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## **Vascular & Endovascular Surgery Society**

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[www.vesurgery.org](http://www.vesurgery.org)

# **VESS Executive Council 2019 - 2020**

## **President**

James H. Black, MD  
Johns Hopkins Hospital  
Baltimore, MD

## **President-Elect**

Matthew A. Corriere, MD  
University of Michigan  
Ann Arbor, MI

## **Secretary**

Jason T. Lee, MD  
Stanford University Medical Center  
Stanford, CA

## **Treasurer**

Mark Conrad, MD  
Massachusetts General Hospital  
Boston, MA

## **Recorder**

Ravi Veeraswamy, MD  
Medical University of South Carolina  
Charleston, SC

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Misty Humphries, MD  
University of California, Davis  
Davis, CA

## **Councilor-At-Large**

Todd Berland, MD  
New York University  
New York, NY

## **Councilor-At-Large**

Dawn Coleman, MD  
University of Michigan  
Ann Arbor, MI

## **Immediate Past President**

Jonathan L. Eliason, MD  
University of Michigan  
Ann Arbor, MI

## **Past President**

Peter Nelson, MD  
University of Oklahoma  
Tulsa, OK

# VESS Committee Members

## **Bylaws**

Bryan Ehlert, MD, Chair  
Charles Fox, MD  
Kakra Hughes, MD

## **Communications**

Yim Wei Lum, MD, Chair

## **Newsletter**

*(Communications Sub-Committee)*  
Ravishankar Hasanadka, MD, Chair  
Laura Drudi, MD  
Gregory Magee, MD  
Adel Barkat, MD

## **Website**

*(Communications Sub-Committee)*  
Mounir (Joe) Haurani, MD, Chair  
Kristopher Charlton-Ouw, MD  
Kelly Kempe, MD  
Matthew Smeds, MD

## **Fundraising**

Niten Singh, MD, Chair  
Rebecca Kelso, MD  
Mel Sharafuddin, MD  
Jordan Stern, MD  
Jeffrey Syracuse, MD  
James Black, MD  
Matt Corriere, MD  
Jason Lee, MD  
Mark Conrad, MD  
Dawn Coleman, MD

## **Grants & Scholarships**

Christopher Smolock, MD, Chair  
Faisal Aziz, MD  
Benjamin Brooke, MD  
Misty Humphries, MD  
Todd Berland, MD  
Dawn Coleman, MD

## **Membership Development**

Katherine Gallagher, MD, Chair  
Mel Sharafuddin, MD  
Justin Hurie, MD  
Nicolas Mouawad, MD  
Hasan Aldailami, MD  
Jason Lee, MD

## **VESS Committee Members** *(continued)*

### **Program Committee (Annual Meeting)**

Raj Rajani, MD, Chair  
Natalie Glebova, MD, Vice Chair  
Luke Brewster, MD  
Faisal Aziz, MD  
Andrew Meltzer, MD  
Karan Garg, MD  
Jeanie Ruddy, MD  
Max Wohlauer, MD

### **Program Committee (Spring Meeting)**

Shang Loh, MD, Chair  
Matthew Wooster, MD  
Yazan Duwayri, MD  
Shipra Arya, MD  
Karen Woo, MD  
Caitlin Hicks, MD  
Bjoern Suckow, MD

### **Student Education**

John Rectenwald, MD, Chair  
David O'Connor, MD  
Shang Loh, MD  
Max Wohlauer, MD  
Courtney Morgan, MD  
Tze-Woe Tan, MD  
Michelle Williams, MD  
William Yoon, MD

### **Vascular Resident Education Committee**

Joanelle Lugo, MD, Co-Chair (Fellows Program)  
Jordan Stern, MD, Co-Chair (Technology Forum)  
Matthew Smeds, MD  
Raghunandan Motaganahalli, MD  
Dave Kauvar, MD  
Jaime Benarroch-Gampel, MD  
Gabby Velazquez, MD  
Karan Garg, MD (Ex-Officio)  
Dawn Coleman, MD (Ex-Officio)

### **Women & Diversity**

Venita Chandra, MD, Chair  
Jeanie Ruddy, MD  
Jill Zink, MD  
Sam Cox, MD

**VESS Committee Members** *(continued)*

**VESS Representatives**

**Representative to the American College of Surgeons  
Board of Governors**

Mark Conrad, MD

**Representative to the ACS Advisory Council for  
Surgical Specialties**

Peter R. Nelson, MD

**Vascular Surgery Board of the ABS**

Bernadette Aulivola, MD

**SVS Executive Committee**

Murray Shames, MD

**SVS Young Surgeons Advisory**

Misty Humphries, MD

## Past Meetings & Presidents

<b>Date</b>	<b>Location</b>	<b>President</b>
1976	Chicago, IL	Organizational Meeting
1977	Dallas, TX	Steven M. Dosick, MD
1978	San Francisco, CA	Robert G. Scribner, MD
1979	Chicago, IL	William S. Gross, MD
1980	Chicago, IL	Charles A. Andersen, MD
1981	Dallas, TX	Larry H. Hollier, MD
1982	Boston, MA	G. Edward Bone, MD
1983	San Francisco, CA	Robert C. Batson, MD
1984	Atlanta, GA	Lee C. Bloemendal, MD
1985	Baltimore, MD	George J. Collins, Jr.
1986	New Orleans, LA	Jonathan B. Towne, MD
1987	Toronto, Canada	Thomas S. Riles, MD
1988	Chicago, IL	Paul T. McDonald, MD
1989	New York, NY	Anthony J. Comerota, MD
1990	Los Angeles, CA	John W. Hallett, Jr., MD
1991	Boston, MA	Paul M. Orecchia, MD
1992	Chicago, IL	David L. Rollins, MD
1993	Washington, DC	Frank T. Padberg, Jr., MD
1994	Seattle, WA	Peter G. Kalman, MD
1995	New Orleans, LA	William J. Quinones-Baldrich, MD
1996	Chicago, IL	Joseph L. Mills, MD
1997	Boston, MA	Gary Giangola, MD
1998	San Diego, CA	J. Gordon Wright, MD
1999	Washington, DC	Jeffrey R. Rubin, MD
2000	Toronto, Canada	Donald L. Akers, Jr., MD
2001	Baltimore, MD	Thomas F. Lindsay, MD
2002	Boston, MA	R. Clement Darling, III, MD
2003	Chicago, IL	Jeffrey L. Ballard, MD
2004	Anaheim, CA	Samuel R. Money, MD
2005	Chicago, IL	Lewis B. Schwartz, MD
2006	Philadelphia, PA	Robert A. Cambria, MD
2007	Baltimore, MD	William D. Jordan, Jr., MD
2008	San Diego, CA	W. Charles Sternbergh, III, MD
2009	Denver, CO	Tina R. Desai, MD
2010	Boston, MA	Karl A. Illig, MD
2011	Chicago, IL	Marc A. Passman, MD
2012	Baltimore, MD	Martin R. Back, MD
2013	Park City, UT	Ruth L. Bush, MD, MPH
2014	Steamboat Springs, CO	W. Darrin Clouse, MD
2015	Vail, CO	Vikram S. Kashyap, MD
2016	Park City, UT	Sean P. Roddy, MD
2017	Steamboat Springs, CO	Thomas S. Maldonado, MD
2018	Vail, CO	Peter R. Nelson, MD
2019	Snow Bird, UT	Jonathan Eliason, MD

## Award History

<b>Year</b>	<b>Award</b>	<b>Recipient</b>
2011	<ul style="list-style-type: none"> <li>• Academic Award—Faculty</li> <li>• Academic Award—Fellow</li> <li>• Travel Award</li> </ul>	Guillermo A. Escobar, Ann Arbor, MI Bjoern Suckow, Salt Lake City, UT Judith C. Lin, Detroit, MI
2012	<ul style="list-style-type: none"> <li>• Academic Award—Faculty</li> <li>• Academic Award—Fellow</li> <li>• Travel Award</li> <li>• Norman M. Rich Military Award</li> </ul>	John Curci, St. Louis, MO Kathleen Lamb, Philadelphia, PA Karen Woo, Los Angeles, CA Cpt. Carole Villamaria, Ft. Sam Houston, TX
2013	<ul style="list-style-type: none"> <li>• Norman M. Rich Military Award</li> </ul>	Cpt. Marlin Wayne Causey, Tacoma, WA
2014	<ul style="list-style-type: none"> <li>• Norman M. Rich Military Award</li> <li>• Young Faculty Research Award</li> </ul>	Cpt. Daniel Scott, San Antonio, TX Dawn Coleman, Ann Arbor, MI
2015	<ul style="list-style-type: none"> <li>• Early Career Faculty Research Aw.d</li> <li>• W. L. Gore Travel Award</li> </ul>	Ryan McEnaney, Pittsburgh, PA Matthew Mell, Stanford, CA
2016	<ul style="list-style-type: none"> <li>• Best Paper Award</li> <li>• W. L. Gore Travel Award</li> </ul>	Diego Ayo, New York, NY Justin Hurie, Winston-Salem, NC
2017	<ul style="list-style-type: none"> <li>• Early Career Faculty Award</li> <li>• Medtronic Resident Research Awd.</li> <li>• W. L. Gore Travel Award</li> </ul>	Jean Marie Ruddy, Charleston, SC Gayan de Silva, MD, St. Louis, MO Ying Wei Lum, MD, Baltimore, MD
2018	<ul style="list-style-type: none"> <li>• Early Career Faculty Award</li> <li>• Medtronic Resident Research Awd.</li> <li>• W. L. Gore Travel Award</li> </ul>	Jeffrey Siracuse, Boston, MA Frank Davis, Ann Arbor, MI Nicolas Mouawad, Bay City, MI
2019	<ul style="list-style-type: none"> <li>• Early Career Faculty Award</li> <li>• Medtronic Resident Research Awd.</li> </ul>	Andrea Obi, Ann Arbor, MI Elizabeth Chou, Boston, MA

# General Information

## Registration

For security reasons, the scientific session hall and exhibit hall will be monitored for conference badges and/or hotel staff badges. Please wear your conference badge to all events. The VESS registration desk will be located in the **Ballroom Foyer** of the Korbel Ballroom. Registration hours are as follows:

Thursday, January 30	7:00 am – 5:00 pm
Friday, January 31	6:00 am – 9:30 am 3:00 pm – 6:30 pm
Saturday, February 1	6:00 am – 9:30 am 3:00 pm – 6:00 pm

## Scientific Sessions

All scientific sessions will be conducted in the **Korbel Ballrooms** at the Steamboat Grand unless otherwise noted.

## Speaker Ready Room

Speakers are required to check-in to the Speaker Ready Room to upload their PowerPoint presentations (using USB flash drive) at least 2-hours prior to their scheduled talk. **No personal laptops will be permitted at the podium.** The hours of operation of the Speaker Ready Area are listed below:

Thursday, January 30	7:00 am – 1:00 pm
Friday, January 31	6:30 am – 9:30 am 3:30 pm – 7:00 pm
Saturday, February 1	6:30 am – 9:30 am 3:30 pm – 6:00 pm

## 2020 Tech Exchange

The 2020 Tech Exchange will focus on broad vascular pathology and will showcase some of the best that industry has to offer. In addition to highlighting aortic endografts, peripheral and embolization technology and the latest in venous care, we will also be showcasing current and advanced capabilities in medical imaging. The emphasis of this program is for industry to provide insight into current and up-and-coming technology, as well as what treating physicians may see in the near future as it relates to developments in the pipeline. It will also provide opportunity for an intensive, hands-on experience in a small group format that provides a granular experience for the participating physicians.

The 2020 Tech Exchange will be held on **Thursday, January 30, 2020** from **12:30 pm – 3:30 pm**. If you did not pre-register for this event, please check-in at the registration desk located in the Ballroom Foyer.

Please Note: This program is not eligible for CME credits.



# Round Table Discussions

## **Women in Vascular Surgery** Moderator: Jeannie Ruddy, MD

**Friday, January 31, 2020 | 10:00 am – 12:00 pm**  
**Location: Burgess Creek I**

### **Objectives:**

- Recognize the difference between a mentor, a role model and a sponsor, and understand how each person may influence your career path
- Identify arenas where women surgeons/surgical trainees may feel less confident, acknowledge how "imposter syndrome" may contribute to these scenarios and discuss ways to overcome these obstacles
- Celebrate that a woman surgeon's life (inside and outside of the hospital) is complex, diverse and valuable

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## **A Program Director's Perspective on Surgical Education** Moderator: Mark Conrad, MD

**Friday, January 31, 2020 | 1:00 pm – 3:00 pm**  
**Location: Burgess Creek I**

### **Objectives:**

- Identify barriers to implementing a surgical curriculum
- Discuss goals for surgical education in the context of level of training
- Recognize differences in 0-5 and 5-2 training paradigms

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## **Video Case Presentation Session** Moderator: Ravi Rajani, MD & Kelly Kempre, MD

**Saturday, February 1, 2020 | 10:00 am – 12:00 pm**  
**Location: Korbel Ballroom**

### **Objectives:**

- Recognize alternative surgical approaches to intra-abdominal vascular abnormalities
- Understand the treatment steps involved in the management of infected vascular grafts
- Describe the challenges in the surgical treatment of renal artery aneurysms

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## **How to Get Involved in Research** Moderator: Peter Nelson, MD

**Saturday, January 31, 2020 | 1:00 pm – 3:00 pm**  
**Location: Burgess Creek I**

### **Objectives:**

- Appreciate the range of research opportunities in vascular surgery
- Learn strategies to get involved in research as a student or trainee
- Gain insight into how to develop a skill set to be successful incorporating research into a vascular surgical career

# Continuing Medical Education Credit Information

## Accreditation Statement

In support of improving patient care, this activity has been planned and implemented by Amedco, LLC and Vascular and Endovascular Surgery Society. Amedco, LLC is jointly accredited by the Accreditation Council for Continuing Medical Education (ACCME), the Accreditation Council for Pharmacy Education (ACPE) and the American Nurses Credentialing Center (ANCC) to provide continuing education for the healthcare team.



## Credit Designation Statement

Amedco, LLC designates this live activity for a maximum of 14.75 *AMA PRA Category 1 Credits*<sup>™</sup>. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

## Satisfactory Completion

Learners must complete an evaluation form to receive a certificate of completion. Your chosen sessions must be attended in their entirety. Partial credit of individual sessions is not available. If you are seeking continuing education credit for a specialty not listed below, it is your responsibility to contact your licensing/certification board to determine course eligibility for your licensing/certification requirement.

## Learning Objectives

This activity is designed for vascular surgeons. Upon completion of this course, attendees should be able to:

- Evaluate the use of tibial interventions within their own practice
- Review their practice patterns regarding the administration of opioid medications
- Better stratify patients for risk of deep vein thrombosis after ablation of superficial veins
- Better evaluate patients regarding use of measures of frailty
- Understand risk factors for high radiation exposure
- Better treat patients who have sustained vascular injuries from trauma
- Evaluate the use of ultrasound for arterial access within their own institution

# Acknowledgements

## **Educational Grants**

The Vascular and Endovascular Surgery Society wishes to recognize and thank the following companies for their ongoing support through educational grants:

Boston Scientific  
Cook Medical  
Medtronic  
W. L. Gore & Associates

## **Marketing Support**

The Vascular and Endovascular Surgery Society wishes to recognize and thank the following companies for their ongoing support through marketing:

Abbott Vascular  
BD (formerly Bard Peripheral Vascular)  
Cook Medical  
Janssen Pharmaceuticals  
Penumbra  
Silk Road Medical  
Terumo Aortic  
W. L. Gore & Associates

## **2020 Exhibitors**

Abbott Vascular  
AngioAdvancements  
BD (formerly Bard Peripheral Vascular)  
Boston Scientific  
ConvaTec  
Cook Medical  
CryoLife  
Endologix  
Getinge  
Intact Vascular  
Janssen Pharmaceuticals  
Medtronic Vascular  
Osborn Medical  
Penumbra  
Shockwave Medical  
Silk Road Medical  
Terumo Aortic  
ThinkMed Consulting  
Vascular Insights  
W.L. Gore & Associates



## Notes

# Schedule-at-a-Glance

## Thursday, January 30, 2020

6:45 am – 8:00 am	Continental Breakfast
6:45 am – 5:00 pm	Registration
7:25 am – 12:15 am	<b>VASCULAR FELLOWS PROGRAM</b> Moderator: Jordan Stern, MD
7:30 am – 12:15pm	<b>STUDENT MENTOR PROGRAM</b> Moderator: John Rectenwald, MD
12:30 pm - 3:30 pm	<b>TECHNOLOGY FORUM – DIDACTIC &amp; HANDS-ON</b> Moderator: Jordan Stern, MD
<b>4:00 pm – 6:00 pm</b>	<b>SCIENTIFIC SESSION I</b> Moderators: James Black, MD & Ravi Rajani, MD
4:00 pm – 4:12 pm	1 <b>Industry Compensation to Physician Vascular Specialist Authors of Highly Cited Aortic Aneurysm Manuscripts</b> Tiffany R. Bellomo, Charles Hwang, Gloria Kim, Nick Osborne, James Stanley, Matthew A. Corriere— University of Michigan Medical School, Ann Arbor, MI
4:12 pm – 4:24 pm	2 <b>An Apple a Day Keeps the Hospital Away: Food Deserts are Associated with 30-Day Readmission after Revascularization for Chronic Limb Threatening Ischemia</b> Eric Smith, Joel Ramirez, Bian Wu, Devin Zarkowsky, Warren Gasper, Michael Conte, James Iannuzzi— University of California San Francisco, San Francisco, CA
4:24 pm – 4:36 pm	3 <b>Contemporary Practices and Complications of Surgery for Thoracic Outlet Syndrome in the United States</b> Elizabeth L. George <sup>1</sup> , Kara A. Rothenberg <sup>2</sup> , Thuy-Vy Ho <sup>1</sup> , Shipra Arya <sup>1</sup> , Hugh A. Gelabert <sup>3</sup> , Jason T. Lee <sup>1</sup> — <sup>1</sup> Stanford University, Stanford, CA; <sup>2</sup> UCSF East Bay, Oakland, CA; <sup>3</sup> UCLA Medical Center, Los Angeles, CA
4:36 pm – 4:48 pm	4 <b>Vascular Surgeons Care for Increasingly Complex Patients Despite Decreasing Reimbursements: A Decade of Trends in Over 5 Million Patients</b> Rameen S. Moridzadeh, Yas Sanaiha, Josef Madrigal, Peyman Benharash, Donald T. Baril—University of California, Los Angeles, Los Angeles, CA

## Schedule-at-a-Glance

4:48 pm – 5:00 pm	5 <b>Increased Re-Intervention Following Infrainguinal Revascularization for Chronic Limb-Threatening Ischemia in Women</b> Bian Wu, Devin Zarkowsky, Elizabeth Lancaster, Joel Ramirez, Alexander Reyzelman, Warren Gasper, Michael Conte, Jade Hiramoto—UCSF, San Francisco, CA
5:00 pm – 5:08 pm	6 (RF) <b>Peri-Procedural Outcomes in Patients on Chronic Anticoagulation Undergoing Fistulograms</b> Lucero Paredes, Nkiruka Arinze, Denise Garofalo, Scott R. Levin, Rajendran Vilvendhan, Alik Farber, Douglas W. Jones, Jeffrey Siracuse—Boston University, Boston, MA
5:08 pm – 5:16 pm	7 (RF) <b>Female Sex Portends Worse Long-Term Survival after Open Type I-III Thoracoabdominal Aneurysm Repair</b> Christopher A. Latz, Laura Boitano, Linda J. Wang, Elizabeth Chou, Charles DeCarlo, Anna A. Pendleton, Jahan Mohebali, Mark Conrad—Massachusetts General Hospital, Boston, MA
5:16 pm – 5:24 pm	8 (RF) <b>A Novel Approach to Limb Salvage: Healing Transmetatarsal Amputations without a Viable Plantar Flap</b> Janell Holloway, Kimberly Lauer, Nikhil Kansal, Frederic Bongard, Ashley Miller—Harbor UCLA, Los Angeles, CA
5:24 pm – 5:36 pm	9 <b>Prevalence and Outcomes of Endovascular Infrapopliteal Interventions for Intermittent Claudication</b> Clarence H. Mullins, Zdenek Novak, John C. Axley, Danielle C. Sutzko, Emily L. Spangler, Benjamin J. Pearce, Mark A. Patterson, Marc A. Passman, Adam W. Beck, Graeme E. McFarland—University of Alabama at Birmingham, Birmingham, AL
5:36 pm – 5:48 pm	10 <b>Upper Arm Arteriovenous Grafts are Superior Over Forearm Arteriovenous Grafts in Upper Extremity Dialysis Access</b> Rueshil Fadia <sup>1</sup> , Chyi Chyi Chong <sup>1</sup> , Scott Berman <sup>2</sup> , Jeffrey J. Siracuse <sup>3</sup> , Denis Rybin <sup>4</sup> , Wei Zhou <sup>1</sup> , Tze-Woei Tan <sup>1</sup> — <sup>1</sup> University of Arizona, Tucson, AZ; <sup>2</sup> Pima Heart, Tucson, AZ; <sup>3</sup> Boston University School of Medicine, Boston, MA; <sup>4</sup> Boston University School of Public Health, Boston, MA

## Schedule-at-a-Glance

5:48 pm – 6:00 pm 11  
**Pediatric Renal Artery Stenosis: A 19-Year Experience in Management and Outcomes at a Tertiary Pediatric Hospital**  
Hans K. Boggs, Sharon C. Kiang, Ahmed M. Abou-Zamzam, Jr., Paul Miller, Ellie Rickards, Roger T. Tomihama—Loma Linda University School of Medicine, Loma Linda, CA

6:00 pm – 7:30 pm **WELCOME RECEPTION**  
All attendees, guests & exhibitors are welcome.

