve Replacement (TAVR) vs. Off Pump Aortic Valve Bypass (AVB) With an Apico-Aortic Conduit: A Comparison of Outcomes and Hospital Economics*
COMMERICAL RELATIONSHIPS: DISCUSSANT: Faisal G. Bakaeen: Principal Investigator: VA Cooperative Studies Program, NHLBI; Speakers Bureau/Honoraria: AstraZenca

THIRD SCIENTIFIC SESSION A

GENERAL THORACIC BREAKOUT
Moderator Commercial Relationships
Traves D. Crabtree, Consultant/Advisory Board: Ethicon Endo-Surgery, Inc.
Mitchell J. Magee, Nothing to Disclose

25. *An Assessment of the Optimal Time for Removal of Esophageal Stents Used in the Treatment of an Esophageal Anastomotic Leak or Perforation*
REGULATORY DISCLOSURE: This presentation describes the off-label use of an esophageal stent for the treatment of an esophageal perforation or intrathoracic esophageal anastomotic leak.

THIRD SCIENTIFIC SESSION A

CONGENITAL BREAKOUT
Moderator Commercial Relationship
Lauren Kane, Nothing to Disclose
Jorge D. Salazar, Nothing to Disclose

THIRD SCIENTIFIC SESSION B

ADULT CARDIAC BREAKOUT
Moderator Commercial Relationships
Faisal G. Bakaeen, Principal Investigator: VA Cooperative Studies Program, NHLBI; Speakers Bureau/Honoraria: AstraZenca
J**ennifer S. Lawton,** Nothing to Disclose

37. *Nadir Hematocrit on Bypass and Rates of Acute Kidney Injury: Does Gender Matter?*
COMMERICAL RELATIONSHIPS: DISCUSSANT: Gorav Ailawadi: Consultant/Advisory Board: Edwards Lifesciences, Abbott Vascular, Mitralign; Speakers Bureau/Honoraria: St. Jude Medical, Inc., Atricure

38. *Severe Aortic Valve Stenosis in Rural Community Practice: Under Treated and Under Referred for Definitive Management*
COMMERICAL RELATIONSHIPS: DISCUSSANT: Himanshu J. Patel: Principal Investigator/Co-Investigator: Medtronic, Inc., Edwards Lifesciences; Principal Investigator: W. L. Gore & Associates, Inc., Cook Medical; Ownership Interest: W. L. Gore & Associates, Inc.

40. *A New Surgical Approach to Exclude the Left Atrial Appendage Through Right Minithoracotomy and the Transverse Sinus During a Minimally Invasive CryoCox-Maze Procedure*
COMMERICAL RELATIONSHIPS: Niv Ad: Consultant/Advisory Board: Atricure, Estech, Medtronic, Inc.; Speaker Bureau/Honoraria: Atricure, Estech, Medtronic, Inc.

THIRD SCIENTIFIC SESSION B
GENERAL THORACIC BREAKOUT
Moderator Commercial Relationships
Mark J. Krasna, Nothing to Disclose
Theresa D. Luu, Nothing to Disclose

THIRD SCIENTIFIC SESSION B
CONGENITAL BREAKOUT
Moderator Commercial Relationships
Jennifer C. Hirsch-Romano, Nothing to Disclose
Jeffrey P. Jacobs, Nothing to Disclose

47. *Early Outcomes of Pulmonary Valve Replacement With the Mitroflow Bovine Pericardial Bioprosthesis*
REGULATORY DISCLOSURE: This presentation describes the off-label use of the Sorin Mitroflow Aortic Pericardial Heart Valve for pulmonary valve replacement.

SATURDAY, NOVEMBER 8, 2014

CODING UPDATE
Moderator Commercial Relationships
Peter K. Smith, Nothing to Disclose

FOURTH SCIENTIFIC SESSION A
ADULT CARDIAC BREAKOUT
Moderator Commercial Relationships
Anthony L. Estrera, Nothing to Disclose
Charles Patrick Murrah, Nothing to Disclose

50. *Cost Analysis of Physician Assistant Home Visit Program to Reduce Hospital Readmission*
COMMERCIAL RELATIONSHIPS: Joseph T. McGinn: Speaker Bureau/Honoraria: Medtronic, Inc. **DISCUSSANT: Kevin D. Accola:** Consultant: Edwards Lifesciences, CorMatrix; Speakers Bureau/Honoraria: Edwards Lifesciences, Cryolife

52. *Surgical Embolectomy for Acute Massive and Submassive Pulmonary Embolism in a Series of 115 Patients*
COMMERCIAL RELATIONSHIPS: DISCUSSANT: Neal D. Kon: Advisory Board/Consultant: Medtronic, Inc.

FOURTH SCIENTIFIC SESSION A
GENERAL THORACIC BREAKOUT
Moderator Commercial Relationships
Min P. Kim, Speakers Bureau/Honoraria: Ethicon Endo-Surgery, Inc.
Daniel L. Miller, Thoracic Surgery Advisory Board: Ethicon Endo-Surgery, Inc., Davol, A Bard Company

FOURTH SCIENTIFIC SESSION A
TRANSPLANT BREAKOUT
Moderator Commercial Relationships
Shahab A. Akhter, Nothing to Disclose
Allan Pickens, Nothing to Disclose

FOURTH SCIENTIFIC SESSION A
CONGENITAL BREAKOUT
Moderator Commercial Relationships
Paul J. Chai, Nothing to Disclose
Charles B. Huddleston, Nothing to Disclose

HAROLD URSCHEL HISTORY LECTURESHIP
Moderator Commercial Relationships
John W. Hammon, Nothing to Disclose

65. *Osler Almon Abbott: The Man, The Award and His Legacy*
COMMERICAL RELATIONSHIPS: Thoracic Surgery Advisory Board: Ethicon Endo-Surgery, Inc., Davol, A Bard Company

FOURTH SCIENTIFIC SESSION B
Moderator Commercial Relationships
John H. Calhoon, Nothing to Disclose
Robert J. Cerfolio, Speakers Bureau/Honoraria: Intuitive Surgical, Inc.; Ownership Interest/Author: Super Performing at Work and at Home: The Athleticism of Surgery and Life

66. *One Hundred Safe Transports on Extracorporeal Life Support to a Regional Extracorporeal Membrane Oxygenation Center*
COMMERICAL RELATIONSHIPS: Daniel Brodie: Research Support: Maquet Cardiovascular; Consultant/Advisory Board: ALung Technologies
DISCUSSANT: Joseph B. Zwischenberger: Ownership Interest: Avalon, Maquet

PROGRAM PARTICIPANTS

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