### Friday, January 31, 2020

6:00 am – 7:00 am Continental Breakfast

6:00 am – 9:30 am Registration

6:50 am – 7:00 am **NEWS & VIEWS FROM THE SVS**  
Ronald Dalman, MD  
SVS President-Elect

**7:00 am – 9:03 am** **SCIENTIFIC SESSION II**  
Moderators: Andrew Meltzer, MD & Jason Less, MD

7:00 am – 7:12 am 12  
**Plantar Flexion Induced Entrapment of the Dorsalis Pedis Artery in a Teenaged Cross-Country Runner**  
Leighton T. McCabe, Jason W. Stoneback, Jeniann A. Yi, William R. Hiatt, Mary K. Jesse, Max V. Wohlaer—University of Colorado Anschutz School of Medicine, Aurora, CO

7:12 am – 7:24 am 13  
**Vascular Surgeons Carry an Increasing Responsibility in the Management of Lower Extremity Vascular Trauma**  
Siddhant Parihar, Jaime Benarroch-Gampel, Victoria Teodorescu, Christopher Ramos, Keri Minton, Ravi Rajani—Emory University, Atlanta, GA

7:24 am – 7:36 am 14  
**Practice Patterns of Vascular Surgery's "1%"**  
William W. Sheaffer, Samuel R. Money, Victor J. Davila, Ina Y. Soh, Matthew D. Breite, William M. Stone, Andrew J. Meltzer—Mayo Clinic Arizona, Phoenix, AZ

## Schedule-at-a-Glance

7:36 am – 7:48 am	15 <b>Regional Market Competition is Associated with Aneurysm Diameter at Time of EVAR</b> Courtenay Holscher <sup>1</sup> , M. Libby Weaver <sup>1</sup> , James H. Black, III <sup>1</sup> , Christopher Abularrage <sup>1</sup> , Ying Wei Lum <sup>1</sup> , Devin Zarkowsky <sup>2</sup> , Caitlin Hicks <sup>1</sup> — <sup>1</sup> Johns Hopkins University, Baltimore, MD; <sup>2</sup> University of Colorado, Aurora, CO
7:48 am – 7:56 am	16 (RF) <b>Flow Diversion: A Novel Technique in the Management of Aneurysmal False Lumen in Chronic Type B Aortic Dissection</b> Motahar Hosseini <sup>1</sup> , David N. Blitzer <sup>2</sup> , Anahita Ghazi <sup>1</sup> , Shahab Toursavadkoshi <sup>1</sup> — <sup>1</sup> University of Maryland, Baltimore, MD; <sup>2</sup> MedStar Health, Baltimore, MD
7:56 am – 8:04 am	17 (RF) <b>Endovascular Repair of Ascending Aortic Pseudoaneurysm using Transfemoral Frame-Coiling Under Total Cerebral Protection</b> Jeanette Man, Mel J. Sharafuddin—University of Iowa Carver's College of Medicine, Iowa City, IA
8:04 am – 8:12 am	18 (RF) <b>Mid-Aortic Syndrome with Aortoiliac Occlusive Disease and Venous Stasis Ulceration</b> Anna M. Boniakowski, Bobby Beaulieu, Jonathan L. Eliason, Dawn Coleman—University of Michigan, Ann Arbor, MI
8:12 am – 8:24 am	19 <b>Comparison of Atherectomy and Balloon Angioplasty for Isolated Femoro-Popliteal Revascularization</b> Arash Fereydooni <sup>1</sup> , Halbert Bai <sup>2</sup> , Haoran Zhuo <sup>2</sup> , Yawei Zhang <sup>2</sup> , Cassius Iyad Ochoa Chaar <sup>1</sup> — <sup>1</sup> Yale School of Medicine, New Haven, CT; <sup>2</sup> Yale School of Public Health, New Haven, CT
8:24 am – 8:35 am	20 <b>Ruptured AAA Patients Treated with EVAR Off-IFU Demonstrate Lower In-Hospital Survival than Those with On-IFU Repair</b> Devin S. Zarkowsky <sup>1</sup> , Joel L. Ramirez <sup>2</sup> , Courtenay M. Holscher <sup>3</sup> , Philip P. Goodney <sup>4</sup> , Mahmoud B. Malas <sup>5</sup> , James C. Iannuzzi <sup>2</sup> , Max Wohlauer <sup>1</sup> , Caitlin W. Hicks <sup>3</sup> — <sup>1</sup> University of Colorado, Aurora, CO; <sup>2</sup> University of California San Francisco, San Francisco, CA; <sup>3</sup> The Johns Hopkins Medical Institutions, Baltimore, MD; <sup>4</sup> Dartmouth-Hitchcock Medical Center, Lebanon, NH; <sup>5</sup> University of California San Diego, San Diego, CA



## Schedule-at-a-Glance

8:35 am – 8:47 am	21 <b>Utility of the Mangled Extremity Severity Score in Predicting Amputation in Military Lower Extremity Arterial Injury</b> David W. Schechtman <sup>1</sup> , Thomas J. Walters <sup>2</sup> , David S. Kauvar <sup>1</sup> — <sup>1</sup> San Antonio Military Medical Center, Fort Sam Houston, TX; <sup>2</sup> U.S. Army Institute for Surgical Research, Fort Sam Houston, TX
8:47 am – 8:55 am	22 (RF) <b>The Triple Wire Technique for Delivery of Endovascular Components in Difficult Anatomy</b> Jordan R. Stern, Benjamin D. Colvard, Jason T. Lee, Christopher P. Cheng—Stanford University, Stanford, CA
8:55 am – 9:03 am	23 (RF) <b>Outcomes Following Urgent Fenestrated-Branched Endovascular Repair for Pararenal and Thoracoabdominal Aortic Aneurysms</b> Joedd H. Biggs, Emanuel R. Tenorio, Randall R. DeMartino, Bernardo C. Mendes, Gustavo S. Oderich—Mayo Clinic, Rochester, MN
10:00 am – 12:00 pm	<b>ROUND TABLE DISCUSSION SESSION</b> <b>Women in Vascular Surgery</b> Moderator: Jeanie Ruddy, MD
1:00 pm – 3:00 pm	<b>ROUND TABLE DISCUSSION SESSION</b> <b>A Program Director's Perspective on Surgical Education</b> Moderator: Mark Conrad, MD
3:00 pm	Registration Re-Opens
3:00 pm – 4:00 pm	Coffee/Snacks – Visit Exhibitors
4:00 pm – 6:00 pm	<b>SCIENTIFIC SESSION III</b> Moderators: Jeanie, Ruddy, MD & Karan Garg, MD
4:00 pm – 4:12 pm	24 <b>Re-Evaluating the Need for Routine Coverage of the Left Subclavian Artery in Thoracic Blunt Aortic Injury</b> Nicolas A. Stafforini, Niten Singh, Benjamin W. Starnes, Nam T. Tran, Elina Quiroga—University of Washington, Seattle, WA
4:12 pm – 4:24 pm	25 <b>Paclitaxel-Coated Peripheral Arterial Devices are Associated with Reduced Mortality in Younger Patients</b> Alexander H. King, Vikram S. Kashyap, Ravi N. Ambani, Jones P. Thomas, Saideep Bose, Kareem C. Harth, Virginia L. Wong, Jae S. Cho, Norman H. Kumins—University Hospitals Cleveland Medical Center, Cleveland, OH

## Schedule-at-a-Glance

4:24 pm – 4:36 pm	26 <b>Effects of Continued Dual Antiplatelet Therapy on Major Adverse Cardiovascular Events after Carotid Artery Stenting</b> Nathan Belkin, Benjamin M. Jackson, Paul J. Foley, Scott M. Damrauer, Ronald M. Fairman, Grace J. Wang—Hospital of the University of Pennsylvania, Philadelphia, PA
4:36 pm – 4:48 pm	27 <b>Endovascular Embolization Techniques in a Swine Model of Fatal Uncontrolled Solid Organ Hemorrhage and Coagulopathy</b> David S. Kauvar <sup>1</sup> , David W. Schechtman <sup>1</sup> , Sarah B. Thomas <sup>1</sup> , Rodolfo J. DeGuzman <sup>2</sup> , Irene A. Polykratis <sup>2</sup> , Malcolm D. Prince <sup>2</sup> , Bijan S. Kheirabadi <sup>2</sup> , Michael A. Dubick <sup>2</sup> — <sup>1</sup> San Antonio Military Medical Center, Fort Sam Houston, TX; <sup>2</sup> U.S. Army Institute for Surgical Research, Fort Sam Houston, TX
4:48 pm – 4:56 pm	28 (RF) <b>Ascending Lumbar Vein Angioplasty and Stenting to Improve Lower Extremity Venous Drainage in the Setting of Ipsilateral Common Iliac Vein Occlusion</b> Hunter Ray, Stuart Harlin—University of Texas Health Science Center at Houston (UT Health), McGovern Medical School, Houston, TX
4:56 pm – 5:04 pm	29 (RF) <b>Hybrid Endovascular and Open Surgical Approach to an Acute Type-A Aortic Dissection in a Pregnant Female with Marfan Syndrome</b> Spencer Hansen, John Eidt, Charles Roberts—Baylor University Medical Center, Dallas, TX
5:04 pm – 5:12 pm	30 (RF) <b>Pharmacologic Therapy is not Associated with Stroke Prevention in Patients with Isolated Blunt Vertebral Artery Injury</b> Amit Pujari <sup>1</sup> , Christopher R. Ramos <sup>1</sup> , Jonathan Nguyen <sup>2</sup> , Ravi R. Rajani <sup>1</sup> , Jaime Benarroch-Gampel <sup>1</sup> — <sup>1</sup> Emory University School of Medicine, Atlanta, GA; <sup>2</sup> Morehouse School of Medicine, Atlanta, GA
5:12 pm – 5:24 pm	31 <b>An Endovascular First Approach for Aortoiliac Occlusive Disease is Safe: Prior Endovascular Intervention not Associated with Inferior Outcomes after Aortofemoral Bypass</b> Charles Decarlo, Christopher Latz, Laura T. Boitano, Jahan Mohebbali, Samuel I. Schwartz, Matthew J. Eagleton, W. Darrin Clouse, Mark F. Conrad—Massachusetts General Hospital, Boston, MA

## Schedule-at-a-Glance

5:24 pm – 5:36 pm	32 <b>Non-Operative and Delayed Operative Management of Severe Asymptomatic Carotid Artery Stenosis</b> Dylan Dominguez, Scott Levin, Thomas Cheng, Alik Farber, Douglas Jones, Jeffrey Kalish, Jeffrey Siracuse—Boston University School of Medicine, Boston, MA
5:36 pm – 5:48 pm	33 <b>Complete Venous Leg Ulceration Healing Following Perforated Ablation is not Dependent on Treatment Modality</b> Katherine M. Reitz, Karim Salem, Abhisekh Mohapatra, Nathan L. Liang, Efthimios Avgerinos, Michael Singh, Eric Hager—UPMC, Pittsburgh, PA
5:48 pm – 6:00 pm	34 <b>Impacts of a Limb Preservation Service on the Incidence of Major Amputations for All Indications at a Level I Trauma Center</b> Jake F. Hemingway, Rachel Hoffman, Benjamin W. Starnes, Elina Quiroga, Nam T. Tran, Niten Singh—University of Washington, Seattle, WA
6:00 pm	<b>VESS MEMBER BUSINESS MEETING</b>
6:00 pm	<b>INDUSTRY SYMPOSIUM</b> <b>Xarelto: Results from the Einstein Trials in VTE and the COMPASS Trial in Chronic CAD/PAD</b> Sponsored By: Janssen Pharmaceuticals

## Saturday, February 1, 2020

6:00 am – 7:00 am	Continental Breakfast
6:00 am – 9:30 am	Registration
<b>7:00 am – 8:15 am</b>	<b>SCIENTIFIC SESSION IV</b> Moderators: Max Wohlauser, MD & Natalia Glebova, MD
7:00 am – 7:12 am	35 <b>Treatment and Outcomes of Aortic Graft Infections: A Single Center Experience</b> Amanda Filiberto, Javariah Fatima, Craig Elder, Salvatore Scali, Thomas Huber—University of Florida, Gainesville, FL
7:12 am – 7:24 am	36 <b>Online Ratings for Vascular Interventional Providers Varies by Physician Specialty</b> Zachary J. Wanken, John B. Rode, Sarah Y. Bessen, Peter B. Anderson, J. Aaron Barnes, Mark Eid, Philip P. Goodney—Dartmouth-Hitchcock, Lebanon, NH

## Schedule-at-a-Glance

7:24 am – 7:36 am	37 <b>Underrepresentation of Vascular Surgery in Twitter-Based Clinical Discussions on the Management of Peripheral Arterial Disease</b> Reid A. Ravin <sup>1</sup> , Daniel K. Han <sup>2</sup> , Kassandra Carrion <sup>1</sup> , Nicole Ilonzo <sup>1</sup> , Peter L. Faries <sup>2</sup> — <sup>1</sup> Mount Sinai West Hospital, New York, NY; <sup>2</sup> Mount Sinai Hospital, New York, NY
7:36 am – 7:48 am	38 <b>Real-World Usage of the Wavelinq EndoAVF System</b> Mark S. Zemela <sup>1</sup> , Hataka R. Minami <sup>1</sup> , Alejandro Alvarez <sup>2</sup> , Matthew R. Smeds <sup>1</sup> — <sup>1</sup> St. Louis University School of Medicine, St. Louis, MO; <sup>2</sup> SSM Health, St. Louis, MO
7:48 am – 7:56 am	39 (RF) <b>Contemporary Outcomes of Bailout Popliteal Stenting</b> Karim M. Salem, Vei Shaun Siow, Ricardo J. Martinez Garcia, Abhisekh M. Mohapatra, Nathan L. Liang, Richard E. Redlinger, Georges E. Al-Khoury, Mohammad H. Eslami, Rabih A. Chaer, Efthymios D. Avgerinos—UPMC, Pittsburgh, PA
7:56 am – 8:04 am	40 (RF) <b>Evolving, Versatile and Durable Aorto-Uni-Iliac Endograft Techniques for Complex Aorto-Iliac Aneurysms without Bifurcated EVAR Options: Lessons from More than 100 Cases</b> Martin R. Back <sup>1</sup> , Mathew D. Wooster <sup>2</sup> — <sup>1</sup> University of Florida, Gainesville, FL; <sup>2</sup> Medical University of South Carolina, Charleston, SC
8:04 am – 8:12 am	41 (RF) <b>Use of the Bard BD Venovo™ Venous Stent in the Treatment of Non-Thrombotic or Post-Thrombotic Iliac Vein Lesions - Short Term Results from a Multi-Centre Asian Cohort</b> Hao Yun Yap <sup>1</sup> , Jimmy Wei Hwa Tan <sup>2</sup> , Mervin Han Hui Lim <sup>1</sup> , Tze Tec Chong <sup>1</sup> , Tjun Yip Tang <sup>1</sup> — <sup>1</sup> Singapore General Hospital, Singapore, Singapore; <sup>2</sup> Tainan An-nan Municipal Hospital, Tainan, Taiwan
8:15 am – 8:45 am	<b>AWARD SESSION</b> Moderators: James Black, MD & Christopher Smolock, MD <b>Update from 2019 Winner(s)</b> <b>2020 Award Winners:</b> <ul style="list-style-type: none"><li>• VESS/Medtronic Vascular Resident Research Award</li><li>• VESS Early Career Faculty Research Award</li></ul>

## Schedule-at-a-Glance

8:50 am – 9:00 am	<b>Introduction of the President</b> Matthew Corriere, MD
9:00 am – 9:45 am	<b>PRESIDENTIAL ADDRESS</b> James Black, MD
10:00 am – 12:00 pm	<b>VESS VIDEO CASE PRESENTATION SESSION</b> Moderators: Kelly Kempe, MD & Ravi Rajani, MD
1:00 pm – 3:00 pm	<b>ROUND TABLE DISCUSSION</b> <b>How to Get Involved in Research</b> Moderator: Peter Nelson, MD
3:00 pm	Registration Re-Opens
3:00 pm – 4:00 pm	Coffee/Snacks – Visit Exhibitors
<b>4:00 pm – 6:00 pm</b>	<b>SCIENTIFIC SESSION V</b> Moderators: Matthew Corriere, MD & Misty Humphries, MD
4:00 pm – 4:12 pm	42 <b>Long-Term Impact of Vascular Surgery Stress on Frail Older Patients</b> Ellen A. Gilbertson, Travis R. Bailey, Larry W. Kraiss, Claire L. Griffin, Brigitte K. Smith, Mark Sarfati, Julie Beckstrom, Benjamin S. Brooke—University of Utah School of Medicine, Salt Lake City, UT
4:12 pm – 4:24 pm	43 <b>Clinical Outcomes of Double Mandibular Osteotomy for Exposure of Skull Base Carotid Artery Pathology</b> Andrew Hodge, Mina Fahmy, Michael M. McNally, Josh Arnold, Oscar Grandas, Eric Carlson, Michael Freeman, Michael Buckley—University of Tennessee Knoxville, Knoxville, TN
4:24 pm – 4:36 pm	44 <b>Branch Vessel Patency after TEVAR for Type B Aortic Dissection</b> Gregory A. Magee <sup>1</sup> , Anastasja Plotkin <sup>1</sup> , Michael D. Dake <sup>2</sup> , Benjamin W. Starnes <sup>3</sup> , Sukgu M. Han <sup>1</sup> , Li Ding <sup>1</sup> , Fred A. Weaver <sup>1</sup> — <sup>1</sup> University of Southern California, Los Angeles, CA; <sup>2</sup> University of Arizona, Tucson, AZ; <sup>3</sup> University of Washington, Seattle, WA

## Schedule-at-a-Glance

4:36 pm – 4:48 pm	45 <b>Access Type for Endovascular Repair in Ruptured Abdominal Aortic Aneurysms does not Affect Major Morbidity or Mortality</b> Thomas W. Cheng <sup>1</sup> , Shelley K. Maitzel <sup>2</sup> , Nii-Kabu Kabuṭey <sup>2</sup> , Roy M. Fujitani <sup>1</sup> , Alik Farber <sup>1</sup> , Virendra I. Patel <sup>3</sup> , Douglas W. Jones <sup>1</sup> , Denis Rybin <sup>4</sup> , Gheorghe Doros <sup>4</sup> , Jeffrey J. Siracuse <sup>1</sup> — <sup>1</sup> Boston University School of Medicine, Boston, MA; <sup>2</sup> University of California Irvine Medical Center, Orange, CA; <sup>3</sup> Columbia University College of Physicians and Surgeons, New York, NY; <sup>4</sup> Boston University School of Public Health, Boston, MA
4:48 pm – 4:56 pm	46 (RF) <b>Factors Associated with Medication Compliance in Vascular Surgery Patients</b> Hataka R. Minami, Mark S. Zemela, Adam C. Ring, Michael S. Williams, Jr., Matthew R. Smeds—Saint Louis University, Saint Louis, MO
4:56 pm – 5:04 pm	47 (RF) <b>Aorto-Caval Reconstruction for Inferior Vena Cava Leiomyosarcoma with Aortic Involvement</b> Anthony N. Grieff, Justin W. Ady, Randy Shafritz, William Beckerman, Saum Rahimi—Rutgers Robert Wood Johnson, New Brunswick, NJ
5:04 pm – 5:12 pm	48 (RF) <b>A Centralized Vascular Access Service Team for Tunneled Catheter Placement Reduces Time-to-Insertion in a Large Academic Medical Center</b> Hanna J. Barnes, Mark J. Bailey, Daniel K. Han, Roopa Kohli-Seth, Amy Brito, Francis S. Nowakowski, David S. Lee, Barry A. Love, Peter L. Faries—Icahn School of Medicine at Mount Sinai, New York, NY
5:12 pm – 5:24 pm	49 <b>Gaussian Surface Curvature Mapping Indicating High Risk Type B Thoracic Aortic Dissections</b> Sanjeev S. Dhara <sup>1</sup> , Michael Hermsen <sup>1</sup> , Erin Abbott <sup>1</sup> , Ross Milner <sup>1</sup> , Cheong Jun Lee <sup>2</sup> , Luka Pocivavsek <sup>1</sup> — <sup>1</sup> University of Chicago, Chicago, IL; <sup>2</sup> Northshore University Health System, Evanston, IL
5:24 pm – 5:36 pm	50 <b>Aortic Dilatation after Thoracic Endovascular Aneurysm Repair for Blunt Aortic Injury</b> Kenneth Tran, Ming Lai, Jordan Stern, Jason Lee—Stanford University, Stanford, CA

## Schedule-at-a-Glance

5:36 pm – 5:48 pm	51 <b>Pedal Acceleration Time: A Novel Predictor of Limb Salvage</b> Desarom Teso, Jill Sommerset, BeeJay Feliciano, Yolanda Vea, Riyad Karmy-Jones—Peacehealth Medical Southwest Medical Center, Vancouver, WA
5:48 pm – 5:56 pm	52 (RF) <b>Long-Term Follow-Up of Occlusive Complications after EVAR</b> Christopher M. Faries, Rami O. Tadros, David Oceau, Hanna J. Barnes, Joshua Harris, Peter L. Faries, Michael L. Marin—Icahn School of Medicine at Mount Sinai, New York, NY
5:56 pm – 6:04 pm	53 (RF) <b>Comparison of Radiation and Contrast Exposure in Transfemoral Versus Transcarotid Stenting</b> David O'Connor, Lifen Cao, Jacqueline Steinman, Stanton Nielsen, Kristin Cook, Anjali Ratnathicam, Michael Wilderman, Gregory Simonian, Massimo Napolitano—Hackensack University Medical Center, Hackensack, NJ
7:00 pm – 10:00 pm	<b>PRESIDENT'S DINNER</b> (Tickets Required)



# Notes



# Full Program & Abstracts

## Thursday, January 30, 2020

6:45 am – 8:00 am	Continental Breakfast
6:45 am – 5:00 pm	Registration
7:25 am – 12:15 am	<b>VASCULAR FELLOWS PROGRAM</b> Moderator: Jordan Stern, MD
7:30 am – 12:15pm	<b>STUDENT MENTOR PROGRAM</b> Moderator: John Rectenwald, MD
12:30 pm - 3:30 pm	<b>TECHNOLOGY FORUM – DIDACTIC &amp; HANDS-ON</b> Moderator: Jordan Stern, MD
<b>4:00 pm – 6:00 pm</b>	<b>SCIENTIFIC SESSION I</b> Moderators: James Black, MD & Ravi Rajani, MD
4:00 pm – 4:12 pm	1 <b>Industry Compensation to Physician Vascular Specialist Authors of Highly Cited Aortic Aneurysm Manuscripts</b> Tiffany R. Bellomo, Charles Hwang, Gloria Kim, Nick Osborne, James Stanley, Matthew A. Corriere— University of Michigan Medical School, Ann Arbor, MI

**INTRODUCTION AND OBJECTIVES:** Industry compensation may influence physician attitudes toward medical devices and products. Disclosure of industry compensation by authors of manuscripts is often left up to authors themselves and is not routinely audited. The purpose of this analysis was to characterize industry compensation among highly cited research studies related to AA.

**METHODS:** A Web of Science search of “Aortic Aneurysm” excluding review articles and non-English language publications identified publications from 2013-2017. The top 100 most-cited publications were abstracted by author. Industry compensation to physician authors registered as Medicare providers were queried using the ProPublica Dollars for Docs search tool (linked to Centers for Medicare and Medicaid Services Open Payments data) based on provider name, specialty, and geographic location. Statistical analysis included descriptive statistics and categorical tests.

**RESULTS:** Industry compensation was identified for 126 authors of highly cited AA manuscripts. Physician specialties included Vascular Surgery (44%), Cardiothoracic Surgery (34%), Interventional Cardiology (10%), Pediatric Cardiology (7%) and Vascular & Interventional Radiology (5%). Physician authors received 14,170 payments totaling \$6,301,536 over the study period. Median total industry compensation per physician author (among those with reported payments) ranged from \$18 to \$810,483 (median \$6,932, interquartile range \$47,588). Categories accounting for the largest share of physician compensation were consulting (\$2,014,757), promotional speaking (\$1,008,046), Royalty or Licensing (\$504,631), and Honoraria (\$474,742). Food and beverage accounted for the largest number of transactions (10,148 payments with a median amount of \$31, IQR \$76), while the largest payment amounts per transaction were related to royalties or licensing fees (median of \$15,418).

## Full Program & Abstracts

**CONCLUSIONS:** Although only a minority of physician authors of highly cited AA manuscripts receive industry compensation, payments may be significant and potentially influential. Transparent reporting of any industry compensation should be advocated so that readers can assess potential bias, which may be underestimated based on selective self-reporting.

## Full Program & Abstracts

4:12 pm – 4:24 pm

2

**An Apple a Day Keeps the Hospital Away: Food Deserts are Associated with 30-Day Readmission after Revascularization for Chronic Limb Threatening Ischemia**

Eric Smith, Joel Ramirez, Bian Wu, Devin Zarkowsky, Warren Gasper, Michael Conte, James Iannuzzi—  
University of California San Francisco, San Francisco, CA

**INTRODUCTION AND OBJECTIVES:** Living in a Food Desert has been associated with increased cardiovascular risk; however, its impact on post-surgical outcomes is unknown. This study hypothesized that living in a Food Desert would be associated with 30-day readmission in patients undergoing revascularization for chronic limb threatening ischemia (CLTI).

**METHODS:** This was a single-center retrospective analysis of open or endovascular infrainguinal revascularization for CLTI between April 2013 and December 2015. A Food Desert was defined using the U.S. Department of Agriculture’s Food Access Research Atlas, which describes Food Access as low if  $\geq 33$  percent is greater than 1 mile from the nearest supermarket, supercenter, or large grocery store for an urban area. Bivariate analyses were performed appropriate to the data. Variables were placed into the multivariable model if  $p < 0.1$  on bivariate analysis.

**RESULTS:** Of the 152 cases, 17% (n=26) resided in Low Access areas. Patients in the Low-Access cohort were less likely to be Low-Income (27% vs. 54%,  $p=0.01$ ). Low-Access was associated with increased 30-day readmission (39% vs. 20%,  $p=0.04$ ), unadjusted OR: 2.5 (CI: 1.0-6.2). On multivariable analysis, Low-Access remained associated with increased odds of 30-day readmission (OR: 2.7 CI: 1.2-8.4,  $p=0.047$ ) (Table 1). Reasons for readmission in the Low-Access group were primarily due to wound complications (90% vs. 68,  $p=0.24$ ).

**CONCLUSIONS:** Living in a Food Desert was associated with a more than twofold increased odds of 30-day readmission after lower extremity revascularization for CLTI with wound complications being a potential mechanism. This finding supports considering access to healthy food as a potential modifiable risk factor for adverse outcomes, particularly for CLTI, a disease process that is highly dependent on nutrition.

Adjusted Odds Ratio for 30-day Readmission		
Variable	AOR (CI)	p-value
Low-Access	2.7 (1.0-6.9)	0.047
Infrapopliteal Revascularization	2.3 (0.9-6.3)	0.10
Low-Income	1.2 (0.5-2.6)	0.71
Active Smoker	0.8 (0.3-2.2)	0.61

## Full Program & Abstracts

4:24 pm – 4:36 pm

3

### Contemporary Practices and Complications of Surgery for Thoracic Outlet Syndrome in the United States

Elizabeth L. George<sup>1</sup>, Kara A. Rothenberg<sup>2</sup>, Thuy-Vy Ho<sup>1</sup>, Shipra Arya<sup>1</sup>, Hugh A. Gelabert<sup>3</sup>, Jason T. Lee<sup>1</sup>—  
<sup>1</sup>Stanford University, Stanford, CA; <sup>2</sup>UCSF East Bay, Oakland, CA; <sup>3</sup>UCLA Medical Center, Los Angeles, CA

**INTRODUCTION AND OBJECTIVES:** Thoracic outlet syndrome (TOS) surgery is relatively rare and controversial given a wide range of outcomes. Our aims were to measure trends in utilization of TOS surgery, complications, and mortality rates in a nationally representative cohort and compare higher- versus lower-volume centers.

**METHODS:** The National Inpatient Sample was queried using ICD-9 codes for rib resection and scalenectomy paired with subclavian aneurysm/embolism [arterial (aTOS)], subclavian DVT/thrombolysis [venous (vTOS)], or brachial plexus lesions [neurogenic (nTOS)]. Non-parametric tests and logistic regression models were used to compare time trends and high- and low-volume hospitals.

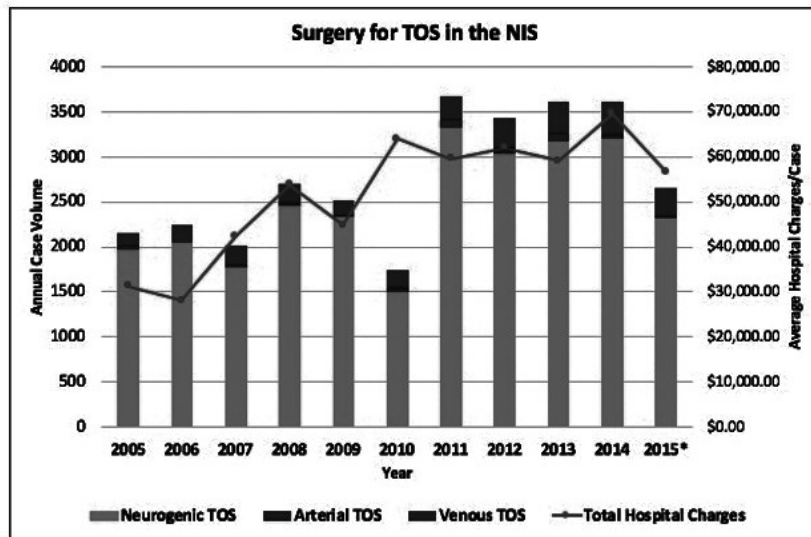
**RESULTS:** There were 30,350 TOS operations performed between 2005-2015 (89.4% nTOS, 9.1% vTOS, 1.6% aTOS) with annual case volume trending upwards ( $p < 0.015$ ) [Figure 1 bar]. Higher-volume centers ( $\geq 20$  cases/year) represented 2.2% of hospitals (26.1% cases) and achieved significantly lower overall major complication rates [OR 0.61 (95% CI 0.50-0.75);  $p < 0.001$ ] and fewer vascular injuries [OR 0.42 (0.21-0.84);  $p < 0.014$ ], but no difference in nerve injuries (OR 0.77 (0.31-1.91);  $p = 0.576$ ). Overall mortality was 0.3%, neurologic injury was rare (0.5%), and the proportion of patients experiencing any major complication decreased over time ( $p < 0.001$ ). However, vTOS & aTOS had  $> 2.5$  times the odds of complication compared to nTOS [OR 2.78 (2.23-3.47) & OR 5.22 (3.40-8.01);  $p < 0.001$ ]. Despite increasing aggregate volume, average hospital charges significantly increased ( $p < 0.001$ ) [Figure 1 line], and charges were higher when surgery was performed in lower-volume centers [median \$32,793.50 (91,159) vs (\$21,219.50 (35,363),  $p < 0.001$ ).

**CONCLUSION:** During the past decade the annual number of TOS operations and average hospital charges have increased while total complications are decreasing, and mortality and neurologic injury remain rare. Higher-volume centers delivered higher-value care: less operative morbidity with lower charges.

## Full Program & Abstracts

Figure 1. Weighted case volumes per year in the Nationwide Inpatient Sample (NIS) of surgery for thoracic outlet syndrome (TOS) between 2005-2015 stratified by etiology (stacked bar). Also shown is the increasing average hospital charges for TOS procedures (line) during the same time period.

\*2015 represents totals from Q1-Q3 due to transition from ICD-9 to ICD-10 coding systems during Q4.



## Full Program & Abstracts

4:36 pm – 4:48 pm

4

### **Vascular Surgeons Care for Increasingly Complex Patients Despite Decreasing Reimbursements: A Decade of Trends in Over 5 Million Patients**

Rameen S. Moridzadeh, Yas Sanaiha, Josef Madrigal, Peyman Benharash, Donald T. Baril—University of California, Los Angeles, Los Angeles, CA

**BACKGROUND:** Clinical experience suggests that vascular surgeons care for medically complex patients. Despite increasingly intensive care, policies have led to diminishing reimbursements. We herein analyze a decade of trends in medical comorbidities of vascular patients and their relationship with outcomes and reimbursement.

**METHODS:** The National Inpatient Sample was queried for adults undergoing surgery between 2005-2014. The most commonly performed operations that constituted 80% of the coded procedures for vascular surgery were abstracted. The Elixhauser Comorbidity Index (ECI) was calculated per year. Reimbursement was extrapolated by collecting relative value units (RVUs) data from the Center for Medicaid and Medicare Services Physician Fee Schedule.

**RESULTS:** 5,120,266 patients underwent vascular operations during the study period, with 60.7% emergent operations. Vascular comorbidities included 70% hypertension, 27% renal failure, and 35% diabetes. Mean ECI increased from 3.11 in 2005 to 3.76 in 2014 ( $p<0.001$ ). For emergent operations, ECI increased from 3.56 in 2005 to 4.00 in 2014 ( $p<0.001$ ). Overall mortality rate was 1% (elective operations) and 5% (emergent operations). Length of stay (LOS) and costs were higher for emergent operations (LOS: 3d elective vs. 9d emergent; costs: \$15,641 vs. \$22,605 emergent). When examining reimbursement, work RVUs decreased year-to-year on average 15% and decreased 54% for facility RVUs. (Figure 1, 2)

**CONCLUSION:** Despite caring for patients with an increasingly high burden of medical comorbidities, the majority of whom require emergent operations, vascular surgeons have seen decreases in reimbursement. Increases in reimbursement and hospital resource allocation are necessary for vascular surgeons to meet the demands of caring for this medically complex patient population.

# Full Program & Abstracts

Figure 1. Trends in Elixhauser Score for Vascular Surgery

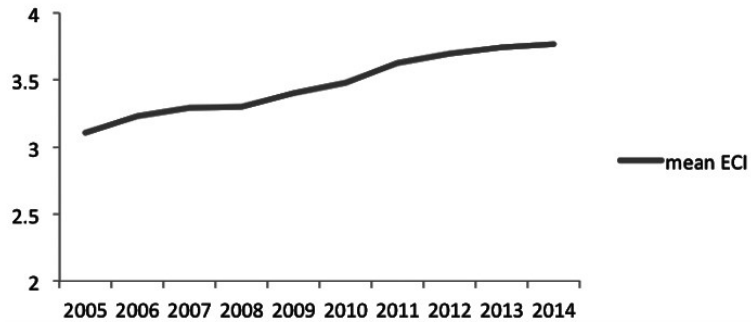
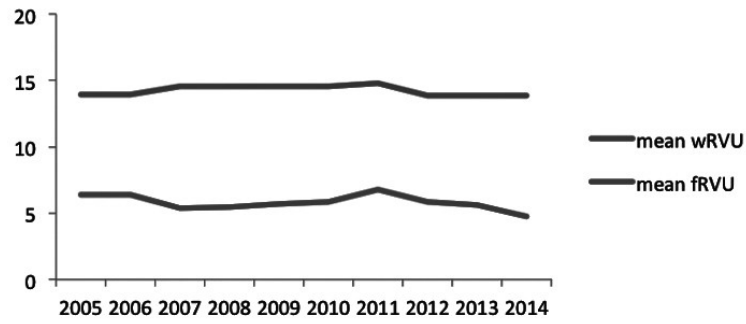


Figure 2. Trends in Reimbursement for Vascular Procedures



## Full Program & Abstracts

4:48 pm – 5:00 pm

5

### **Increased Re-Intervention Following Infringuinal Revascularization for Chronic Limb-Threatening Ischemia in Women**

Bian Wu, Devin Zarkowsky, Elizabeth Lancaster, Joel Ramirez, Alexander Reyzelman, Warren Gasper, Michael Conte, Jade Hiramoto—UCSF, San Francisco, CA

**INTRODUCTION AND OBJECTIVES:** To determine if there are gender-based differences in major adverse limb events following revascularization for chronic limb-threatening ischemia (CLTI), and to identify potential causative factors.

**METHODS:** Single center retrospective analysis of 152 patients who underwent infringuinal revascularization for CLTI between 4/2013 and 12/2015. Only the first revascularized limb was included in patients with bilateral CLTI. Demographic data and clinical outcomes were collected using electronic medical records.

**RESULTS:** The mean age was  $68.2 \pm 12.2$  years and 56/152 (37%) were women. Women were less likely to carry a diagnosis of hyperlipidemia (61% vs 83%,  $p = .003$ ), less likely to be on a statin medication (59% vs 81%,  $p = .004$ ), and less likely to undergo an infrapopliteal revascularization (61% vs 77%,  $p = .04$ ) compared to men. There were no differences between genders with regards to the SVS Wifl Stage at presentation, or utilization of open versus endovascular intervention. During the median follow-up time of 678 days (IQR: 167-1277 days), 50/152 patients (33%) underwent re-intervention on the threatened limb; 23/152 (15%) underwent major amputation, and 11/152 (7%) underwent both. Women were more likely than men to need re-intervention ( $p = .02$ ), but not major amputation ( $p = .51$ ) (Figure 1). In a multivariable Cox Proportional Hazards model for re-intervention that included gender, ischemia score  $\geq 2$ , anticoagulation, and hyperlipidemia (all  $p < .20$  in univariate analysis), only female gender (HR 1.84 [1.04-3.25],  $p = .04$ ) was significantly associated with increased rates of re-intervention.

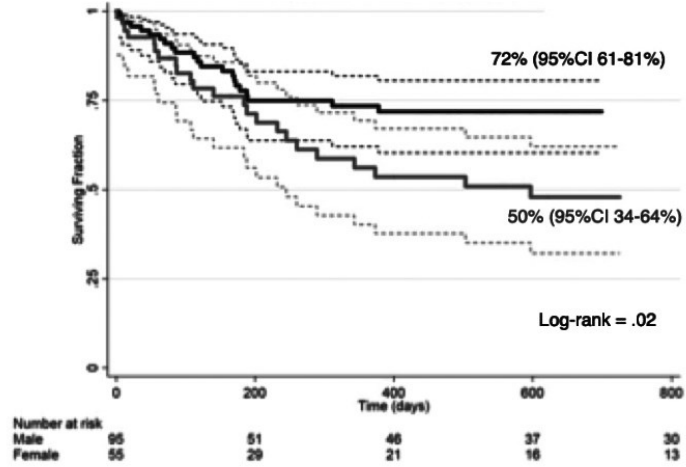
**CONCLUSIONS:** Women undergoing lower extremity revascularization for CLTI were more likely to require re-intervention compared to men, but had similar rates of limb preservation. Further study is required to understand potential causative factors to improve treatment outcomes in women.



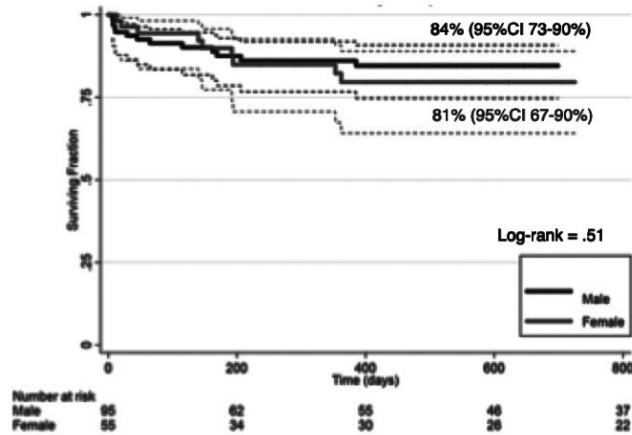
# Full Program & Abstracts

Figure 1. Survival curves for freedom from re-intervention (A) and freedom from major amputation (B) by gender.

Figure 1A. Freedom from Re-Intervention



Freedom 1B. Freedom from Major Amputation



## Full Program & Abstracts

5:00 pm – 5:08 pm

6 (RF)

### **Peri-Procedural Outcomes in Patients on Chronic Anticoagulation Undergoing Fistulograms**

Lucero Paredes, Nkiruka Arinze, Denise Garofalo, Scott R. Levin, Rajendran Vilvendhan, Alik Farber, Douglas W. Jones, Jeffrey Siracuse—Boston University, Boston, MA

**INTRODUCTION AND OBJECTIVES:** The management of anti-thrombotic therapy with warfarin in patients undergoing fistulograms and possible interventions is controversial and can be difficult due to lack of adequate outpatient bridging options. Our goal was to assess peri-procedural outcomes of patients with different anticoagulation management strategies undergoing fistulogram.

**METHODS:** We performed a retrospective, single-institution analysis of patients undergoing fistulograms who were on chronic anticoagulation with warfarin. Anticoagulation management strategies were classified as warfarin held/no bridge (WNB), warfarin held with heparin bridge (WHB), and warfarin continued (WC). Peri-procedural outcomes were analyzed.

**RESULTS:** 87 patients on chronic anticoagulation with warfarin underwent 175 fistulograms during this time period. Median age was 64 years and 43.4% were female. 60%, 14% and 26% of procedures were performed under WNB, WHB, and WC protocol, respectively. Approximately half (53%) were same-day procedures and 30% occurred during an admission for access-related issues. 14% of procedures were performed during non-access-related admissions. Indications for fistulogram included problems with dialysis (62.9%), thrombosed fistula/graft (22.3%), and poor maturation (10.3%). Interventions included angioplasty (82.3%), thrombectomy/embolectomy (18.3%), and stenting (8.6%). Thirty-day outcomes for WNB vs. WHB vs. WC were similar for bleeding complications (5.7% vs 8.3% vs 6.5%,  $P=.89$ ), thrombotic complications (3.8% vs. 0% vs. 2.2%,  $P=.57$ ), and tunneled line placement (13% vs. 12.5% vs. 11.4%,  $P=.96$ ). Length of stay, when excluding procedures during admission for other primary issues, was highest among WHB ( $9.56 \pm 7.82$  days) compared to WNB ( $2.55 \pm 5.88$  days) and WC ( $1.02 \pm 2.78$  days), ( $P<0.01$ ).

**CONCLUSIONS:** Continued warfarin therapy among patients undergoing fistulograms was not associated with increased morbidity and was associated with shorter length of stay. Continuing warfarin is safe and may facilitate procedures for dialysis access maintenances without significantly increasing resource utilization.

## Full Program & Abstracts

5:08 pm – 5:16 pm

7 (RF)

### **Female Sex Portends Worse Long-Term Survival after Open Type I-III Thoracoabdominal Aneurysm Repair**

Christopher A. Latz, Laura Boitano, Linda J. Wang, Elizabeth Chou, Charles DeCarlo, Anna A. Pendleton, Jahan Mohebbi, Mark Conrad—Massachusetts General Hospital, Boston, MA

**INTRODUCTION AND OBJECTIVES:** Although outcomes following infrarenal abdominal aortic aneurysm surgery are worse in females, sex-specific differences in outcomes following open thoracoabdominal aortic aneurysm (TAAA) surgery are less clear. The goal of this study was to identify sex-based disparities in short and long-term outcomes after open type I-III TAAA surgery.

**METHODS:** All open type I-III TAAA repairs performed from 1987-2015 were evaluated using an institutional database. Charts were retrospectively evaluated for peri-operative outcomes: major adverse event (MAE), in-hospital death, and long-term survival. Logistic regression was used for in-hospital endpoints; survival analyses were performed with Cox proportional hazards modelling and Kaplan-Meier techniques. Sensitivity analyses were performed for relevant multivariable models, one with ruptures removed and another evaluating only repairs performed before 2006 to account for any selection bias due to wider use of complex endovascular technology.

**RESULTS:** 516 patients had an open type I-III TAAA repair during the study period. 280 (54.3%) were female. Females were older, less likely to have a chronic dissection etiology, were more likely to present with a symptomatic/ruptured lesion and had a lower admission creatinine. 23 (9.8%) males and 19 (6.8%) females died perioperatively ( $p=0.26$ ); 133 females (47.3%) and 116 males (49.2%) suffered a MAE ( $p=0.72$ ). Multivariable analyses revealed no sex-based difference in peri-operative death (Female sex AOR:0.72, 95%CI:0.4-1.4,  $p=0.34$ ) or MAE (AOR:1.0 CI:0.7-1.5,  $p=0.82$ ). Unadjusted survival at five-years was 50% for females and 67% for males (log-rank  $p<0.001$ ). Female sex was an independent predictor of decreased survival (HR:1.5 CI:1.2-1.9,  $p=0.001$ ), when adjusted for age, extent, creatinine, diameter and symptomatic presentation. After removing all ruptures, female sex remained non-predictive of peri-operative death (AOR:1.1, CI 0.5-2.5,  $p=0.75$ ) or MAE (AOR:1.2, CI:0.8-1.9,  $p=0.31$ ), and predictive of decreased survival (HR:1.6, CI:1.2-2.0,  $p=0.001$ ). Female sex remained predictive of decreased survival when only repairs prior to 2006 were considered.

**CONCLUSIONS:** Despite similar perioperative outcomes, women suffer from decreased long-term survival after open type I-III TAAA surgery.

## Full Program & Abstracts

5:16 pm – 5:24 pm

8 (RF)

### **A Novel Approach to Limb Salvage: Healing Transmetatarsal Amputations without a Viable Plantar Flap**

Janell Holloway, Kimberly Lauer, Nikhil Kansal, Frederic Bongard, Ashley Miller—Harbor UCLA, Los Angeles, CA

**INTRODUCTION AND OBJECTIVES:** The lack of viable plantar flap in patients undergoing trans-metatarsal amputation (TMA) has been considered an indication for below knee amputation (BKA). In an effort to reduce limb loss in this patient population, we sought to review our experience with limb salvage in patients with an open, guillotine TMA.

**METHODS:** This is a retrospective review of 27 patients who underwent an open, guillotine TMA. Patients presented with non-viable plantar flap due to extensive infection on initial presentation or secondary flap necrosis. Patients initially underwent an open TMA for control of infection and debridement of non-viable tissue. Once resolved and all non-viable tissue debrided, negative pressure wound therapy (NPWT) was applied to the open wound. NPWT was continued until a base of granulation tissue covered the previously exposed bone. Wound closure was obtained by the application of a split-thickness skin graft (STSG) or through continued NPWT.

**RESULTS:** Between January 2016 and December 2018, there were 27 open TMAs performed. Two patients did not granulate sufficiently and underwent BKA. 14 patients underwent STSG, while 11 patients continued with NPWT. In the STSG group, 86% of the patients are healed, with a median time to complete healing of 75 days; the remaining two patients are ambulatory and undergoing continued wound care. In the 11 patients that did not receive STSG, 64% are healed with a median heal time of 165 days. Of the remaining four patients in this group, three are still undergoing wound care, and one was lost to follow-up. Overall, 19 patients (70%) have completely healed with a median heal time of 82 days.

**CONCLUSIONS:** Limb salvage in patients with no viable plantar flap for TMA is possible. This technique has the potential to improve functional outcomes and limb salvage in patients who might otherwise undergo BKA.

## Full Program & Abstracts

5:24 pm – 5:36 pm

9

### **Prevalence and Outcomes of Endovascular Infrapopliteal Interventions for Intermittent Claudication**

Clarence H. Mullins, Zdenek Novak, John C. Axley, Danielle C. Sutzko, Emily L. Spangler, Benjamin J. Pearce, Mark A. Patterson, Marc A. Passman, Adam W. Beck, Graeme E. McFarland—University of Alabama at Birmingham, Birmingham, AL

**INTRODUCTION AND OBJECTIVES:** As use of peripheral vascular interventions (PVI) increases for intermittent claudication (IC) patients, the benefits and risks of infrapopliteal interventions in this population remain unclear. This study seeks to evaluate the prevalence and outcomes of PVI at the infrapopliteal level for IC.

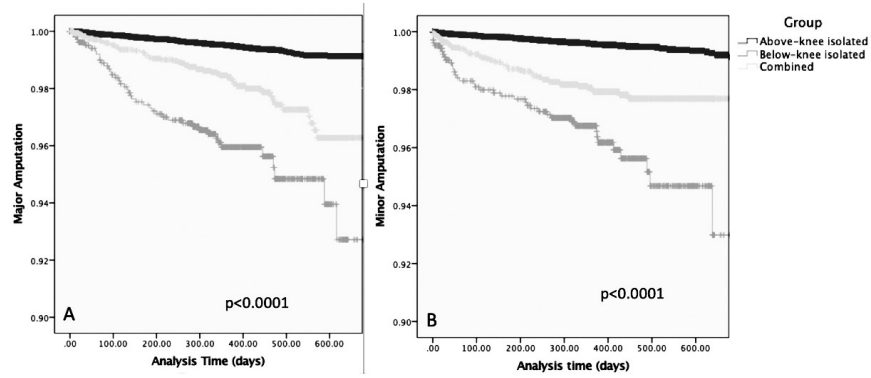
**METHODS:** The Vascular Quality Initiative was queried for PVI procedures performed for IC between 2003-2018. Patients were divided into three groups: isolated above-knee (AK), isolated below-knee (BK), and combined above- and below-knee interventions (COM). Multivariable logistic regression models identified predictors of minor and major amputation, as well as freedom from reintervention. Kaplan-Meier plots were used to estimate amputation-free-survival.

**RESULTS:** We identified 34,944 PVI procedures for IC. There were 31,110 (89.0%) AK interventions, 1,045 (3.0%) BK interventions, and 2,789 (8.0%) COM interventions. Kaplan-Meier plots of amputation-free-survival revealed patients with any BK intervention had significantly higher rates of minor and major amputation (log rank  $<.001$ ) (Figure1). Freedom from reintervention at 1-year was 89.2% for the AK group, 91.3% for the BK group, and 85.3% for the COM group ( $p<.0001$ ). In multivariable analysis, factors associated with an increased risk of major amputation included isolated BK intervention (OR 6.47, 95% CI, 6.45-6.49;  $p<.0001$ ), COM interventions (OR 2.32, 95% CI, 2.31-2.33;  $p<.0001$ ), dialysis dependence (OR 3.34, 95% CI, 3.33-3.35;  $p<.0001$ ), CHF (OR 1.86, 95% CI, 1.85-1.86;  $p=.021$ ) and non-white race (OR 1.64, 95% CI, 1.63-1.64;  $p=.013$ ).

**CONCLUSIONS:** PVI in the below-knee vessels for IC is associated with higher amputation rates. This may be related to the severity of presentation/disease and/or a direct result of the intervention itself, which cannot be determined by a retrospective study. Future prospective trials are warranted to elucidate further.

# Full Program & Abstracts

Figure 1. Kaplan Meier outcomes following peripheral vascular intervention for intermittent claudication. (A) Major Amputation. (B) Minor Amputation.



## Full Program & Abstracts

5:36 pm – 5:48 pm

10

### **Upper Arm Arteriovenous Grafts are Superior Over Forearm Arteriovenous Grafts in Upper Extremity Dialysis Access**

Rueshil Fadia<sup>1</sup>, Chyi Chyi Chong<sup>1</sup>, Scott Berman<sup>2</sup>, Jeffrey J. Siraçuse<sup>2</sup>, Denis Rybin<sup>4</sup>, Wei Zhou<sup>1</sup>, Tze-Woei Tan<sup>1</sup>—<sup>1</sup>University of Arizona, Tucson, AZ; <sup>2</sup>Pima Heart, Tucson, AZ; <sup>3</sup>Boston University School of Medicine, Boston, MA; <sup>4</sup>Boston University School of Public Health, Boston, MA

**INTRODUCTION:** The optimal location for placement of an upper extremity (forearm or upper arm) arteriovenous graft (AVG) is unknown. In this study, we compared the outcomes of forearm AVGs and upper arm AVG.

**METHODS:** Patients who received upper arm AVGs within the national Vascular Quality Initiative (VQI) dataset were identified. Axillary artery to axillary vein AVGs (n=394) were excluded. The primary outcome measures were primary and secondary patency loss at 12-month. Other outcomes included were wound infection, steal syndrome, and arm swelling at 6-month follow-up. The log-rank test was used to evaluate patency loss using Kaplan-Meier analysis, and Cox proportional hazards models were used to examine adjusted association between locations (forearm and upper arm) and outcomes.

**RESULTS:** Among 3,637 upper extremity AVGs in the VQI (2010 to 2017), there were 1,160 forearm AVGs and 509 upper arm AVGs. Patients with forearm AVGs were more often to have BMI >30 (45% vs. 38%, p=.013), no history of previous access (73% vs. 63%, p<.001), and underwent local/regional anesthesia (56% vs. 43%, p<.001). The 12-month primary patency loss (49% vs. 37%, p<.001) and secondary patency loss (24% vs. 11%, p<.001) were significantly higher for forearm AVGs. Wound infection, steal syndrome, and arm swelling were similar between forearm AVGs and upper arm AVGs at 6-month follow up. In multivariable analysis, the 12-month primary patency loss (adjusted Hazard Ratio (aHR) 1.66, 95% Confidence Interval (CI) 1.33-2.01, p<.001) and 12-month secondary patency loss (aHR 2.71, 95% CI 1.84,3.98, p<.001) were significantly higher for forearm AVGs.

**CONCLUSIONS:** The primary and secondary patency rates were superior for upper arm AVGs when compared to forearm AVGs. From this observational study, the presumed benefit of considering forearm over upper arm location in order to preserve future access sites should be weighed carefully due to increased risk of graft thrombosis.

## Full Program & Abstracts

5:48 pm – 6:00 pm

11

### **Pediatric Renal Artery Stenosis: A 19-Year Experience in Management and Outcomes at a Tertiary Pediatric Hospital**

Hans K. Boggs, Sharon C. Kiang, Ahmed M. Abou-Zamzam, Jr., Paul Miller, Ellie Rickards, Roger T. Tomihama—Loma Linda University School of Medicine, Loma Linda, CA

**INTRODUCTION AND OBJECTIVES:** Renal artery stenosis (RAS) is an uncommon cause of pediatric hypertension. Guidelines for the work up and management have not been established. The most widely reported etiology of pediatric renovascular disease has been fibromuscular dysplasia (FMD); however, other etiologies including middle aortic syndrome (MAS) and vasculitides have been described. We reviewed cases of radiologically identified pediatric RAS and describe etiologies, management, and long term clinical outcomes in our patients.

**METHODS:** Reports for duplex ultrasound, computed tomography angiography, magnetic resonance imaging, and conventional angiography from an academic children's hospital between 2000-2019 were evaluated. Positive reports for RAS were confirmed by a vascular surgeon and a radiologist. Demographics, indications for evaluation, management and long term clinical outcomes were documented.

**RESULTS:** Imaging for suspected RAS was performed on 984 children. 42 patients [Female: 25 (60%); Male: 17 (40%); Mean age: 9.7 years (range 0.04-17)] were found to have evidence of RAS based on screening imaging (Duplex 93%; MRA/CTA 7%); 4 had normal findings on repeat exam. Of the 38 patients with positive imaging, 34% (n=13) underwent intervention. Of those requiring intervention, 58% (n=7) had RAS and concomitant aortic pathology [4 MAS; 2 thoracoabdominal vasculitis; 1 aortic thrombus]. Only 16% (n=2) had FMD, 16% (n=2) with neurofibromatosis and 16% (n=2) with unspecified RAS. None of the conservatively managed patients with positive RAS imaging (66%) required interventions during the mean follow up of 33.8 months.

**CONCLUSIONS:** Pediatric RAS is a low frequency disease and long-term outcomes have been underreported. The incidence of associated aortic pathology in our intervention cohort appears higher than previously reported. Long term follow-up of the conservative management cohort demonstrated that up to 66% of patients could be managed successfully without therapy.

6:00 pm – 7:30 pm

### **WELCOME RECEPTION**

All attendees, guests & exhibitors are welcome.



# Full Program & Abstracts

## Friday, January 31, 2020

6:00 am – 7:00 am	Continental Breakfast
6:00 am – 9:30 am	Registration
6:50 am – 7:00 am	<b>NEWS &amp; VIEWS FROM THE SVS</b> Ronald Dalman, MD SVS President-Elect
<b>7:00 am – 9:03 am</b>	<b>SCIENTIFIC SESSION II</b> Moderators: Andrew Meltzer, MD & Jason Less, MD
7:00 am – 7:12 am	12 <b>Plantar Flexion Induced Entrapment of the Dorsalis Pedis Artery in a Teenaged Cross-Country Runner</b> Leighton T. McCabe, Jason W. Stoneback, Jeniann A. Yi, William R. Hiatt, Mary K. Jesse, Max V. Wohlauser—University of Colorado Anschutz School of Medicine, Aurora, CO

**INTRODUCTION AND OBJECTIVES:** Symptomatic peripheral artery disease of the lower extremity rarely affects young adults. Anatomical variances have manifested as symptomatic foot ischemia in two cases in the literature with one published in the *Annals of Vascular Surgery* occurring in a 47-year old male with pain upon dorsiflexion. We describe the case of a 17-year-old female presenting with foot pain upon plantar flexion due to dorsalis pedis artery entrapment.

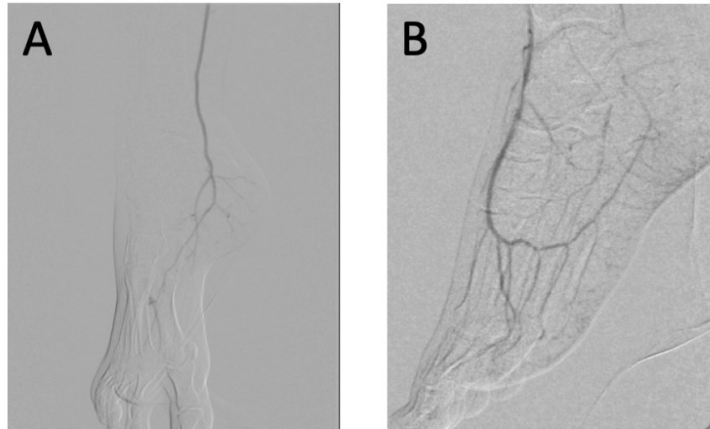
**METHODS:** The patient was a 17-year-old female who presented with right foot pain upon plantar flexion, which resolved upon returning to the neutral position. The potential site of compression was identified on MRI where the dorsalis pedis artery (DP) ran deep to the extensor hallucis brevis (EHB) tendon near the first and second tarsometatarsal joints. On diagnostic arteriogram, there was notching of the DP over the talus bone. The DP Doppler signal was obliterated upon plantar flexion. A longitudinal incision was made over the artery in the area of compression from the proximal talus bone to the EHB tendon insertion. The flexor retinaculum was incised. Abnormal fibrous bands were identified running medial to lateral that were lysed anterior to the artery. A completion angiogram showed a persistently patent DP artery with plantar flexion.

**RESULTS:** She was discharged one day post-operatively without issues. On follow-up, the patient was ambulatory with complete resolution of her pain. Arterial duplex demonstrated normal velocities through the DP in all positions.

**CONCLUSIONS:** Symptomatic PAD is a rare presentation in young adults and is usually due to non-atherosclerotic pathophysiology. We present a rare case of dorsalis pedis artery entrapment syndrome. Given the mechanical nature of obstruction, surgical correction is an effective treatment.

## Full Program & Abstracts

Figure 1. Intraoperative arteriograms showing restricted flow upon plantar flexion (A) and restoration of dorsalis pedis artery flow after removal of impinging fibrous band (B).



## Full Program & Abstracts

7:12 am – 7:24 am

13

### **Vascular Surgeons Carry an Increasing Responsibility in the Management of Lower Extremity Vascular Trauma**

Siddhant Parihar, Jaime Benarroch-Gampel, Victoria Teodorescu, Christopher Ramos, Keri Minton, Ravi Rajani—Emory University, Atlanta, GA

**INTRODUCTION:** There is preliminary evidence that vascular surgeons are increasingly relied on nationally to assist with the management of lower extremity vascular trauma. Current trauma center verification, however, does not require any level of vascular surgery coverage. We sought to assess practice patterns regarding vascular surgery consultation and temporal trends in the surgical management of these patients.

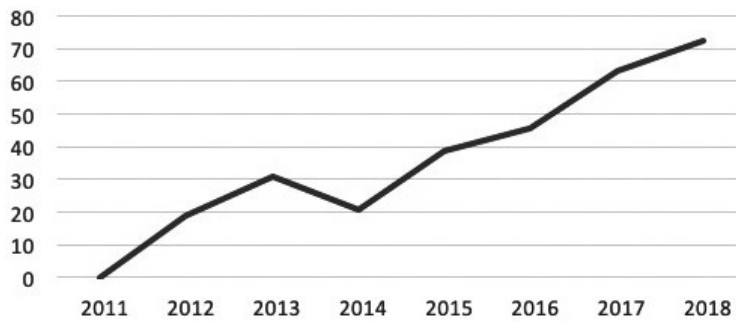
**METHODS:** A retrospective analysis was performed on all patients who underwent surgical repair for vascular trauma of the lower extremity at a single, academic, public hospital from 2011-2018. Demographic data and procedural data were collected. Patients were assigned to a Vascular Surgery (VS) or Non-Vascular Surgery (NV) group. The primary outcome measure was the rate of VS consultation. Secondary outcome measures included 30-day mortality, length-of-stay, and limb salvage.

**RESULTS:** 180 patients were identified (77 VS group, 103 NV group). There was an increase in the proportion of repairs done by VS from 2011 to 2018 ( $p < 0.05$ ). There were significant management differences between the two groups, with vascular surgeons more likely to perform primary end-to-end anastomosis for both arterial (21.33% vs 6.90%) and venous (19.15% vs 5.26%) injuries (both  $p < 0.05$ ). Patients in the VS group were less likely to have balloon embolectomy, fasciotomy, or intravascular shunting than the NV group (all  $p < 0.05$ ). There were no significant differences in mortality (5.19% vs 4.85%), length-of-stay (15.05 days vs 18.38 days), or limb salvage (94.81% vs 95.15%).

**CONCLUSION:** Lower extremity vascular trauma is increasingly managed by vascular surgeons. Furthermore, vascular surgeons are more selective in the use of potentially unnecessary adjunctive maneuvers. Current accreditation guidelines should be revisited to mandate vascular surgery coverage in trauma centers that frequently treat this patient population.

## Full Program & Abstracts

Figure 1. % of LE Vascular Trauma Repairs Conducted by Vascular Surgeons



# Full Program & Abstracts

7:24 am – 7:36 am

14

**Practice Patterns of Vascular Surgery's "1%"**  
William W. Sheaffer, Samuel R. Money, Victor J. Davila, Ina Y. Soh, Matthew D. Breite, William M. Stone, Andrew J. Meltzer—Mayo Clinic Arizona, Phoenix, AZ

**INTRODUCTION AND OBJECTIVES:** Public attention on healthcare spending has increased focus on variation in practice patterns and overutilization of high-cost services. Mainstream news reports have revealed that a small number of providers account for a disproportionate amount of total Medicare payments. Here, we explore variation in Medicare payments among vascular surgeons, and compare practice patterns of the most highly reimbursed surgeons to the rest of the workforce.

**METHODS:** 2016 Medicare Provider Utilization Data were queried to identify procedure, charge, and payment data to vascular surgeons, identified by National Provider Identification (NPI) taxonomy. Commonly performed services (>10/year) were stratified into categories (endovascular, open surgery, varicose vein, evaluation and management, etc. [Table 1]). Practice patterns of vascular surgeons comprising the top 1% Medicare payments (n=31) were compared to the remainder of the workforce (n=3,104).

**RESULTS:** In 2016, Medicare payments to vascular surgeons totaled \$589M. 31 vascular surgeons - 1% of the workforce - received \$91 million (15% of total payments). Practice patterns of the 1% differed significantly from the remainder of vascular surgeons (Table 1; p<0.05), with endovascular procedures accounting for 85% of their reimbursement. Specifically, the 1% received 49% of total Medicare payments for atherectomy (\$121M), 98% of which were performed in the office setting.

**CONCLUSIONS:** 1% of vascular surgeons receive an inordinate amount of total Medicare payments to the specialty. This discrepancy is due to variations in volume, utilization, and site of service. Disproportionate use of outpatient atherectomy in a small number of providers, for example, raises concerns regarding appropriateness and overutilization. Given current scrutiny over healthcare spending, these findings should prompt serious discussion regarding the utility of personal and societal self-regulation.

## Full Program & Abstracts

Table 1.

Category	The "1%"		Remaining Workforce	
	Payments	%Payments	Payments	%Payments
Dialysis Access	\$1,609,112.45	1.8%	\$39,523,879.35	7.9%
Endovascular	\$77,453,057.03	85.4%	\$148,544,695.50	29.8%
Inpatient E&M	\$172,836.97	0.2%	\$22,332,256.45	4.5%
Miscellaneous	\$0	0%	\$2,662,823.33	0.5%
Office E&M	\$2,379,561.82	2.6%	\$77,525,274.74	15.6%
Open				
Procedures	\$444,314.87	0.5%	\$21,545,216.90	4.3%
Varicose Vein	\$2,518,378.46	2.8%	\$53,665,277.63	10.8%
Vascular Access	\$149,355.05	0.2%	\$7,393,521.92	1.5%
Non-invasive				
lab	\$5,836,158.78	6.4%	\$119,402,142.60	24.0%
Wound Care	\$119,558.42	0.1%	\$5,885,013.7	1.2%
<b>Total</b>	<b>\$90,682,333.85</b>		<b>\$498,480,102.20</b>	

## Full Program & Abstracts

7:36 am – 7:48 am

15

### **Regional Market Competition is Associated with Aneurysm Diameter at Time of EVAR**

Courtenay Holscher<sup>1</sup>, M. Libby Weaver<sup>1</sup>, James H. Black, III<sup>1</sup>, Christopher Abularrage<sup>1</sup>, Ying Wei Lum<sup>1</sup>, Devin Zarkowsky<sup>2</sup>, Caitlin Hicks<sup>1</sup>—<sup>1</sup>Johns Hopkins University, Baltimore, MD; <sup>2</sup>University of Colorado, Aurora, CO

**OBJECTIVES:** Local market competition has been previously associated with more aggressive surgical decision making. For example, more local competition for organs is associated with acceptance of lower quality kidney offers in transplant surgery. We hypothesized that market competition would be associated with size of abdominal aortic aneurysm (AAA) at time of elective endovascular aneurysm repair (EVAR).

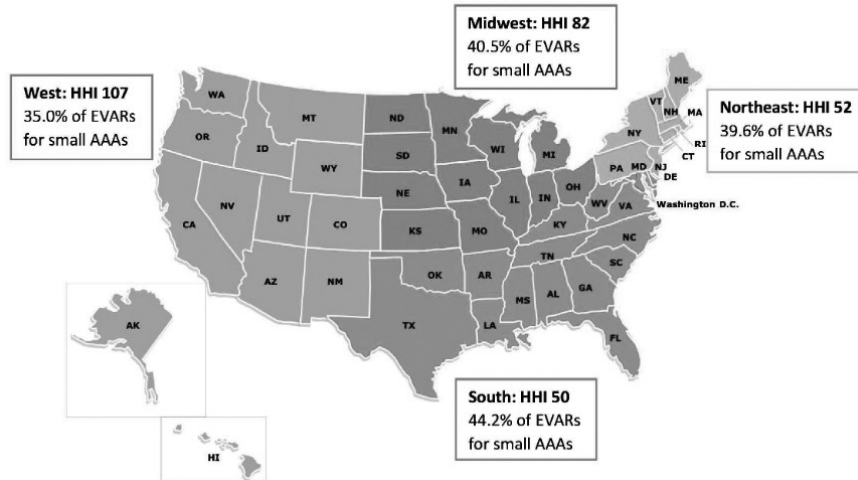
**METHODS:** We included all elective EVARs reported in the Vascular Quality Initiative database (2011-2018). Small AAAs were defined as a maximum diameter <5.5cm in men or <5.0cm in women. We calculated the Herfindahl-Hirschman index (HHI), a measure of physician market concentration (higher HHI=less market competition), for each US census region. Multilevel linear regression was used to examine the association between size of AAA at EVAR and HHI, clustering by region.

**RESULTS:** Of 37,914 EVARs performed, 15,379 (40.6%) were for small AAAs. There was significant variation in proportion of EVARs performed for small AAAs across regions (P<0.001). The South had both the highest proportion of EVARs for small AAAs (44.2%) as well as the highest market competition (HHI 50), while the West had the lowest proportion of EVARs for small AAAs (35.0%) and the lowest market competition (HHI 107) (Figure). Adjusting for patient age, sex, race, and symptoms, each 10 unit increase in HHI was associated with a 0.13mm larger maximum AAA diameter at time of EVAR (95% CI 0.04mm-0.23mm, P=0.006).

**CONCLUSIONS:** Physician market concentration is independently associated with AAA diameter at time of elective EVAR. These data suggest that physician decision-making for EVAR is impacted by market competition.

# Full Program & Abstracts

Figure 1. Regional market competition and proportion of EVARs performed on small AAAs. The Herfindahl-Hirschman index (HHI) ranges from 0-10,000 with higher HHIs demonstrating less market competition and more monopoly, while lower indices demonstrate more competition. Colors indicate regions.





## Full Program & Abstracts

7:48 am – 7:56 am

16 (RF)

### **Flow Diversion: A Novel Technique in the Management of Aneurysmal False Lumen in Chronic Type B Aortic Dissection**

Motahar Hosseini<sup>1</sup>, David N. Blitzer<sup>2</sup>, Anahita Ghazi<sup>1</sup>, Shahab Toursavadkoshi<sup>1</sup> — <sup>1</sup>University of Maryland, Baltimore, MD; <sup>2</sup>MedStar Health, Baltimore, MD

**INTRODUCTION:** Persistent false lumen (FL) perfusion following TEVAR for chronic Type B aortic dissection (cTBAD) is predictive of aneurysmal degeneration and poor outcomes. Several methods exist that attempt to achieve false lumen thrombosis (e.g., coil embolization, Knickerbocker, candy-plug). In the following, we present a novel method to achieve FL thrombosis by excluding aneurysmal changes and diverting FL flow to a nearby branch vessel.

**METHODS:** Two cTBAD patients are described with previous TEVAR who present with symptomatic aneurysmal dilation of their thoracic aorta secondary to continued FL perfusion. In both cases, flow was diverted from the false lumen into a branch vessel by way of covered stent-grafts. Patient 1 had a system of four stent-grafts to divert flow into the left renal artery. Patient 2 had persistent FL perfusion from the left subclavian artery (LSCA), which also supplied a dominant left vertebral artery after aortic debranching and precluded proximal embolization. Flow was ultimately diverted to the level of the celiac artery with a system of five covered stent-grafts (figures 1 and 2).

**RESULTS:** Both patients received follow up CTA and 18 months and 7 months for patients 1 and 2, respectively. In both cases, diverting flow from the FL resulted in FL thrombosis, stable or mildly decreased sac size, and no subsequent endoleak.

**CONCLUSIONS:** Flow diversion is a promising technique that can benefit cTBAD patients with aneurysmal dilation of the FL—particularly those who are not open operative candidates.

## Full Program & Abstracts

Figure 1.

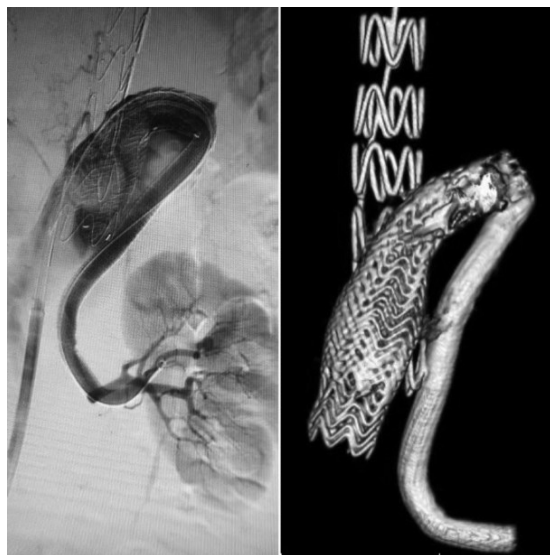


Figure 2.



## Full Program & Abstracts

7:56 am – 8:04 am

17 (RF)

### **Endovascular Repair of Ascending Aortic Pseudoaneurysm using Transfemoral Frame-Coiling Under Total Cerebral Protection**

Jeanette Man, Mel J. Sharafuddin—University of Iowa Carver's College of Medicine, Iowa City, IA

**INTRODUCTION AND OBJECTIVES:** Ascending aortic pseudoaneurysms (AAP) are associated with prior cardiac surgery. Although most commonly incidental, they can present with compression or rupture. Surgery is challenging given its likely reoperative nature. Various transcatheter therapies are associated with a considerable risk for neuroembolic complications.

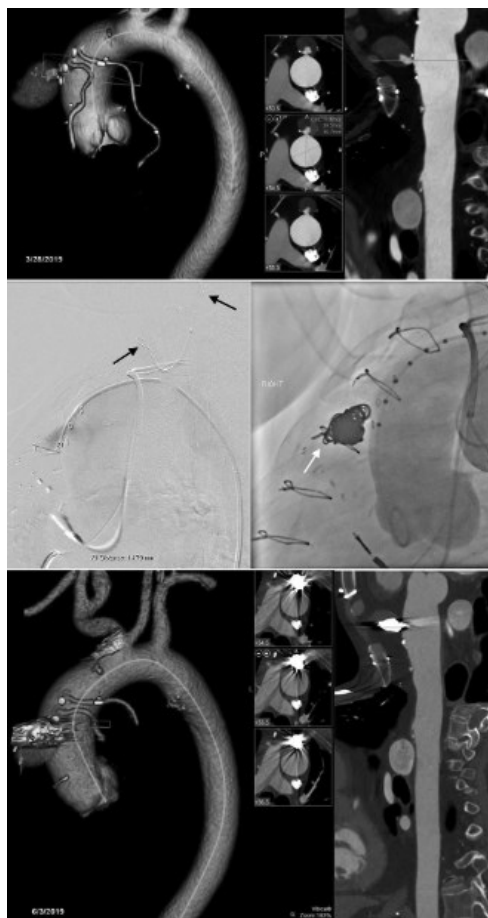
**METHODS:** 64 y.o. man with CABG 10 years prior was referred for an incidental 3 cm saccular pseudoaneurysm of the ascending aorta, with a large thrombus burden. Co-morbidities included severe heart failure, chronic kidney disease, and peripheral vascular disease. He was initially observed with repeat CTA one year later demonstrating interval growth. Endovascular repair was favored. Stent-graft exclusion was contraindicated to multiple adjacent vein graft anastomoses (Figure), and endovascular framing-coil obliteration was felt appropriate. The procedure was performed under total cerebral embolic protection using the Sentinel device.

**RESULTS:** SENTINEL embolic protection device (Boston Scientific) was deployed in the proximal innominate and left common carotid arteries from a right transradial approach. Transfemoral access into the aneurysm was established using a 4Fr tri-axial system (sheath-catheter-microcatheter). Flow lumen was obliterated using 6 framing coils (AZUR, Terumo) in a nested fashion, with complete obliteration of the flow lumen and without coil prolapse into the aorta. The embolic protection device was retrieved uneventfully with evidence of small captured debris. The patient was doing well on his 3-months follow up. CTA showed continued non-filling of the coiled AAP sac, with no prolapse or associated thrombus in the aortic lumen.

**CONCLUSIONS:** Endovascular obliteration of AAP is a viable option in prohibitive risk patients. Transcatheter exclusion using carefully planned frame-coiling is a relatively simple yet effective treatment option. Total cerebral embolic protection is an important adjunct.

# Full Program & Abstracts

Figure 1.



## Full Program & Abstracts

8:04 am – 8:12 am

18 (RF)

### **Mid-Aortic Syndrome with Aortoiliac Occlusive Disease and Venous Stasis Ulceration**

Anna M. Boniakowski, Bobby Beaulieu, Jonathan L. Eliason, Dawn Coleman—University of Michigan, Ann Arbor, MI

**INTRODUCTION:** A 14-year-old female with mid-aortic syndrome, aorto-iliac occlusion, two-drug hypertension, solitary kidney, and right leg hemi-hypertrophy was referred for a progressive chronic non-healing left lower extremity supra-malleolar wound. She had bilateral lower extremity claudication with vigorous exercise. Left femoral/pedal pulses were absent and ABIs reduced. CTA revealed infrarenal aorto-iliac atresia with reconstitution of the right iliac bifurcation and left CFA. She had a persistent sciatic artery associated with distal popliteal ectasia (Figure 1).

**METHODS:** Through a retroperitoneal thoracoabdominal aortic exposure through the 8th intercostal space, her vasculature was exposed. The right CIA was identified as a pulseless cord; the left profunda was hypertrophied and the left SFA was diminutive although patent by Doppler. A thoracic aortic bypass was created to the right iliac bifurcation and left common femoral artery using a 14x7mm bifurcated Rifampin-bonded Hemashield. The graft was tunneled retroperitoneal and retroinguinal, an ultimately fully covered.

**RESULTS:** Wound biopsy returned consistent with venous stasis. Post-operative ABIs were improved and CTA revealed a widely patent reconstruction (Figure 2). She was treated with compression, wound care and discharged on postoperative day 9 without complication. Follow up has revealed wound healing and full resolution of claudication.

**CONCLUSION:** This is a rare case of combined arterial and venous insufficiency complicated by tissue loss in a young child with midabdominal syndrome, an association not previously well-described. She has diffuse vascular aberrancies, limb hemi-hypertrophy, congenital single kidney and a tethered cord, although the pathophysiology of these developmental derangements remains unclear. Judicious surveillance will be imperative.

## Full Program & Abstracts

Figure 1.



## Full Program & Abstracts

Figure 2.



## Full Program & Abstracts

8:12 am – 8:24 am

19

### **Comparison of Atherectomy and Balloon Angioplasty for Isolated Femoro-Popliteal Revascularization**

Arash Fereydooni<sup>1</sup>, Halbert Bai<sup>2</sup>, Haoran Zhuo<sup>2</sup>, Yawei Zhang<sup>2</sup>, Cassius Iyad Ochoa Chaar<sup>1</sup>—<sup>1</sup>Yale School of Medicine, New Haven, CT; <sup>2</sup>Yale School of Public Health, New Haven, CT

**INTRODUCTION AND OBJECTIVES:** The use of atherectomy for lower extremity revascularization is increasing despite concerning reports about its long-term safety and effectiveness. This study compares the outcomes of atherectomy to balloon angioplasty for treatment of isolated femoro-popliteal disease.

**METHODS:** All patients undergoing endovascular treatment of isolated femoro-popliteal lesions in the VQI (2006-2018) were identified. Patients with concomitant stenting, open surgery, or iliac or tibial intervention were excluded. Patients were divided into 2 groups: atherectomy and angioplasty. Propensity matching was performed based on age, gender, race, ambulatory-status, diabetes, smoking, hypertension, CAD, COPD, CHF, dialysis, prior inflow bypass and intervention, amputation, indication, length of treated lesion, ASA class, and TASC classification. The outcomes of the matched groups were compared.

**RESULTS:** A total of 10,061 atherectomy and 22,136 angioplasty of femoro-popliteal disease were identified. After matching, there were 6,383 procedures in each group. Despite matching, patients undergoing atherectomy were more likely to have CHF, be on dialysis, and have a longer length of treated lesion. Atherectomy was associated with higher likelihood of a successful angiographic result (94.4% vs 93%;  $P < .001$ ), but had increased distal embolization (2% vs 1%;  $p < .001$ ) compared to angioplasty. There was no other difference in 30-day outcomes. At one year, atherectomy was associated with improved primary patency (84.6% vs 81.9%;  $P = 0.018$ ) and greater improvement in ABI ( $0.19 \pm .04$  vs  $0.16 \pm 0.39$ ;  $P = 0.01$ ) compared to angioplasty. There was no difference in rates of reintervention, major amputation, ambulatory-status improvement, or mortality. (Table 1)

**CONCLUSIONS:** Atherectomy seems to be associated with improved 1-year femoro-popliteal primary patency compared to angioplasty with no difference in clinical outcomes. Additional research into the value of atherectomy is needed to justify its additional cost.



## Full Program & Abstracts

Table 1. Comparison of baseline characteristics, peri-operative and 1-year outcomes of patients who underwent atherectomy or angioplasty of isolated femoro-popliteal lesions after matching

	Variable		Atherectomy (N=6,383) N (%)	Angioplasty (N=6,383) N (%)	P-Value	
Demographics	Gender	Male	3675 (57.6)	3761 (58.9)	0.123	
	Race	White	4994 (78.2)	5121 (80.2)	0.006*	
	Age (Mean ± SD)		69.1 ± 10.9	68.8 ± 11.2	0.189	
	Ambulatory Status	Ambulatory	5045 (79)	5101 (79.9)	0.447	
Ambulatory with assistance		984 (15.4)	950 (14.9)			
Non-ambulatory		354 (5.6)	332 (5.2)			
Comorbidities	Diabetes		3579 (56.1)	3592 (56.3)	0.809	
	CHF		549 (8.6)	478 (7.5)	0.021*	
	COPD		1503 (23.6)	1471 (23.1)	0.515	
	Hypertension		5743 (90)	5711 (89.5)	0.351	
	Coronary Artery Disease		2147 (33.7)	2129 (33.4)	0.736	
	Dialysis		536 (8.4)	450 (7.1)	0.004*	
	Prior Ipsilateral Inflow Bypass		100 (1.6)	75 (1.2)	0.057	
	Prior Ipsilateral Inflow Intervention		654 (10.3)	701 (11)	0.177	
	Indication	Claudication		3623 (56.8)	3676 (57.6)	0.419
		Rest Pain		844 (13.2)	797 (12.6)	
		Tissue Loss		1916 (30)	1910 (29.9)	
Pre-operative ABI (Mean ± SD)		0.9 ± 1.9	0.7 ± 0.4	0.141		
Length of treated lesion		21.6±20.3	20.8±20.4	0.028*		
Complications	Thrombosis		5 (0.1)	4 (0.1)	0.739	
	Distal embolization		130 (2)	61 (1)	<.001*	
	Arterial Perforation		39 (0.6)	33 (0.5)	0.48	
	Cardiac Complication		10 (0.5)	12 (0.7)	0.613	
	Respiratory Complication		3 (0.2)	4 (0.2)	0.673	
	Renal Complication		6 (0.3)	9 (0.5)	0.4	
	Infection		224 (3.5)	251 (3.9)	0.207	
Early Outcomes	Length of Stay (Mean ± SD)		1.8±8.2	2.8±15.4	<.001*	
	30-day Mortality		6283 (98.4)	6266 (98.2)	0.244	
	Successful angiographic result		6014 (94.4)	5932 (93)	<.001*	
1-year Outcomes	1-year Survival		5193 (81.4)	5111 (80.1)	0.066	
	1- year Primary Patency		1650 (84.6)	1803 (81.9)	0.018*	
	Reintervention		751 (15.8)	771 (15.9)	0.932	
	Major Amputation		157 (3.27)	175 (3.59)	0.39	
	Ambulatory without Assistance		382 (8.2)	343 (7.3)	0.101	
	Improved Ambulation		392 (8.6)	416 (9.1)	0.101	
	Improvement in ABI (Mean ± SD)		0.19±.04	0.16±0.39	0.01*	

## Full Program & Abstracts

8:24 am – 8:35 am

20

### **Ruptured AAA Patients Treated with EVAR Off-IFU Demonstrate Lower In-Hospital Survival than Those with On-IFU Repair**

Devin S. Zarkowsky<sup>1</sup>, Joel L. Ramirez<sup>2</sup>, Courtenay M. Holscher<sup>3</sup>, Philip P. Goodney<sup>4</sup>, Mahmoud B. Malas<sup>5</sup>, James C. Iannuzzi<sup>2</sup>, Max Wohlaer<sup>1</sup>, Caitlin W. Hicks<sup>3</sup>—<sup>1</sup>University of Colorado, Aurora, CO; <sup>2</sup>University of California San Francisco, San Francisco, CA; <sup>3</sup>The Johns Hopkins Medical Institutions, Baltimore, MD; <sup>4</sup>Dartmouth-Hitchcock Medical Center, Lebanon, NH; <sup>5</sup>University of California San Diego, San Diego, CA

**INTRODUCTION AND OBJECTIVES:** Choosing endovascular surgery to treat a rAAA patient often occurs despite concerning anatomic information. We hypothesized that rEVAR outside IFU would demonstrate in-hospital survival no different from patients treated on-IFU or with an infrarenal clamp during open repair.

**METHODS:** VQI datasets for OAAA and EVAR were queried. Proximal neck criteria and graft characteristics from IFU were correlated with VQI data; treatment was identifiable as on- or off-IFU. Univariate comparisons between the on- and off-IFU groups were performed. Coarsened exact matching (CEM) decreased imbalance between off-IFU rEVAR and rOAAA patients to discern a mortality difference between off-IFU EVAR and open surgery. Multivariable regression identified factors independently associated with in-hospital survival.

**RESULTS:** Between 2013 and 2018, 621 patients with graft, anatomic and outcome data were treated with rEVAR, including 404 (65%) on-IFU and 217 (35%) off-IFU. The off-IFU group contained more women (25% vs. 18%, P=0.05) and patients with larger aneurysms (76 vs. 72 mm, P=0.01). Other pre-operative characteristics were not different. In-hospital survival was lower in patients treated off-IFU with rEVAR (78 vs 86%, P=0.02; OR1.94, P=0.006). When off-IFU patients were matched to rOAAA patients requiring infrarenal, suprarenal or supraceliac clamps, no baseline univariate differences were discerned between the groups. In-hospital survival was higher when off-IFU rEVAR patients were compared to the supraceliac clamp group, but not the infra- or suprarenal clamp groups (Summary Table). This finding persisted in a multivariable model (Summary Table).

**CONCLUSIONS:** Off-IFU rEVAR yields inferior outcomes when compared to on-IFU rEVAR. Open repair with an infrarenal or suprarenal clamp, however, demonstrate in-hospital survival that is no different from off-IFU rEVAR, suggesting open surgery is appropriate when proximal aneurysm necks are hostile.

## Full Program & Abstracts

Table 1.

	Repair category	In-hospital Survival (%)	P value
Unmatched	Off-IFU rEVAR	78	
	vs. On-IFU rEVAR	86	0.02
CEM	Off-IFU rEVAR	82	
	vs. infrarenal clamp	78	0.47
	vs. suprarenal clamp	73	0.06
	vs. supraceliac clamp	61	<0.001

MVLR from Matched Data	Odds Ratio	95%CI	P value
Off-IFU rEVAR	1 (ref)	-	-
Infrarenal clamp	1.67	0.74 - 3.75	0.22
Suprarenal clamp	1.49	0.65 - 3.43	0.34
Supraceliac clamp	5.24	2.19 - 12.55	<0.001

Harrell's c-statistic= 0.80

Hosmer-Lemeshow Goodness of Fit = 10.40, P=0.24

Adjusted for all pre-operative characteristics, surgeon and the log of annual center volume

## Full Program & Abstracts

8:35 am – 8:47 am

21

### **Utility of the Mangled Extremity Severity Score in Predicting Amputation in Military Lower Extremity Arterial Injury**

David W. Schechtman<sup>1</sup>, Thomas J. Walters<sup>2</sup>, David S. Kauvar<sup>1</sup>—<sup>1</sup>San Antonio Military Medical Center, Fort Sam Houston, TX; <sup>2</sup>U.S. Army Institute for Surgical Research, Fort Sam Houston, TX

**INTRODUCTION:** Effective amputation prediction may help inform appropriate early limb salvage efforts in military lower extremity (LE) arterial injury. The Mangled Extremity Severity Score (MESS) is the most commonly applied system for early amputation prediction but its utility in military trauma is unknown.

**METHODS:** Retrospective cohort study of Iraq and Afghanistan casualties with LE arterial injury who underwent a vascular limb salvage attempt. Retrospectively assessed MESS was statistically explored as an amputation predictor and MESS component surrogates (mechanism, vascular injury characteristics, tourniquet use, transfusion volume) were used to characterize limb injuries by presenting characteristics and evaluated for amputation prediction.

**RESULTS:** 439 limbs were included with 99 (23%) amputations, 29 (7%) within 48h of injury. Median MESS was 5 (IQR 4-6) among salvaged limbs and 7 (5-9) among amputations ( $P < .0001$ ). A MESS cutoff of  $\geq 7$  had a better ROC sensitivity/specificity profile (AUC .696 overall, .765 amputation within 48h) than MESS  $\geq 8$  (.593, .621), but amputation rates were only 43% for MESS  $\geq 7$  and 50% for  $\geq 8$ . MESS  $\geq 7$  was significantly associated with age, polytrauma, blast or crush mechanism, fracture, tourniquet use, distal (popliteal/tibial) and multiple arterial injuries, and massive transfusion. Amputation was significantly associated with polytrauma, blast or crush mechanism, fracture, and massive transfusion however 83 casualties had all four characteristics with an amputation rate of only 46%. (Table)

**CONCLUSION:** In combat casualties with arterial injury, LE amputation following attempted vascular limb salvage is inadequately predicted by existing scoring systems or the presenting characteristics available in this registry. Limb loss is predominantly late and likely due to factors not projectable at initial presentation.

## Full Program & Abstracts

Table 1.

	<b>MESS &lt; 7 (n=293)</b>	<b>MESS 7+ (n=146)</b>	<b>p</b>	<b>Salvage (n=340)</b>	<b>Amputation (n=99)</b>	<b>p</b>
<b>Age (Median, IQR)</b>	<b>23, 20-26</b>	<b>25, 19-31</b>	<b>0.002</b>	<b>24, 20-27</b>	<b>24, 21-26</b>	<b>.498</b>
<b>Polytrauma</b>	<b>120</b>	<b>97</b>	<b>&lt;.0001</b>	<b>152</b>	<b>65</b>	<b>&lt;.0001</b>
<b>Mechanism</b>			<b>&lt;.0001</b>			<b>&lt;.0001</b>
<b>Blast</b>	<b>175</b>	<b>124</b>		<b>217</b>	<b>82</b>	
<b>GSW</b>	<b>106</b>	<b>16</b>		<b>112</b>	<b>10</b>	
<b>Blunt</b>	<b>12</b>	<b>6</b>		<b>11</b>	<b>7</b>	
<b>Fracture</b>	<b>157</b>	<b>99</b>	<b>0.004</b>	<b>175</b>	<b>81</b>	<b>&lt;.0001</b>
<b>Tourniquet</b>	<b>150</b>	<b>96</b>	<b>0.004</b>	<b>185</b>	<b>61</b>	<b>.204</b>
<b>Most Proximal Level</b>			<b>0.001</b>			<b>.076</b>
<b>Femoral</b>	<b>102</b>	<b>67</b>		<b>140</b>	<b>29</b>	
<b>Popliteal</b>	<b>41</b>	<b>31</b>		<b>51</b>	<b>21</b>	
<b>Tibial</b>	<b>150</b>	<b>48</b>		<b>149</b>	<b>49</b>	
<b>Multi-Level</b>	<b>12</b>	<b>17</b>	<b>0.003</b>	<b>19</b>	<b>10</b>	<b>.112</b>
<b>Vein Injury</b>	<b>56</b>	<b>33</b>	<b>0.391</b>	<b>72</b>	<b>17</b>	<b>.383</b>
<b>Massive Transfusion</b>	<b>95</b>	<b>108</b>	<b>&lt;.0001</b>	<b>138</b>	<b>65</b>	<b>&lt;.0001</b>

## Full Program & Abstracts

8:47 am – 8:55 am

22 (RF)

### **The Triple Wire Technique for Delivery of Endovascular Components in Difficult Anatomy**

Jordan R. Stern, Benjamin D. Colvard, Jason T. Lee, Christopher P. Cheng—Stanford University, Stanford, CA

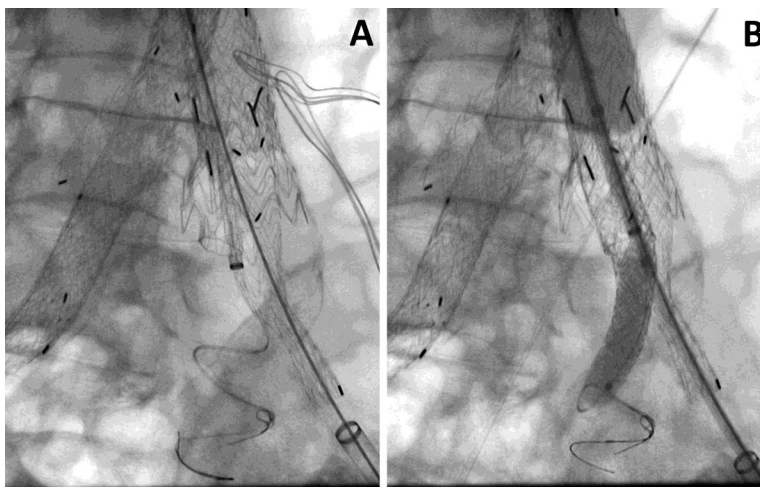
**INTRODUCTION AND OBJECTIVES:** We describe a novel endovascular technique in which three 0.014" guidewires are placed in parallel through an 0.035" lumen catheter, in order to create a stiff platform to allow for delivery of 0.035" profile devices through challenging anatomy.

**CASE REPORT:** A 76-year-old woman with history of prior endovascular aortic aneurysm repair presented for evaluation of late aneurysmal degeneration in the left common iliac artery, where a large bell-bottom limb had been placed. She was ultimately taken for repair with a Gore iliac branch endoprosthesis, and open left brachial access was utilized for delivery of a Gore Viabahn VBX balloon-expandable stent graft into the hypogastric artery. The hypogastric artery was extremely tortuous, and no stiff wire was able to pass with sufficient purchase to deliver an 8F sheath from the arm. Through an 0.035" Quick-Cross catheter, three 0.014" Grand Slam wires were passed sequentially through the tortuous vessel (Panel A). Over the three wires together, the 8F sheath was advanced into the hypogastric and the VBX stent was positioned and successfully deployed (Panel B).

**CONCLUSIONS:** The triple-wire technique is an effective method for tracking endovascular devices through difficult anatomy, and can be used in a variety of clinical settings. The technique is especially useful when a traditional, stiff 0.035" wire will not track without "kicking out." Each 0.014" wire is reasonably soft and traverses the tortuous vessel easily, but when the three wires are used together as a rail it provides a stiff enough platform for delivery.

# Full Program & Abstracts

Figure 1.



# Full Program & Abstracts

8:55 am – 9:03 am

23 (RF)

## **Outcomes Following Urgent Fenestrated-Branched Endovascular Repair for Pararenal and Thoracoabdominal Aortic Aneurysms**

Joedd H. Biggs, Emanuel R. Tenorio, Randall R. DeMartino, Bernardo C. Mendes, Gustavo S. Oderich—Mayo Clinic, Rochester, MN

**INTRODUCTION AND OBJECTIVES:** To evaluate outcomes following urgent or emergent fenestrated-branched endovascular aortic repair (F-BEVAR) for pararenal (PRA) and thoracoabdominal aortic aneurysms (TAAA) in patients considered high-risk for open repair.

**METHODS:** A retrospective, single institution evaluation of outcomes following F-BEVAR of symptomatic, rapidly enlarging, or ruptured PRA or TAAA treated with physician modified endograft (PMEG) and off-the-shelf fenestrated-branched grafts (OTSG). Outcomes were technical success, 30-day morbidity and mortality, and one year aortic related outcomes.

**RESULTS:** Thirty-five patients (25 male, mean age  $73 \pm 9$  years) underwent F-BEVAR using PMEG or OTSG over a 12-year period. Fifteen patients underwent emergent repair for contained rupture and twenty patients underwent urgent repair for symptomatic or rapidly growing aneurysms. Aneurysm classification was PRA in 12 patients and TAAA in 23 (9 extent IV and 14 extent I-III). Twenty-seven patients (77%) were repaired with PMEG and eight patients (23%) with OTSG. Technical success was 97% with a total of 105 renal-mesenteric arteries incorporated using 72 fenestrations (69%), 31 directional branches (29%) and two double-wide scallops (2%). 30-day mortality was 6%, with one patient expiring from unclear causes after hospital discharge and the other from mesenteric ischemia. MAEs otherwise occurred in nine patients (26%) including minor stroke in two patients, transient paraparesis, respiratory failure and heart failure in one patient each, and early return to the operating room in four patients. Mean follow up was  $13 \pm 14$  months. At 1- year, freedom from aortic-related mortality, aortic-related reintervention, and branch instability were  $97\% \pm 3$ ,  $84\% \pm 7$  and  $95\% \pm 5$ , respectively.

**CONCLUSIONS:** Urgent F-BEVAR of selected patients with PRA and TAAA is a feasible and potentially safe treatment in patients with suitable anatomy, with low rates of early mortality and spinal cord complications. Long-term follow up is needed to assess durability of repair and device-related complications.

10:00 am – 12:00 pm

## **ROUND TABLE DISCUSSION SESSION**

### **Women in Vascular Surgery**

Moderator: Jeanie Ruddy, MD

1:00 pm – 3:00 pm

## **ROUND TABLE DISCUSSION SESSION**

### **A Program Director's Perspective on Surgical Education**

Moderator: Mark Conrad, MD

3:00 pm

Registration Re-Opens

3:00 pm – 4:00 pm

Coffee/Snacks – Visit Exhibitors



## Full Program & Abstracts

4:00 pm – 6:00 pm

### SCIENTIFIC SESSION III

Moderators: Jeanie, Ruddy, MD & Karan Garg, MD

4:00 pm – 4:12 pm

24

### Re-Evaluating the Need for Routine Coverage of the Left Subclavian Artery in Thoracic Blunt Aortic Injury

Nicolas A. Stafforini, Niten Singh, Benjamin W. Starnes, Nam T. Tran, Elina Quiroga—University of Washington, Seattle, WA

**OBJECTIVE:** Thoracic Endovascular Aortic Repair (TEVAR) is the treatment of choice for thoracic blunt aortic injury (TBAI) with a 20mm proximal seal zone recommended based on aneurysmal disease literature, often requiring coverage of the left subclavian artery (LSA). The aim of this study was to analyze our experience with TEVAR for TBAI and evaluate whether 20mm is required to achieve successful remodeling.

**METHODS:** Single center, retrospective study of all consecutive patients who received a TEVAR for treatment of moderate and severe TBAI between April 2014 and November 2018. 3D software reconstruction was used for CT scan centerline measurements. Outcomes included technical success and immediate and long-term aortic-related complications.

**RESULTS:** 61 patients underwent TEVAR for TBAI during the study period. 28 (45.9%) patients underwent LSA coverage with an average distance from the LSA to the injury of 6.4mm (0-15.1mm). Of the 33 (54.1%) patients who did not undergo coverage of the LSA, 22 patients (66%) had less than 20 mm of proximal seal zone. The mean distance from the LSA to injury in this group was 16.6mm (7.9-29mm). None of the patients with LSA coverage developed ischemic symptoms and an average decrease in left arm systolic blood pressure of 24.8mmHG (0-62mmHG) was noted versus the right arm. Follow up CT scans revealed excellent remodeling with one reintervention to treat an endoleak from a covered LSA.

**CONCLUSION:** Immediate outcomes of TEVAR for TBAI with LSA coverage is well tolerated, however, the long-term sequela of LSA coverage is unknown. Exclusion of the injury and excellent remodeling appears to occur with less than 20mm of proximal seal and perhaps more attention should be made to preservation of the LSA.

# Full Program & Abstracts

Table 1.

	Patients n= 61	
	LSA Coverage	LSA Not covered
	28 (45.9%)	33(54.1%)
Severe TBAI 10 (16.4%)	3	7
Moderate TBAI 53 (83.6 %)	25	26
Age	44.6 years (16-88)	40.8 years ( 17-68)
Distance from Left Common Carotid to Injury	21.5 mm ( 8.36- 37.1 mm)	33 mm (18.5-56.9 mm)
Distance from LSA to Injury	6.4 mm ( 0-15.1 mm)	16.6 mm (7.9-29.5 mm)
Distance from Left Common Carotid to Graft	1.39 mm (0-13.6 mm)	16.4 mm (11.5-26 mm)
Distance from LSA to Graft	0 mm	1.9 mm (0-10.2)
OR Time	90 min ( 49-197)	82 min (30-192)
Mean Systolic Blood Pressure (SBP) difference with LSA coverage	24.8 mmHg ( 0-62)	x

## Full Program & Abstracts

4:12 pm – 4:24 pm

25

### **Paclitaxel-Coated Peripheral Arterial Devices are Associated with Reduced Mortality in Younger Patients**

Alexander H. King, Vikram S. Kashyap, Ravi N. Ambani, Jones P. Thomas, Saldeep Bose, Karem C. Harth, Virginia L. Wong, Jae S. Cho, Norman H. Kumins—University Hospitals Cleveland Medical Center, Cleveland, OH

**INTRODUCTION AND OBJECTIVES:** Paclitaxel-coated devices have been linked to a possible risk of increased mortality. Our objective was to compare patient age on the outcomes of treatment with paclitaxel vs uncoated-devices to analyze long-term mortality.

**METHODS:** We performed a retrospective review of 1170 consecutive patients who underwent femoropopliteal percutaneous intervention by angioplasty, atherectomy, stent placement, or combination between 2011 and 2018. Patients were grouped by age at the time of procedure: <60 years (N=244, 20.9%), 60-80 years (N=635, 54.3%), and >80 years (N=291, 24.9%). Within each group, patients were further divided by use of paclitaxel-coated devices. The primary outcome measure was survival assessed by Kaplan-Meier analysis. Differences between the groups were analyzed with ANOVA.

**RESULTS:** Demographics and comorbidities were similar among the groups except the >80 group had more females and patients with CLI, and fewer with diabetes and smoking history (Table). The use of paclitaxel-coated devices was similar across groups (<60: 56.2%, 60-80: 57.0%, >80: 52.6%; P=.45). In patients <60, paclitaxel use was associated with increased survival at 3.5 years (81.3% vs. 68.2%; P=.05). Survival was similar in the 60-80 group (66.8% vs. 60.6%; P=.14) and >80 group (43.2% vs. 38.9%; P=.99) (Figure).

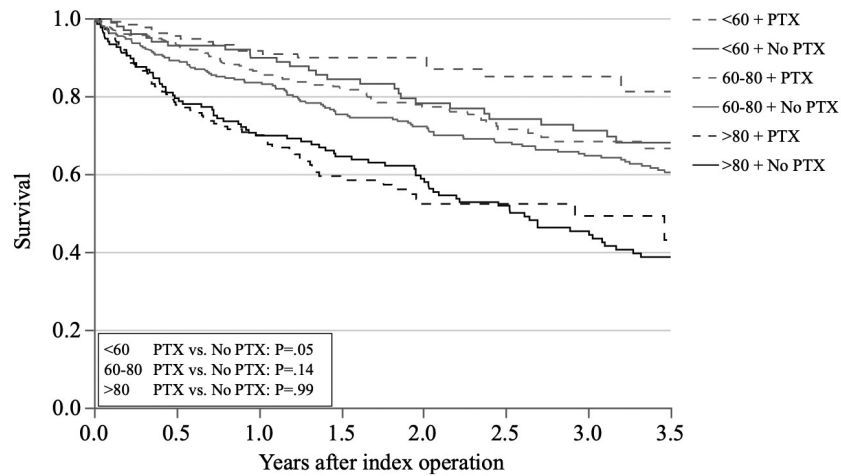
**CONCLUSIONS:** The use of paclitaxel-coated arterial devices is associated with increased survival in younger patients. Furthermore, there was no increased mortality observed in patients older than 60. Paclitaxel-coated devices can be used with continued caution especially in patients at increased risk for restenosis.

# Full Program & Abstracts

Table 1. Baseline characteristics across age cohorts

	<60 Years (n=244)	60-80 years (n=635)	>80 years (n=291)	P value
Age	52.8 ± 6.2	69.8 ± 5.7	86.3 ± 6.2	<.0001
Males	152 (62.3%)	381 (60.0%)	130 (44.7%)	<.0001
Hypertension	207 (84.8%)	568 (89.5%)	272 (93.5%)	.005
Hyperlipidemia	142 (58.2%)	444 (69.9%)	192 (66.0%)	.007
Coronary disease	104 (42.6%)	340 (53.6%)	153 (52.6%)	.01
Diabetes	145 (59.4%)	395 (62.2%)	142 (48.8%)	.0006
Chronic kidney disease	74 (30.3%)	209 (32.9%)	118 (40.6%)	.03
Dialysis	43 (17.6%)	84 (13.2%)	20 (6.9%)	.0004
Smoking history	201 (82.4%)	496 (78.1%)	148 (50.9%)	<.0001
CLTI	163 (66.8%)	415 (65.4%)	228 (78.4%)	.0002
Paclitaxel use	137 (56.2%)	362 (57.0%)	153 (52.6%)	.45

Figure 1. Kaplan-Meier survival analysis of overall survival based on age and use of paclitaxel (PTX).



## Full Program & Abstracts

4:24 pm – 4:36 pm

26

### **Effects of Continued Dual Antiplatelet Therapy on Major Adverse Cardiovascular Events after Carotid Artery Stenting**

Nathan Belkin, Benjamin M. Jackson, Paul J. Foley, Scott M. Damrauer, Ronald M. Fairman, Grace J. Wang—Hospital of the University of Pennsylvania, Philadelphia, PA

**INTRODUCTION AND OBJECTIVES:** Current guidelines recommend dual antiplatelet therapy (DAPT) for at least one month after Carotid Artery Stenting (CAS). The effects of maintained dual antiplatelet therapy after CAS have yet to be examined.

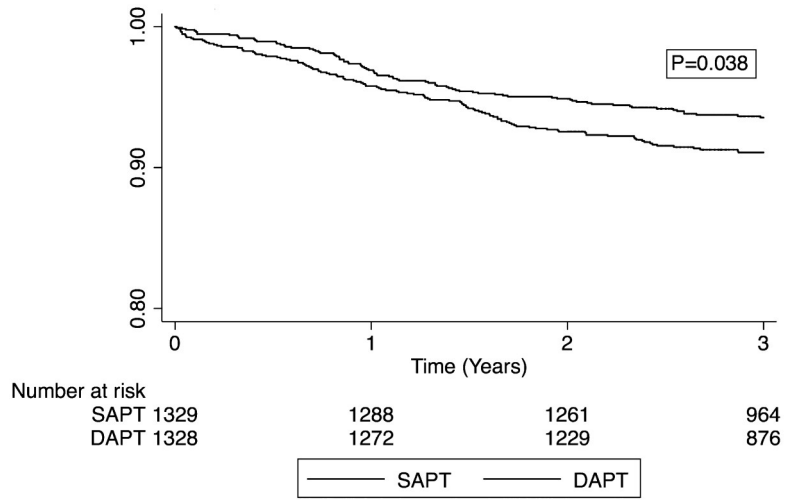
**METHODS:** A retrospective review of CAS procedures entered in the national Vascular Quality Initiative (2003-present) was performed. Patients discharged on DAPT were identified. Based on one year follow up antiplatelet regimens, two groups were propensity score matched: single antiplatelet therapy (SAPT) vs. maintained on DAPT. Kaplan Meier (KM) analysis investigated the impact of continued DAPT on long term major adverse cardiovascular events (MACE), a composite outcome of stroke/TIA, MI, and mortality.

**RESULTS:** Of the 18,326 CAS procedures, 88.2% were discharged on DAPT. At follow up, 68.0% of patients were maintained on DAPT, and 32.0% on SAPT. The DAPT cohort had higher frequencies of atherosclerotic comorbidities (PAD, CAD, prior PCI, prior CABG). After propensity score matching, two groups of 1,330 patients with similar demographics and comorbidities were identified. KM analysis on the matched cohorts out to 3 years showed no association between DAPT and freedom from stroke/TIA (3.6% vs 4.2%,  $p=0.546$ ), MI (0.23% vs 0.76%,  $p=0.070$ ), or mortality (3.0% vs 4.4%,  $p=0.096$ ). Interestingly, DAPT was associated with an increase in MACE (6.5% vs 8.9%,  $p=0.038$ ), Figure.

**CONCLUSIONS:** Continued dual antiplatelet therapy after carotid artery stenting does not improve long term cardiovascular outcomes over single antiplatelet therapy, and appears to be associated with increased combined major adverse cardiovascular events. In patients who do not otherwise have an indication for dual antiplatelet treatment, there is no additive benefit for DAPT beyond the postoperative 30-day period.

# Full Program & Abstracts

Figure 1. Kaplan-Meier: Freedom from MACE, Matched



## Full Program & Abstracts

4:36 pm – 4:48 pm

27

### **Endovascular Embolization Techniques in a Swine Model of Fatal Uncontrolled Solid Organ Hemorrhage and Coagulopathy**

David S. Kauvar<sup>1</sup>, David W. Schechtman<sup>1</sup>, Sarah B. Thomas<sup>1</sup>, Rodolfo J. DeGuzman<sup>2</sup>, Irene A. Polykratis<sup>2</sup>, Malcolm D. Prince<sup>2</sup>, Bijan S. Kheirabadi<sup>2</sup>, Michael A. Dubick<sup>2</sup>—<sup>1</sup>San Antonio Military Medical Center, Fort Sam Houston, TX; <sup>2</sup>U.S. Army Institute for Surgical Research, Fort Sam Houston, TX

**INTRODUCTION:** Endovascular embolization is increasingly used in traumatic hemorrhage and other applications. No endovascular-capable translational models exist and coagulopathy's effect on embolization techniques is unknown. We developed a coagulation-adaptable solid organ hemorrhage model for investigation of embolization techniques.

**METHODS:** Anesthetized swine (n=26, 45±3 Kg) had laparotomy and splenic externalization. Half underwent 50% isovolemic hemodilution with 6% hetastarch and cooling to 33-35°C (COAG group). All had controlled 20mL/Kg hemorrhage and endovascular access to the proximal splenic artery with a 4Fr catheter via a right femoral sheath. Splenic transection and 5min free bleeding were followed by treatment (n=5/group) with 5mL gelfoam slurry, three 6mm coils, or no treatment (n=3, control). Animals received 15mL/Kg plasma and were monitored for 6 hours. Splenic blood loss was measured continuously and angiograms were performed at specified times.

**RESULTS:** Coagulopathy was successfully established in COAG animals. Pretreatment blood loss was greater in COAG (11±6ml/kg) than Non-COAG (7±3ml/kg, P=.04) animals. Hemorrhage was universally fatal without treatment. Non-COAG Coil survival was 4/5 (mean 326±75min) and Non-COAG Gelfoam 3/5 (311±67min) vs Non-COAG Control 0/3 (82±18min, P<.05 for both). Neither COAG Coil (0/5, 195±117min) nor COAG Gelfoam (0/5, 125±32min) significantly improved survival over COAG Control (0/3, 56±19 min). Posttreatment blood loss was 4.6±3.4ml/kg in Non-COAG Coil and 4.6±2.9ml/kg in Non-COAG Gelfoam, both lower than Non-COAG Control (18±1.3ml/kg, P=.05). Neither COAG Coil (8.4±5.4ml/kg) nor COAG Gelfoam (15±11ml/kg) had significantly less blood loss than COAG Control (20±1.2ml/kg). Both Non-COAG treatment groups had minimal blood loss during observation, while COAG groups had ongoing slow blood loss. In the COAG Gelfoam group, there was an increase in hemorrhage between 30 and 60 minutes.

**CONCLUSION:** A model of coagulation-adaptable fatal hemorrhage suitable for endovascular treatment was developed. Coagulopathy had profound negative effects on coil and gelfoam efficacy, with implications for trauma and elective embolization procedures.

## Full Program & Abstracts

4:48 pm – 4:56 pm

28 (RF)

### **Ascending Lumbar Vein Angioplasty and Stenting to Improve Lower Extremity Venous Drainage in the Setting of Ipsilateral Common Iliac Vein Occlusion**

Hunter Ray, Stuart Harlin—University of Texas Health Science Center at Houston (UT Health), McGovern Medical School, Houston, TX

**INTRODUCTION AND OBJECTIVES:** Iliofemoral deep venous thrombosis (IFDVT) can result in the post-thrombotic syndrome(PTS) with catheter directed thrombolysis(CDT) aiming to reduce the development and/or severity of PTS. After reduction of thrombus burden with thrombolysis any underlying anatomic venous abnormalities should be addressed.

**METHODS:** We present two cases of IFDVT treated with CDT and found to have uncrossable common iliac vein(CIV) occlusion with large ascending lumbar vein (ALV) collaterals draining via the hemiazygos system necessitating venous stent placement resulting in symptomatic improvement.

**RESULTS:** A 40-year-old male truck driver with acute left IFDVT was taken for pharmacomechanical thrombolysis with CDT overnight. Venography the following day revealed occluded left CIV, but with large yet stenotic ALV emptying via the hemiazygos system. The CIV occlusion was uncrossable and thus attention was turned to the stenotic ALV which was then angioplastied and stented with brisk emptying of the leg via the ALV noted along with immediate symptomatic improvement.

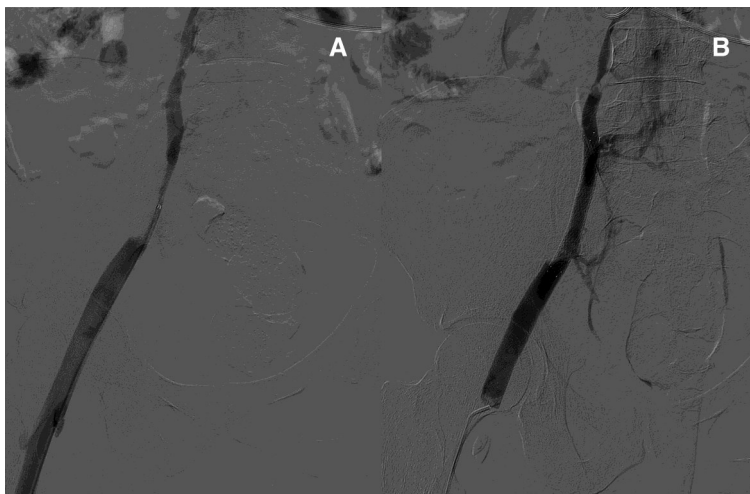
The second patient is a 39-year-old male with a recent international flight and history of medically managed left lower extremity DVT 10-years prior who presented with new acute left IFDVT and was taken for pharmacomechanical thrombolysis with CDT overnight. Venography the following day demonstrated CIV occlusion, but with large thrombus-laden ALV, thus CDT was initiated in this vessel. The following day venography demonstrated stenotic ALV with balloon angioplasty providing suboptimal improvement(Figure1A), thus a stent was placed with notable improvement in venous drainage(Figure1B). At follow-up he is asymptomatic without DVT recurrence.

**CONCLUSIONS:** Given uncrossable CIV occlusion and drainage via the ALV into collateral venous pathways diameter augmentation with angioplasty and stent placement appears to be safe and to afford symptomatic improvement in the short-term.



# Full Program & Abstracts

Figure 1.



## Full Program & Abstracts

4:56 pm – 5:04 pm

29 (RF)

### **Hybrid Endovascular and Open Surgical Approach to an Acute Type-A Aortic Dissection in a Pregnant Female with Marfan Syndrome**

Spencer Hansen, John Eidt, Charles Roberts—Baylor University Medical Center, Dallas, TX

**INTRODUCTION AND OBJECTIVES:** Acute aortic dissection can represent one of the most complex diseases treated by vascular surgeons. Presented is a 39-year-old female with Marfan Syndrome and previous aortic interventions with acute type-A aortic dissection complicated by visceral and cerebral malperfusion. The case was further complicated by twin pregnancy, active anticoagulation for mechanical aortic valve, ectopia lentis syndrome of the right eye and TIA involving the left eye, and rupture of the remaining native ascending aorta requiring cardiopulmonary bypass and hypothermic circulatory arrest with a 26-week twin pregnancy.

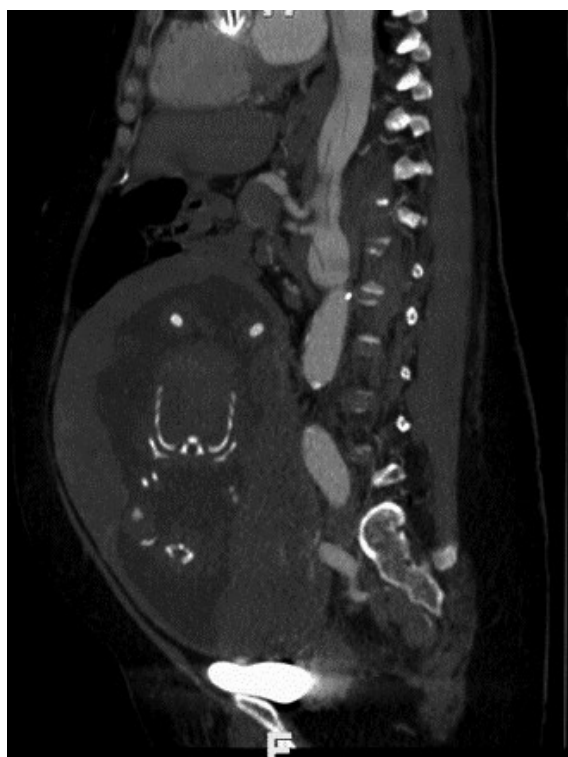
**METHODS:** Single patient experience with a staged hybrid approach to repair of a complex aortic dissection in a pregnant Marfan patient.

**RESULTS:** Repair was staged and performed by a hybrid open and endovascular approach including endovascular fenestration of the visceral and thoracic aorta for mesenteric ischemia, transfemoral stenting of the left common carotid artery origin with open patch angioplasty and septal tacking of the left CCA and ICA, and open repair of the remaining native ascending aorta on cardiopulmonary bypass and hypothermic circulatory arrest.

**CONCLUSION:** A staged hybrid approach to repair of acute aortic dissection can successfully treat the patient while maintaining a viable pregnancy until a safe cesarean delivery can be performed.

## Full Program & Abstracts

Figure 1.



## Full Program & Abstracts

5:04 pm – 5:12 pm

30 (RF)

### **Pharmacologic Therapy is not Associated with Stroke Prevention in Patients with Isolated Blunt Vertebral Artery Injury**

Amit Pujari<sup>1</sup>, Christopher R. Ramos<sup>1</sup>, Jonathan Nguyen<sup>2</sup>, Ravi R. Rajani<sup>1</sup>, Jaime Benarroch-Gampel<sup>1</sup>—<sup>1</sup>Emory University School of Medicine, Atlanta, GA; <sup>2</sup>Morehouse School of Medicine, Atlanta, GA

**INTRODUCTION AND OBJECTIVES:** Vertebral artery injury (VAI) is often grouped with carotid artery injury into a broader classification of blunt cerebrovascular injury, despite fundamental differences in mechanism of injury and outcome. This study seeks to evaluate the efficacy of medical therapy in preventing strokes for isolated VAI.

**METHODS:** Patients with blunt VAI (2011-2018) were identified from the trauma registry of a level I trauma center. A retrospective chart review was conducted excluding patients with concomitant carotid artery injury. Factors examined included demographics, injury characteristics, anatomic classification and management strategy. Patients were stratified by whether they received pharmacological (antiplatelet or anticoagulation) therapy. The primary outcome was new posterior circulation stroke within 30 days of injury.

**RESULTS:** A total of 206 patients with blunt VAI were included. Median injury severity score was 17 and 33 (16.0%) patients presented with Glasgow Coma Scale <8. The most common mechanism of injury was motor vehicle collision (58.7%). The injuries were bilateral in 38 (18.5%) patients and 73 (35.4%) suffered multi-segmental injuries. The anatomic severity of injuries was Grade 1=38.3%, Grade 2=25.7%, Grade 3=4.9%, Grade 4=30.6% and Grade 5=0.5%. There was no correlation between anatomic grade and stroke (P=.12) or initiation of pharmacologic therapy (P=.30). 172 (84%) patients received pharmacological therapy with no differences in baseline characteristics between treated and untreated patients. Overall, the 30-day stroke rate was 1.9%. There was no difference in stroke rate between patients who received medical therapy versus those who did not (5.9% vs. 1.2%, P=.13). In sub-group analysis by injury severity, medical therapy did not improve stroke rates. Among patients treated with aspirin, there was no difference in stroke rate between doses (P=1).

**CONCLUSIONS:** Isolated vertebral artery injury is associated with a very low risk of stroke and treatment with medical therapies including antiplatelet or anticoagulation does not improve risk of stroke.

## Full Program & Abstracts

5:12 pm – 5:24 pm

31

### **An Endovascular First Approach for Aortoiliac Occlusive Disease is Safe: Prior Endovascular Intervention not Associated with Inferior Outcomes after Aortofemoral Bypass**

Charles Decarlo, Christopher Latz, Laura T. Boitano, Jahan Mohebbi, Samuel I. Schwartz, Matthew J. Eagleton, W. Darrin Clouse, Mark F. Conrad—  
Massachusetts General Hospital, Boston, MA

**BACKGROUND:** While prior endovascular intervention is a risk factor for inferior outcomes after infrainguinal bypass, there are few studies evaluating the effect of prior aortoiliac endovascular intervention (AIEI) on outcomes after aortofemoral bypass (AFB). We sought to determine if prior AIEI was predictive of adverse events after AFB.

**METHODS:** The VQI was queried for all patients who underwent AFB from 2009-2019. Urgent/emergent cases and patients lacking data on the primary outcomes were excluded. Primary outcomes were major perioperative complication, major adverse-limb-event (MALE)-free survival, and long-term survival. Multivariable logistic regression identified predictors of major complication. MALE-free and long-term survival analyses were performed with Cox Proportional Hazards modelling and Kaplan-Meier techniques.

**RESULTS:** There were 2,982 patients who underwent AFB; 603 had a prior AIEI. Patient demographics are displayed in Table 1. There was no difference in major complications between the two groups (AIEI:19.7%, No AIEI:20.4%; p-value=0.721). Factors associated with major complication were simultaneous lower extremity intervention (OR 1.43,95%CI:1.19-1.72;p<0.001), COPD (OR 1.30,95%CI:1.08-1.57;p=0.006), blood loss (OR 1.28 per liter,95%CI:1.15-1.43;p<0.001), age (OR 1.03 per year,95%CI:1.02-1.04;p<0.001), diabetes (OR 1.26,95%CI:1.03-1.55;p=0.027), procedure time (OR 1.06 per hour,95%CI:1.00-1.11;p=0.045) and end-to-side proximal anastomosis (OR 1.22,95%CI:1.02-1.46;p=0.027). One-year MALE-free survival was 90.6% (95%CI:87.7-92.9%) in the prior AIEI group vs 92.2% (95%CI:90.9-93.3%) in the group without prior AIEI (Logrank p-value=0.184). Predictors of MALE/death were increasing degree of ischemia (HR 1.30,95%CI:1.16-1.45;p<0.001), diabetes (HR 1.39,95%CI:1.11-1.73;p=0.004), prior bypass (HR 1.52,95%CI:1.15-1.99;p=0.003), hemoglobin<9 g/dl (HR 1.85,95%CI:1.03-3.31;p=0.039), and ESRD (HR 3.26,95%CI:1.04-10.24;p=0.043). One-year survival was 96.3% (95%CI:95.4-97.0%) with no significant difference between groups. Prior AIEI did not predict any of the primary outcomes in multivariable analysis.

**CONCLUSION:** An endo-first approach for aortoiliac occlusive disease is safe and does not portend to inferior results after AFB.

## Full Program & Abstracts

Table 1. Patient Demographics, Comorbidities, Preoperative Medications, Surgical History, and Operative Factors

	Prior AIEI (N=603)		No Prior AIEI (N=2,379)		P-value
	<i>n</i>	%	<i>n</i>	%	
Age (Mean, Sd)	58.5	8.6	60.5	8.6	<b>&lt;0.001</b>
BMI (Mean, Sd)	26.7	5.8	25.8	5.5	<b>&lt;0.001</b>
CAD	144	23.9%	496	20.9%	0.105
Diabetes	159	26.4%	543	22.8%	0.067
History of CABG or PCI	170	28.2%	488	20.5%	<b>&lt;0.001</b>
CHF	34	5.6%	157	6.6%	0.389
COPD	178	29.5%	777	32.7%	0.140
ESRD on HD	1	0.2%	8	0.3%	0.496
Hemoglobin<9	13	2.2%	35	1.5%	0.233
Prior Bypass	155	25.7%	177	7.4%	<b>&lt;0.001</b>
Statin	478	79.3%	1758	73.9%	<b>0.007</b>
Highest Indication					0.059
Asymptomatic	3	0.5%	36	1.5%	
Claudication	330	54.7%	1,378	57.9%	
Rest Pain	188	31.2%	645	27.1%	
Tissue Loss	51	8.5%	230	9.7%	
Acute Ischemia	31	5.1%	90	3.8%	
Prior Infrainguinal Bypass	87	14.4%	86	3.6%	<b>&lt;0.001</b>
Prior Infrainguinal PVI	113	18.7%	139	5.8%	<b>&lt;0.001</b>
Simultaneous Lower Extremity Intervention	222	36.8%	930	39.1%	0.305

## Full Program & Abstracts

Simultaneous Endarterectomy	205	34.0%	885	37.2%	0.145
Simultaneous Bypass	32	5.3%	85	3.6%	<b>0.050</b>
Simultaneous PVI	5	0.8%	20	0.8%	0.978
Estimated Blood Loss	740.6	678.8	763.7	795.3	0.513
Total Procedure Time	279.6	105.5	268.3	122.4	<b>0.043</b>
End-to-Side Proximal Anastomosis	323	53.57	1,090	45.82	<b>0.007</b>

## Full Program & Abstracts

5:24 pm – 5:36 pm

32

### **Non-Operative and Delayed Operative Management of Severe Asymptomatic Carotid Artery Stenosis**

Dylan Dominguez, Scott Levin, Thomas Cheng, Alik Farber, Douglas Jones, Jeffrey Kalish, Jeffrey Siracuse—Boston University School of Medicine, Boston, MA

**INTRODUCTION AND OBJECTIVES:** Although intervention is generally the standard of care for severe asymptomatic carotid artery stenosis, conservative management may be appropriate in a subset of patients. Our goal was to assess reasons for and outcomes of non-operative/delayed operative management of asymptomatic severe carotid stenosis.

**METHODS:** Institutional vascular laboratory data (2011-2019) was queried for patients undergoing carotid duplex ultrasonography. Patients with severe asymptomatic carotid stenosis, defined as having end diastolic velocity >140 cm/s without transient ischemic attacks (TIA)/strokes  $\leq 6$  months prior to imaging, were included. Patients receiving non-operative/delayed operative management did not undergo carotid endarterectomy (CEA) or carotid artery stenting (CAS)  $\leq 6$  months after imaging. Descriptive statistics and Kaplan-Meier analysis were used to evaluate patient characteristics and outcomes.

**RESULTS:** Among 225 patients with severe asymptomatic carotid stenosis, 35 (15.5%) were managed non-operatively or with delayed operation. Mean age in the non-operative/delayed operative cohort was  $72.6 \pm 11.4$  years and most were female (57%), smokers (74.3%), and on statins (62.9%). In 85.7% of these patients, reasons for no/delayed intervention were documented, often by surgeons - severe cardiovascular comorbidities (56.7%), advanced age (13.3%), patient refusal (13.3%), other severe concomitant cerebrovascular disease (10%), and active/advanced cancer (6.7%). In the remaining 14.3% without documented reasons, they had no referrals to vascular surgeons/interventionalists or delayed referrals beyond 6 months. Over a median follow-up of 35.2 months, no patients experienced TIAs/strokes attributable to carotid stenosis, but one patient had a cardiogenic stroke. A subset underwent delayed CEA (8.6%) or CAS (2.8%). Four-year survival after initial imaging was 79%.

**CONCLUSIONS:** Non-operative and delayed operative management of severe asymptomatic carotid stenosis was commonly due to comorbidities and advanced age, however a subset of patients were never referred to vascular surgeons/interventionalists. Adverse neurologic events due to carotid stenosis were not observed during follow-up and patients had high long-term survival.



## Full Program & Abstracts

5:36 pm – 5:48 pm

33

### **Complete Venous Leg Ulceration Healing Following Perforated Ablation is not Dependent on Treatment Modality**

Katherine M. Reitz, Karim Salem, Abhisekh Mohapatra, Nathan L. Liang, Efthimios Avgerinos, Michael Singh, Eric Hager—UPMC, Pittsburgh, PA

**INTRODUCTION AND OBJECTIVES:** Venous leg ulceration (VLU) represents the most severe form of chronic venous insufficiency (CVI). Following VLU non-invasive treatment failure, minimally invasive endovascular chemical (ultrasound-guided foam sclerotherapy [UGFS]) and thermal ablation (endovenous laser therapy [EVLT] or radiofrequency ablation [RFA]) targeting incompetent veins is recommended. Current guidelines suggest ablation of incompetent perforating veins (IPV); however, the ideal treatment modality is unknown. We hypothesize that like incompetent great saphenous vein (GSV) therapies, VLU healing is equivalent across minimally invasive IPV treatment options.

**METHODS:** Utilizing the vascular low-frequency disease consortium, adults with VLU across 12 medical centers were retrospectively reviewed (2013-2017). We included those who underwent IPV therapies. Baseline patient, VLU, and venous characteristics were compared by therapy using Kruskal-Wallis and Chi-2. VLU healing overtime was compared with Kaplan-Meier analysis and log-rank testing. Number of subsequently required procedures were compared with negative binomial regression.

**RESULTS:** Of 832 adults with VLU, 389 (47%) underwent IPV index intervention (EVLT: 146[38%], RFA: 226[58%], UGFS: 17[4%]). Baseline age, gender, and venous characteristics significantly varied between groups, ulcer size did not (Table 1). Throughout patient follow-up (median 18.6 months), there were no differences in VLU healing (EVLT: 78[53.4%], RFA: 135[59.7%], UGFS: 8[47.1%]; Figure 1). Treatment did not alter number of subsequent procedures( $p=0.470$ ).

**CONCLUSIONS:** This multi-institutional, retrospective study demonstrates IPV ablative technique does not affect the rate of VLU healing or need for subsequent procedures. This data is consistent with CVI therapies targeting the GSV indicating surgical technique should be guided by patient and provider preference.

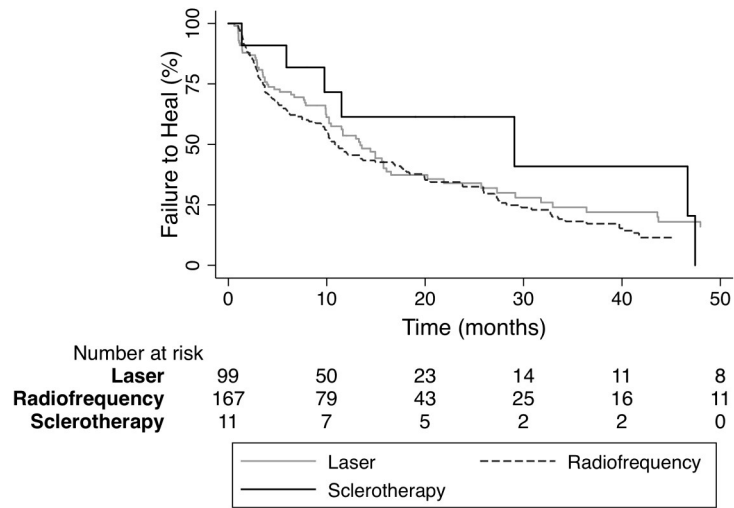
## Full Program & Abstracts

Table 1. Baseline patient and ulcer characteristics. Data presented median (IQR) or proportion (%), tested with Kruskal-Wallis or Chi-2. [Abbreviation- Body mass index, BMI. Superficial venous thrombosis, SVT. Deep venous thrombosis, DVT]

<b>Baseline Characteristics</b>	<b>EVLT</b>	<b>RFA</b>	<b>UGFS</b>	<b>p-value</b>
	n = 146	n = 226	n = 17	
Age	59.5 (47, 67)	64 (53, 70)	52 (44, 60)	0.002
Male	57 (39.0%)	142 (62.8%)	11 (64.7%)	<0.001
BMI	31.1 (25.7, 38.6)	33.0 (27.4, 40.7)	33.8 (27.4, 42.0)	0.089
Anti-coagulation	23 (15.8%)	80 (35.4%)	2 (11.8%)	<0.001
Ulcer Size (cm)	3 (2, 4.4)	3 (1.7, 8)	4 (1, 6)	0.300
<b>Venous Thrombosis</b>				
Superficial	46 (31.5%)	39 (17.3%)	2 (11.8%)	0.003
Deep	36 (24.7%)	60 (26.5%)	6 (35.3%)	0.630
<b>Vein Incompetence by Location</b>				
Perforator	146 (100%)	226 (100%)	17 (100%)	0.470
Superficial	146 (100%)	218 (96.5%)	17 (100%)	0.053
Deep	37 (25.3%)	66 (29.2%)	7 (41.2%)	0.350

# Full Program & Abstracts

Figure 1. Rate of Ulcer Healing Over Time



## Full Program & Abstracts

5:48 pm – 6:00 pm

34

### **Impacts of a Limb Preservation Service on the Incidence of Major Amputations for All Indications at a Level I Trauma Center**

Jake F. Hemingway, Rachel Hoffman, Benjamin W. Starnes, Elina Quiroga, Nam T. Tran, Niten Singh—  
University of Washington, Seattle, WA

**INTRODUCTION AND OBJECTIVES:** Multidisciplinary limb preservation services (LPS) have improved the care of patients with limb-threatening vascular disease. However, the impact of an LPS on major amputations for non-vascular etiologies is unknown. We sought to characterize the trends in major amputations performed at a level I trauma center following the institution of an LPS.

**METHODS:** A retrospective review of all patients undergoing amputation at a level I trauma center from January 2009 to December 2018 was performed. Patients were divided into two cohorts: those undergoing amputation pre- (2009-2013) and post-LPS (2014-2018). Major amputations were defined as any amputation at or proximal to the below-knee level. Indications are listed in Table I, with revision amputations including any revision requiring removal of additional bone.

**RESULTS:** 609 major amputations were performed (Table I), 490 pre- and 119 post-LPS, representing a 76% reduction. Reductions were seen for every indication, including trauma (95%), ALI (90%), CLTI (68%), and acute infection (62%) (Figure 1). Vascular surgery performed 21% and 22% of amputations pre- and post-LPS, respectively, with reductions seen in the number of amputations performed by vascular surgeons for CLTI (42%), ALI (71%), and diabetic foot infection (63%) following implementation of the LPS.

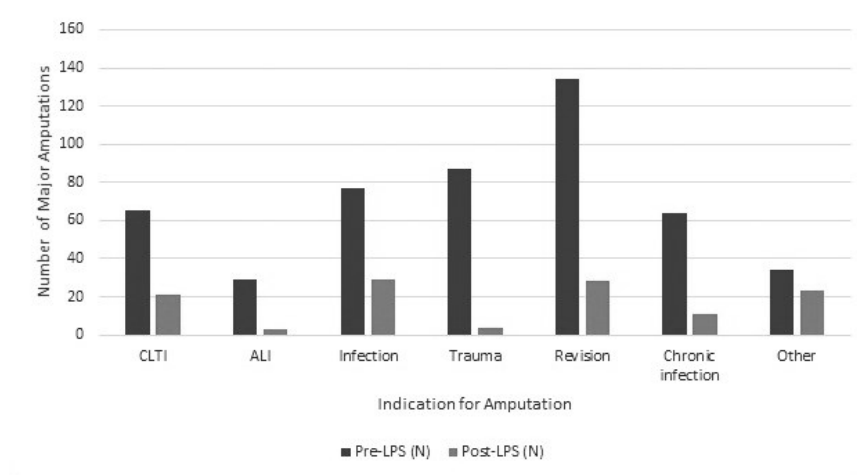
**CONCLUSIONS:** Although previous work has validated the role of an LPS in advanced vascular disease, its value extends beyond vascular disease alone. The drastic reductions seen in the number of amputations performed for a variety of indications, including trauma and diabetic foot infections, further validates the use of a multidisciplinary LPS.

# Full Program & Abstracts

Table 1. Indications for Major Amputation

Indication	Pre-LPS (N=490)	Post-LPS (N=119)
Chronic Limb Threatening Ischemia (CLTI)	65	21
Acute Limb Ischemia (ALI)	29	3
Infection	77	29
Trauma	87	4
Revision	134	28
Chronic Infection	64	11
Other	34	23

Figure 1. Major Amputations by Indication



6:00 pm

**VESS MEMBER BUSINESS MEETING**

6:00 pm

**INDUSTRY SYMPOSIUM**

**Xarelto: Results from the Einstein Trials in VTE and the COMPASS Trial in Chronic CAD/PAD**

Sponsored By: Janssen Pharmaceuticals

# Full Program & Abstracts

## Saturday, February 1, 2020

6:00 am – 7:00 am	Continental Breakfast
6:00 am – 9:30 am	Registration
<b>7:00 am – 8:15 am</b>	<b>SCIENTIFIC SESSION IV</b> Moderators: Max Wohlauser, MD & Natalia Glebova, MD
7:00 am – 7:12 am	35 <b>Treatment and Outcomes of Aortic Graft Infections: A Single Center Experience</b> Amanda Filiberto, Javariah Fatima, Craig Elder, Salvatore Scali, Thomas Huber—University of Florida, Gainesville, FL

**OBJECTIVE:** Aortic graft infections (AGI) are a devastating complication requiring explant of infected prosthesis and complex reconstruction. Herein we review surgical management and outcomes of patients with AGI after infrarenal aortic surgery.

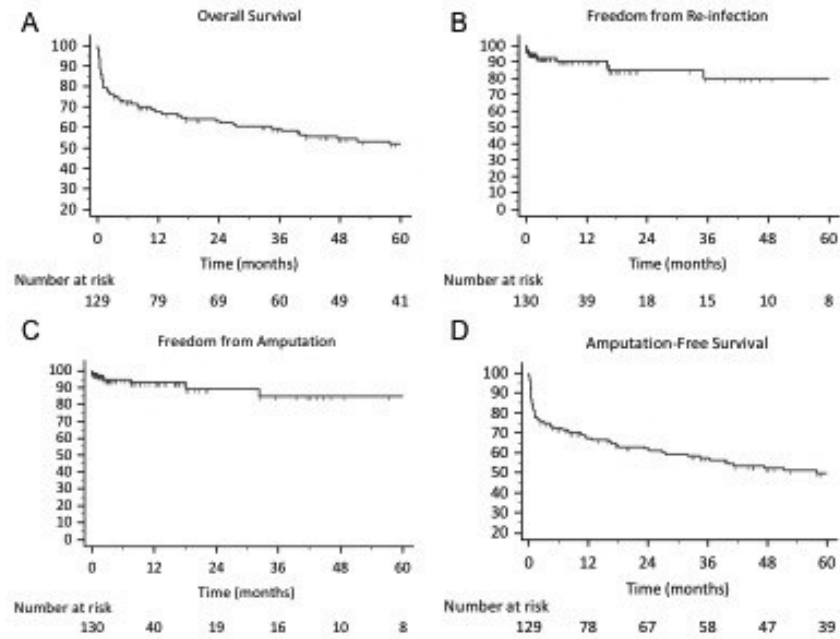
**METHODS:** Study included patients diagnosed with AGI between 2002-2019. Demographics, surgical management and outcomes were extracted via chart review. Primary end-point was mortality and secondary end-points were complications, reinfection, reintervention and survival.

**RESULTS:** An AGI was diagnosed in 131 patients (52 males, age  $66 \pm 1$  years). Median time to presentation was 47 months (range 0-488 months). Clinical findings at presentation include pain (65%), leukocytosis (54%), fever (22%), and GI bleed (18%). Total excision of the infected graft was performed in 91% patients. In situ aortic replacement was performed in 86 patients (66%) using neoarterioiliac system in 44 (34%), PTFE in 33 (25%), cryopreserved-allograft in 31 (24%), and Dacron in 25 (19%). Extra-anatomic axillo-femoral-bypass was performed in 33 patients (25%). An aortoenteric-fistula was noted in 39 (30%) patients. Blood cultures were positive in 20 of 93 obtained (22%). Median follow up was 3 months (range 0-133 months). In-hospital/30-day mortality was 19%. There was one intraoperative death. Overall 1-year and 5-year survival were  $68 \pm 4\%$  and  $51 \pm 5\%$ , freedom from reinfection at 1 year and 5 years were  $91 \pm 3\%$  and  $69 \pm 10\%$ , freedom from amputation at 1 year and 5 years was  $93 \pm 3\%$  and  $74 \pm 10\%$ , and amputation free survival at 1 year and 5 years was  $67 \pm 4\%$  and  $49 \pm 5\%$ , respectively (Fig. 1).

**CONCLUSIONS:** Aortic graft infection results in significant early morbidity and mortality with surgical extirpation; however, late term survival is good in appropriately selected patients. The risk of late re-infection mandates lifelong surveillance and consideration of indefinite anti-microbial suppression.

# Full Program & Abstracts

Figure 1.



# Full Program & Abstracts

7:12 am – 7:24 am

36

## **Online Ratings for Vascular Interventional Providers Varies by Physician Specialty**

Zachary J. Wanken, John B. Rode, Sarah Y. Bessen, Peter B. Anderson, J. Aaron Barnes, Mark Eid, Philip P. Goodney—Dartmouth-Hitchcock, Lebanon, NH

**INTRODUCTION AND OBJECTIVES:** Practice patterns vary significantly across the United States and there is significant overlap among vascular interventional proceduralists in many parts of the country. At the same time, patient/consumer reviews have become more impactful for physicians who perform vascular procedures. We hypothesized that there are differences in online reviews based on specialty.

**METHODS:** We used official program lists from the Association for Graduate Medical Education to identify institutions with training programs in integrated vascular surgery (VS), integrated interventional radiology (IR), and interventional cardiology (IC). Faculty providers were identified in each specialty at these institutions. A standardized search was used to collect online ratings on Vitals.com, Healthgrades.com, and google.com as well as social media presence on Facebook, Instagram, and Twitter. Between specialty differences were analyzed using chi-squared and analysis of variance tests as appropriate.

**RESULTS:** A total of 1,330 providers (n=454 VS, n=451 IR, n=425 IC) were identified across 47 institutions in 27 states. VS (55.5%-69.4%) and IC (63.8%-71.1%) providers were significantly more likely to have reviews than IR (28.6%-48.8%) providers across all online platforms (Table 1,  $p < 0.001$  for all websites). Across all platforms, IC providers were rated significantly higher than VS and IR providers. A minority of providers utilize social media. VS providers were significantly more likely to use Instagram ( $p = 0.001$ ) but there was no significant difference in utilization of Facebook and Twitter.

**CONCLUSIONS:** Among vascular interventional proceduralists, IR providers are less likely to be rated online by patients and IC providers are more highly rated than IR and VS providers. VS providers may benefit from patient marketing for positive online reviews although the utility of social media for this purpose remains unclear.



# Full Program & Abstracts

Table 1. Online Characteristics of Vascular Interventional Proceduralists

Characteristics	Vascular Surgery n=454	Interventional Radiology n=451	Interventional Cardiology n=425	p-value
Medical Degree				0.048
MD	437 (96.3)	434 (96.2)	418 (98.4)	
DO	5 (1.1)	9 (2.0)	6 (1.4)	
Other	12 (2.6)	8 (1.8)	1 (0.2)	
Has review on Vitals.com				<0.001
No	139 (30.6)	231 (51.2)	123 (28.9)	
Yes	315 (69.4)	220 (48.8)	302 (71.1)	
Mean number of Vitals.com reviews	5.6 ± 7.6	2.5 ± 5.9	5.5 ± 7.8	<0.001
Mean star rating on Vitals.com	4.2 ± 0.8	4.1 ± 1.1	4.4 ± 0.7	0.001
Has review on Healthgrades.com				<0.001
No	202 (44.5)	313 (69.4)	154 (36.2)	
Yes	252 (55.5)	138 (30.6)	271 (63.8)	
Mean number of Healthgrades.com reviews	2.9 ± 5.1	1.1 ± 3.2	3.6 ± 4.9	<0.001
Mean star rating on Healthgrades.com	4.1 ± 1.0	4.2 ± 1.3	4.5 ± 0.8	<0.001
Has review on google.com				<0.001
No	151 (33.3)	322 (71.4)	134 (31.5)	
Yes	303 (66.7)	129 (28.6)	291 (68.5)	
Mean number of google.com reviews	35.4 ± 57.6	3.8 ± 19.4	45.7 ± 90.2	<0.001
Mean star rating on google.com	4.4 ± 0.8	4.2 ± 1.1	4.5 ± 0.6	<0.001
Provider has facebook page				0.12
No	325 (71.7)	345 (76.5)	328 (77.2)	
Yes	128 (28.3)	106 (23.5)	97 (22.8)	
Provider has instagram account				0.001
No	388 (85.5)	403 (89.4)	396 (93.2)	
Yes	66 (14.5)	48 (10.6)	29 (6.8)	
Provider has twitter account				0.57
No	379 (83.5)	367 (81.4)	344 (80.9)	
Yes	75 (16.5)	84 (18.6)	81 (19.1)	

*Categorical variables analyzed using chi-squared and reported as n (%). Continuous variables analyzed using ANOVA and reported as mean ± standard deviation*

## Full Program & Abstracts

7:24 am – 7:36 am

37

### **Underrepresentation of Vascular Surgery in Twitter-Based Clinical Discussions on the Management of Peripheral Arterial Disease**

Reid A. Ravin<sup>1</sup>, Daniel K. Han<sup>2</sup>, Kassandra Carrion<sup>1</sup>, Nicole Ilonzo<sup>1</sup>, Peter L. Faries<sup>2</sup> —<sup>1</sup>Mount Sinai West Hospital, New York, NY; <sup>2</sup>Mount Sinai Hospital, New York, NY

**INTRODUCTION AND OBJECTIVES:** Increasingly, the social media platform Twitter is used for discussion among physicians on a broad range of topics. Physicians have begun concerted efforts to use these platforms for specialty-specific branding and promotion to other physicians. There has been a trend in sharing de-identified clinical vignettes to further these goals (figure 1). We analyzed a year of clinical vignettes relating to peripheral arterial disease (PAD) management, and assess the participation of vascular surgery (VS), and the discussion of open vascular reconstruction.

**METHODS:** A retrospective analysis was performed on PAD clinical vignettes posted on Twitter in 2018. These vignettes were identified with popular hashtags related to PAD e.g. (#pad, #cli). The cases were included if they were posted by a physician account and included a specific clinical PAD case and description of treatment. Case-specific data were collected including patient anatomy, treatment modality, specialty of proceduralist and discussion content.

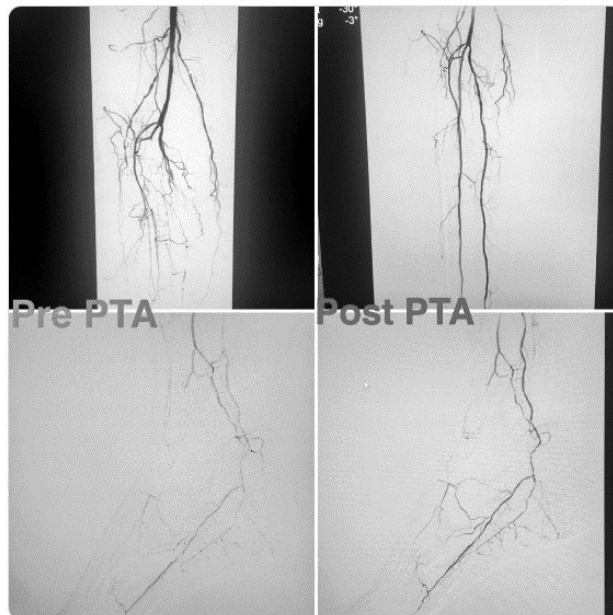
**RESULTS:** 73 PAD cases were identified in 2018. All 73 were managed with endovascular revascularization. Composite of engagement (retweets, likes and comments) were 3,776. Specialty of posters included 55 IR (75%), 12 Cardiology (16%) and 6 VS (8%). Specialty of the proceduralist was explicitly mentioned in 37% of the posts. Open surgical reconstruction was discussed in 6.8% of vignettes, and was mentioned by commenters in 13.6%. Of the users discussing open revascularization, 8/9 (89%) were vascular surgeons.

**CONCLUSION:** Vascular surgery is underrepresented as a specialty in Twitter PAD discussions. This is leading to a minimization of the role for surgical management of PAD, and has potential long term risk of deteriorating the perception among doctors that vascular surgeons have a unique role in managing PAD.

## Full Program & Abstracts

Figure 1.

71 yrs M DM RF IV, Vascular Surgeon tells him no chance for endovascular Recan. Here is the #IRad work. #stopthechop #PTA #PAD #CLI #CLIfighters @JVIRmedia @AlexCVIR @CVIR\_Journal @Interventional2 @SIRspecialists @SIRRFs @sirs\_ksa



## Full Program & Abstracts

7:36 am – 7:48 am

38

### Real-World Usage of the WavelinQ EndoAVF System

Mark S. Zemela<sup>1</sup>, Hataka R. Minami<sup>1</sup>, Alejandro Alvarez<sup>2</sup>, Matthew R. Smeds<sup>1</sup>—<sup>1</sup>St. Louis University School of Medicine, St. Louis, MO; <sup>2</sup>SSM Health, St. Louis, MO

**BACKGROUND:** Dependent on existing deep to superficial perforating venous branches, the WavelinQ EndoAVF System is a novel technique used to create an arteriovenous fistula (AVF) between ulnar or radial veins and concomitant arteries for dialysis access. We sought to examine a single center's success rates and short-term follow-up using this device.

**METHODS:** All consecutive patients undergoing placement of a WavelinQ AVF from 10/2018 to 7/2019 were included. Preoperative/intraoperative variables including demographics, pre/post-operative duplex ultrasonography, success rate of procedure, and subsequent endovascular/surgical procedures were obtained. Descriptive statistics and comparison of groups requiring subsequent intervention was performed.

**RESULTS:** 35 patients underwent placement of the WavelinQ AVF with 32 (91%) patients having at least one documented follow-up. These patients were predominantly male (29/32,91%) with an average age of 60.2 and 23/32(72%) were on dialysis. Initial fistula creation success rate was 100%. Average procedural length was 120 minutes, fluoroscopy time 9.6 minutes and contrast usage of 52.2 mL. 8/32(25%) patients had perioperative complications (3 hematomas, 3 contrast extravasations, 1 resolved vessel spasm, and 1 pseudoaneurysm requiring surgical repair). 13/32(41%) underwent subsequent endovascular interventions to assist with maturation (9/32(28%) branch coiling, 5/32(16%) angioplasty/stenting, and 3/32(9%) access thrombectomy) and 4/32 (13%) required subsequent surgical interventions (1 pseudoaneurysm repair, 1 revision of fistula, and 2 definitive AV fistula creation in thrombosed grafts). Majority (30/32,94%) were ulnar-ulnar fistulas and overall patency at average follow-up of 72 days was 88% (28/32) with average brachial artery inflow volume of 1082 cc/min and average cephalic vein (18/32) outflow volume of 447 cc/min. 11/23 (48%) patients on dialysis successfully using the endoAVF at follow-up.

**CONCLUSIONS:** The WavelinQ AVF system has a high initial procedural success rate, although a significant portion of patients require subsequent endovascular procedures to aid in maturation. Further work on determining factors predictive of need for reintervention is necessary.

## Full Program & Abstracts

7:48 am – 7:56 am

39 (RF)

### **Contemporary Outcomes of Bailout Popliteal Stenting**

Karim M. Salem, Vei Shaun Siow, Ricardo J. Martinez Garcia, Abhisekh M. Mohapatra, Nathan L. Liang, Richard E. Redlinger, Georges E. Al-Khoury, Mohammad H. Eslami, Rabih A. Chaer, Efthymios D. Avgerinos—UPMC, Pittsburgh, PA

**INTRODUCTION:** Stent placement within the popliteal segment in patients with peripheral arterial disease (PAD) is controversial due to the risks of stent fracture and occlusion. Contemporary practice is against routine stent placement in this segment, except when used as bailout stenting (BS). Our aim was to characterize the indications and outcomes of BS focusing on novel dedicated popliteal stents.

**METHODS:** A retrospective chart review of patients with PAD who underwent popliteal stent placement in our institution from 2011-2018. Demographics, comorbidities, perioperative details, and follow-up data were reviewed. Bailout stenting was defined as stenting following balloon angioplasty with flow-limiting dissection or significant residual stenosis. The primary outcome was primary patency at 12 months.

**RESULTS:** 138 patients underwent popliteal BS during interventions for claudication (20.9%), rest pain (14.9%), or tissue loss (63.4%). Mean age was  $72.6 \pm 11.4$  with 60.1% being male. BS was performed for flow-limiting dissection in 67.4% and residual stenosis in 32.6%. Subintimal recanalization was required in 64.7% and 6.5% underwent concurrent atherectomy. Concomitant SFA treatment was performed in 81.9%. Drug-coated balloons (DCB) were used in 23.9% of cases. Mean stent diameter was  $5.7 \pm 0.53$ mm and length  $10.7 \pm 4.5$ cm. Single vessel runoff was present in 44.9% of cases. Twelve-month primary patency was 63.7% (67.1% Supera, 62.4% Tigris, 58.6% other). No fractures were identified. Reintervention was required in 11.6% of patients at 12 months. Major amputation was ultimately required in 13.6% at 12 months. Multivariate predictors of loss of primary patency were stent diameter, hypercoagulable state, subintimal recanalization, single-vessel runoff, and ESRD (table).

**CONCLUSIONS:** Bailout popliteal stenting is required as a rescue method after flow-limiting dissection or residual stenosis and can provide adequate patency at one year.

## Full Program & Abstracts

Table 1.

Variable	Hazard Ratio	P Value	CI
Hypercoagulable State	11.06	<i>0.004</i>	2.11-57.94
Subintimal Recanalization	3.18	<i>0.006</i>	1.39-7.27
ESRD	2.69	<i>0.033</i>	1.08-6.69
Single Vessel Runoff	2.67	<i>0.006</i>	1.33-5.36
Stent Diameter	0.46	<i>0.019</i>	0.23-0.88

## Full Program & Abstracts

7:56 am – 8:04 am

40 (RF)

### **Evolving, Versatile and Durable Aorto-Uni-Iliac Endograft Techniques for Complex Aorto-Iliac Aneurysms without Bifurcated EVAR Options: Lessons from More than 100 Cases**

Martin R. Back<sup>1</sup>, Mathew D. Wooster<sup>2</sup>—<sup>1</sup>University of Florida, Gainesville, FL; <sup>2</sup>Medical University of South Carolina, Charleston, SC

**INTRODUCTION AND OBJECTIVES:** Aorto-uni-iliac (AUI) endografts combined with visceral branch revascularization and iliofemoral reconstructions can accomplish durable repair of challenging primary aorto-iliac anatomy and secondary rescue of failing endografts.

**METHODS:** Since 2005, 112 patients (97 male, mean age 72) possessing aortoiliac aneurysms not anatomic candidates for bifurcated EVAR were treated with AUI devices. Indications for AUI were primary repair (67%: narrow terminal aorta (7), iliofemoral PAD (49), bilateral iliac aneurysms (19)), and secondary repair (37%: proximal fixation loss (25), failed iliac fixation (12)) after prior EVAR at a mean interval of 57 months. Forty-seven patients (42%) had pararenal involvement treated with no renovisceral revascularization (9), parallel renal endoprostheses (21), and fenestrated EVAR with distal AUI (17). Adjunctive ipsilateral iliac conduit (18), iliac stenting (17), hypogastric embolization (16) and femoral endarterectomy (51) were needed for lower limb revascularization. Contralateral iliac was occluded preoperatively (13) embolized (84), or had retrograde external to internal iliac endografts placed (15).

**RESULTS:** Four early 1A endoleaks occurred in the pararenal subgroup (4/47, 9%) requiring additional intervention (no renovisceral revascularization (3 + 4 early deaths), parallel endograft (1), FEVAR (0) (P=.01)). Length of stay averaged 8 days. Major complications occurred in 30% of cases. Six patients (5%) died within 60 days postop. During mean follow-up of 36 (2-103) months, early (7) or late (13) secondary intervention was needed in 18% of cases (8 type 1 / 3 endoleaks, 4 type 2 leaks, 2 infrainguinal reconstructions, 1 iliorenal bypass, 5 iliac stenoses). Iliac limb and/or cross femoral graft thrombosis occurred in 2 patients (2%). No limb loss, delayed visceral or hypogastric vessel occlusions, or late aortic complications occurred in the series.

**CONCLUSIONS:** AUI endografts with adjunctive visceral and pelvic revascularization can effectively treat difficult aorto-iliac aneurysm anatomy. Establishing suprarenal fixation with renovisceral endoprostheses led to optimal pararenal AAA outcomes.

## Full Program & Abstracts

8:04 am – 8:12 am

41 (RF)

### **Use of the Bard BD Venovo™ Venous Stent in the Treatment of Non-Thrombotic or Post-Thrombotic Iliac Vein Lesions - Short Term Results from a Multi-Centre Asian Cohort**

Hao Yun Yap<sup>1</sup>, Jimmy Wei Hwa Tan<sup>2</sup>, Mervin Han Hui Lim<sup>1</sup>, Tze Tec Chong<sup>1</sup>, Tjun Yip Tang<sup>1</sup>—<sup>1</sup>Singapore General Hospital, Singapore, Singapore; <sup>2</sup>Tainan An-nan Municipal Hospital, Tainan, Taiwan

**INTRODUCTION AND OBJECTIVES:** Deep venous stenting with intravascular ultrasound (IVUS) has become the gold standard treatment for symptomatic ilio-femoral venous occlusive disease. The aim was to determine the short-term patency and symptomatic relief gained using the Venovo™ venous stent in the endovascular treatment of non-thrombotic iliac vein lesions (NIVL) or post-thrombotic venous obstruction (PTO) from 2 Asian centres.

**METHODS:** Patients (n= 61; 39 females; median age 66.5 years (range 42-84 years)) who underwent IVUS and ilio-femoral stenting from June 2018 to May 2019 in 2 Asian centres were included. Patients' were followed prospectively. Clinical improvement was determined by revised Venous Clinical Severity score (rVCSS), pain using the visual analogue scale (VAS), and ulcer healing outcome. Primary and secondary patency were evaluated using a combination of Duplex ultrasound and computer tomography venogram.

**RESULTS:** 72 legs were interrogated and stented; 11 patients had a bilateral procedure. Indications for surgery were: PTO (n=10), NIVL (n= 51). 23/61 patients had CEAP 6 disease. The median follow-up duration was 232.5 days (IQR 126-292 days). Technical and procedural success were 100%. 23/72 legs had a combination of Venovo™ and Sinus Obliquus™ stents inserted for ilio-caval lesions. There were no major post-operative complications. 6 month primary and secondary patency were 94.4% and 100% respectively. There were no stent fractures. Early stent thrombosis occurred in 2 PTO patients and were successfully treated endovascularly. Mean rVCSS improved from 12.1 (±3.3) pre-operatively to 4.33 (±2.8) on follow-up (p<0.05). Mean VAS improved from 7.0 (±1.4) to 2 (±1.7) (p<0.05). Complete ulcer healing was seen in 20/23 patients.

**CONCLUSIONS:** Use of the Venovo™ stent for symptomatic ilio-femoral venous disease showed excellent six-month primary and secondary patencies with no stent fractures. There was significant clinical improvement and low-device related complications. Longer follow-up is awaited to see how this dedicated venous stent fares.



# Full Program & Abstracts

8:15 am – 8:45 am	<b>AWARD SESSION</b> Moderators: James Black, MD & Christopher Smollock, MD  <b>Update from 2019 Winner(s)</b>  <b>2020 Award Winners:</b> <ul style="list-style-type: none"><li>• VESS/Medtronic Vascular Resident Research Award</li><li>• VESS Early Career Faculty Research Award</li></ul>
8:50 am – 9:00 am	<b>Introduction of the President</b> Matthew Corriere, MD
9:00 am – 9:45 am	<b>PRESIDENTIAL ADDRESS</b> James Black, MD
10:00 am – 12:00 pm	<b>VESS VIDEO CASE PRESENTATION SESSION</b> Moderators: Kelly Kempe, MD & Ravi Rajani, MD
1:00 pm – 3:00 pm	<b>ROUND TABLE DISCUSSION</b> <b>How to Get Involved in Research</b> Moderator: Peter Nelson, MD
3:00 pm	Registration Re-Opens
3:00 pm – 4:00 pm	Coffee/Snacks – Visit Exhibitors

# Full Program & Abstracts

4:00 pm – 6:00 pm

## SCIENTIFIC SESSION V

Moderators: Matthew Corriere, MD & Misty Humphries, MD

4:00 pm – 4:12 pm

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### Long-Term Impact of Vascular Surgery Stress on Frail Older Patients

Ellen A. Gilbertson, Travis R. Bailey, Larry W. Kraiss, Claire L. Griffin, Brigitte K. Smith, Mark Sarfati, Julie Beckstrom, Benjamin S. Brooke—University of Utah School of Medicine, Salt Lake City, UT

**INTRODUCTION/OBJECTIVE:** Frailty compromises a patient's ability to cope with acute surgical stress, but it's uncertain how this stress impacts their long-term outcomes. V-POSSUM is a validated method for calculating physiologic stress associated with vascular procedures. We designed this study to evaluate the long-term impact of different levels of surgical stress among frail patients undergoing vascular procedures.

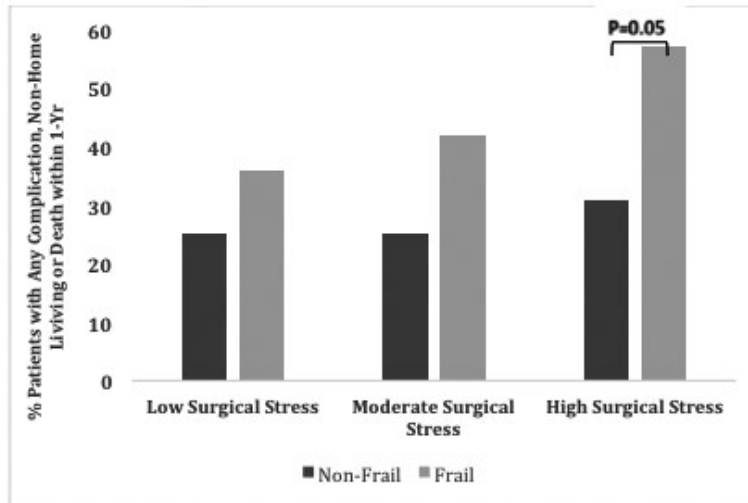
**METHODS:** We identified all independently-living patients who underwent prospective frailty assessment followed by an elective vascular surgery procedure captured in the VQI registry at an academic institution between January 2016 and July 2018. After stratifying patients based on V-POSSUM scores calculated from institutional and VQI databases, we evaluated the association between frailty and the 1-yr composite outcome of any major complication, non-home living status, or death using bivariate and regression models.

**RESULTS:** A total of 163 patients were identified (70% male, mean age 67.8-years) that underwent open AAA repair (6%), EVAR (21%), TEVAR (7%), supra-inguinal bypass (5%), infra-inguinal bypass (18%), CEA (18%), or PVI (25%), with 27% deemed frail pre-surgery. Overall, frail patients had significantly higher rates of the 1-year composite outcome (48% frail vs. 27% non-frail;  $P=.012$ ) when compared to non-frail patients, exhibiting a dose-dependent effect with increasing surgical stress (see figure). In regression models, the interaction between frailty and high surgical stress was found to be a significant predictor of adverse outcomes within 1-year after vascular surgery (OR:4; 95%CI:1.5-10.8,  $P<0.01$ ).

**CONCLUSION:** Frail patients who undergo high-stress vascular procedures have a significantly higher rate of complications, loss of independence, and mortality within the year after their surgery. These data suggest that estimates of surgical stress should be incorporated into surgical decision making for frail older patients.

# Full Program & Abstracts

Figure 1.



## Full Program & Abstracts

4:12 pm – 4:24 pm

43

### **Clinical Outcomes of Double Mandibular Osteotomy for Exposure of Skull Base Carotid Artery Pathology**

Andrew Hodge, Mina Fahmy, Michael M. McNally, Josh Arnold, Oscar Grandas, Eric Carlson, Michael Freeman, Michael Buckley—University of Tennessee Knoxville, Knoxville, TN

**INTRODUCTION AND OBJECTIVES:** Distal exposure of the internal carotid artery is technically challenging and often inaccessible from a standard lateral neck incision. The double mandibular osteotomy (DMO) technique is described as an adjunct for vascular exposure. To date, no case series within the literature explores the technical and functional outcomes. The purpose of this study is to report our institutional results for exposure of skull base carotid artery pathology.

**METHODS:** A retrospective review was performed on patients between 2011 and 2019 who underwent double mandibular osteotomy to treat vascular pathology. Patient demographics, intra-operative variables, functional outcomes, post-operative morbidity, and mortality were analyzed.

**RESULTS:** A total of 14 patients underwent 15 DMO procedures during the study period. Indications included: carotid body tumor (n=7), symptomatic high grade internal carotid artery stenosis (n=6), and internal carotid artery aneurysm (n=2). Operations included tumor excision (7), patch angioplasty (4), and saphenous vein interposition bypass (4). Average operative time was 323 minutes with 208cc mean blood loss. Average length of stay was 7.0 days. 47% percent of patients (7 of 15) had procedure related complications including dysphagia requiring PEG tube (5), osteomyelitis (1), and contralateral watershed infarct (1). Four of five patients experienced resolution of dysphagia with PEG removal; the remaining patient had a planned excision of cranial nerves IX and XII. The technical success rate was 100% with no postop mortality.

**CONCLUSIONS:** Double mandibular osteotomy allows high exposure and treatment of skull based carotid artery lesions with 100% technical success. Our cohort experienced zero embolic events and no post-operative mortality. While 43% of patients experienced short-term dysphagia, this resolved in all but 1 patient. While emerging techniques are available for treatment of high atherosclerotic lesions, DMO remains a viable option for carotid body tumors, internal carotid aneurysms, and patients with anatomy unsuitable for stent placement.

## Full Program & Abstracts

4:24 pm – 4:36 pm

44

### **Branch Vessel Patency after TEVAR for Type B Aortic Dissection**

Gregory A. Magee<sup>1</sup>, Anastasja Plotkin<sup>1</sup>, Michael D. Dake<sup>2</sup>, Benjamin W. Starnes<sup>3</sup>, Sukgu M. Han<sup>1</sup>, Li Ding<sup>1</sup>, Fred A. Weaver<sup>1</sup>—<sup>1</sup>University of Southern California, Los Angeles, CA; <sup>2</sup>University of Arizona, Tucson, AZ; <sup>3</sup>University of Washington, Seattle, WA

**INTRODUCTION AND OBJECTIVES:** Thoracic endovascular aortic repair for type B aortic dissections (TEVAR-AD) is used to promote false lumen (FL) thrombosis and favorable aortic remodeling, but it may lead to occlusion of FL origin branch vessels. We compare FL vs. true lumen (TL) branch vessel patency after TEVAR-AD.

**METHODS:** Patients treated by TEVAR-AD in zones 2-5 in the Vascular Quality Initiative from 2009-2018 were evaluated. The primary outcome was postoperative branch patency. Secondary outcomes were need for branch vessel intervention, preoperative origin and postoperative patency of individual branch vessels (celiac, SMA, renals, iliacs).

**RESULTS:** Of 11,774 patients, 1,484 met criteria for analysis. The left renal was the most common to have FL origin (21.6%), while right and left common iliacs were the most likely to originate off both lumens (22% and 24%). Branch vessels that originated from the TL, FL, or both, or were obstructed had postoperative patency rates of 99%, 99%, 99%, and 87% ( $p < 0.0001$ ). (Table 1) Branch vessel treatment was required in 5% of patients. The vessel most frequently obstructed postoperatively was the left renal artery (3.5%). (Table 2) On multivariate analysis, preoperative lumen origin (obstructed, OR:0.03,  $p < 0.0001$ ) and branch vessel treatment (OR:3.8,  $p = 0.004$ ) were independent predictors of postoperative patency. FL origin, number of zones covered by TEVAR, urgency, dissection chronicity, and demographics were not independently associated with patency.

**CONCLUSIONS:** Branch vessel patency rates after TEVAR-AD are equivalent irrespective of lumen of origin. Branch vessels that are patent prior to TEVAR almost always remain patent but intervention is occasionally required.

## Full Program & Abstracts

Table 1. Preoperative lumen origin status association with postoperative patency,  $p < 0.0001$

		Postoperative Patency	
		Patent	Obstructed
Preoperative Lumen Origin	True lumen (n=2733)	2716 (99.4%)	17 (0.6%)
	False lumen (n=428)	425 (99.3%)	3 (0.7%)
	Both lumen (n=498)	492 (98.8%)	6 (1.2%)
	Obstructed (n=356)	308 (86.5%)	48 (13.4%)

Table 2. Postoperative individual branch vessel patency

	Patent	Obstructed
Celiac (n=839)	823 (98.1%)	16 (1.9%)
SMA (n=793)	788 (99.4%)	5 (0.6%)
Right renal (n=746)	727 (97.5%)	19 (2.5%)
Left renal (n=601)	580 (96.5%)	21 (3.5%)
Right iliac (n=492)	487 (99%)	5 (1%)
Left iliac (n=399)	392 (98.2%)	7 (1.8%)

## Full Program & Abstracts

4:36 pm – 4:48 pm

45

### **Access Type for Endovascular Repair in Ruptured Abdominal Aortic Aneurysms does not Affect Major Morbidity or Mortality**

Thomas W. Cheng<sup>1</sup>, Shelley K. Maithe<sup>2</sup>, Nii-Kabu Kabuṭey<sup>2</sup>, Roy M. Fujitani<sup>2</sup>, Alik Farber<sup>1</sup>, Virendra I. Patel<sup>3</sup>, Douglas W. Jones<sup>1</sup>, Denis Rybin<sup>4</sup>, Gheorghie Doros<sup>4</sup>, Jeffrey J. Siracuse<sup>1</sup> — <sup>1</sup>Boston University School of Medicine, Boston, MA; <sup>2</sup>University of California Irvine Medical Center, Orange, CA; <sup>3</sup>Columbia University College of Physicians and Surgeons, New York, NY; <sup>4</sup>Boston University School of Public Health, Boston, MA

**INTRODUCTION AND OBJECTIVES:** There is heterogeneity in practice with limited data to guide for access type when treating ruptured abdominal aortic aneurysms (rAAA) with EVAR. Our study's objective was to evaluate access type in rAAA and its associated outcomes.

**METHODS:** The Vascular Quality Initiative was queried from 2009-2018 for rAAAs treated with an index EVAR. Procedures were grouped by access type: percutaneous, open, and conversion to open after failed percutaneous access. Patients with iliac access, both percutaneous and open access, and concurrent bypass were excluded. Baseline characteristics, procedure details, and outcomes were collected. Univariable and multivariable analyses were performed.

**RESULTS:** There were 1,206 rAAAs identified - 739 (61.3%) had percutaneous access, 416 (34.5%) open access, and 51 (4.2%) conversion to open after failed percutaneous access. Percutaneous access, compared to open access and conversion after failed percutaneous access, respectively, had the shortest operative time (mins, median) (111vs.138vs.180,  $P < .001$ ) and was most often performed under local anesthesia (16.7%vs.5%vs.9.8%,  $P < .001$ ). The estimated blood loss and amount of contrast used were similar. Univariable analysis showed 30-day mortality was lower with percutaneous access (19.9%vs.24.8% vs.39.2%,  $P = .002$ ), any post-operative complication (33.7%vs.40.2% vs.54%,  $P = .003$ ), and cardiac complications (18.2%vs.19.8%vs.34.7%,  $P = .018$ ). Multivariable analysis did not show access type to have a significant effect on cardiac or pulmonary complications, return to the OR, or perioperative mortality. Open access was independently associated with a prolonged length of stay (OR 1.17, 95%CI 1.04-1.33,  $P = .012$ ). Factors independently associated with conversion to open from failed percutaneous access were prior bypass (OR 9.77, 95%CI 2.44-39.16,  $P = .001$ ) and altered mental status (OR 2.45, 95%CI 1.17-5.15,  $P = .018$ ).

**CONCLUSIONS:** Access type for rAAA did not significantly affect major morbidity or mortality. Percutaneous access had the shortest operative time, however, failed percutaneous access had the longest operative time. Access during these emergent procedures should be based on surgeon preference, comfort, and experience to provide the most expeditious care.

## Full Program & Abstracts

4:48 pm – 4:56 pm

46 (RF)

### **Factors Associated with Medication Compliance in Vascular Surgery Patients**

Hataka R. Minami, Mark S. Zemela, Adam C. Ring, Michael S. Williams, Jr., Matthew R. Smeds—Saint Louis University, Saint Louis, MO

**INTRODUCTION AND OBJECTIVES:** Patients with vascular disease have higher mortality rates than age-matched peers and medical management of co-existing diseases may alter these outcomes. We sought to understand factors associated with medication non-compliance in vascular surgery patients at a single University vascular surgery clinic over a three-month period.

**METHODS:** Consecutive vascular surgery patients were surveyed from June to August 2019. The survey included demographic questions, the validated Morisky Medication Adherence (MMAS-8) and Patient Health Questionnaire for Anxiety and Depression (PHQ-4) scales, and other medication-related questions. Medical and surgical histories were retrospectively collected from charts. High adherence (MMAS=8) was compared to low adherence (MMAS<6). Numerical, ordinal, and categorical variables were analyzed with two-tailed t-tests, Mann-Whitney U/Wilcoxon rank sum tests, and chi-squared tests of contingency tables. The likelihood of type I error was reduced with a False Discovery Rate (FDR) correction cutoff of 0.05.

**RESULTS:** 128/174 (74%) patients met study inclusion criteria. Lower medication adherence was associated with younger age ( $p=0.004$ ), depression ( $p=0.001$ ), higher daily pain ( $p<0.001$ ), and patients who believed their medications were less important for treating their vascular disease ( $P<0.001$ ). Compliance was not associated with symptomatic vascular disease, education level, marital, employment, or insurance status, gender, race, or the use of medication usage reminders/aides. 72% ( $n=85$ ) of respondents used aides to assist taking their medications with the most common being pillboxes. Most patients believe that their medications make them feel better (82%), and most thought they had a good understanding of how to take their medications (90%), although half (50%) thought doctors used words they don't understand in describing their use.

**CONCLUSIONS:** Younger age, poor mental health, high level of pain, and perceived unimportance of prescribed medications are associated with lower medication adherence. Altering the words we use when describing medication/procedure use for patients may improve their understanding.



## Full Program & Abstracts

4:56 pm – 5:04 pm

47 (RF)

### **Aorto-Caval Reconstruction for Inferior Vena Cava Leiomyosarcoma with Aortic Involvement**

Anthony N. Grieff, Justin W. Ady, Randy Shafritz,  
William Beckerman, Saum Rahimi—Rutgers Robert  
Wood Johnson, New Brunswick, NJ

**INTRODUCTION:** Leiomyosarcoma of the Inferior Vena Cava (IVC) is a rare smooth muscle neoplasm for which surgical resection remains the gold standard treatment in non-metastatic disease. We present an atypical case of leiomyosarcoma involving both the IVC and infrarenal abdominal aorta.

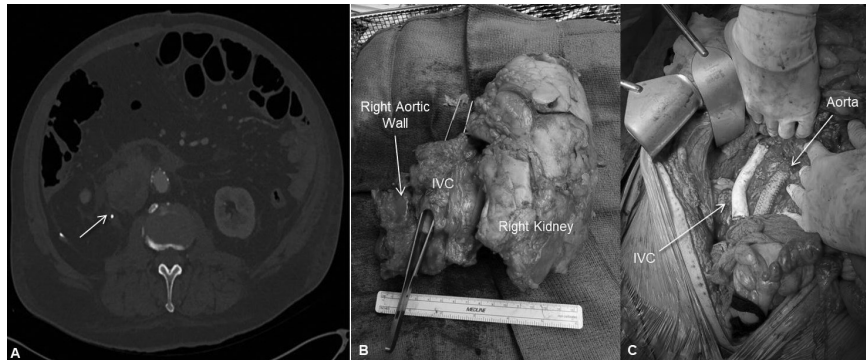
**METHODS:** A 63-year-old man with back pain was found on MRI to have a large mass involving the IVC. Following neo-adjuvant chemotherapy, preoperative MRI demonstrated resectable disease likely requiring IVC reconstruction. Intraoperatively the tumor was found to involve both the IVC and distal aorta. The iliac vessels demonstrated extensive calcification so the procedure was aborted and CTA imaging was performed to plan for complex aorto-caval reconstruction. In conjunction with surgical oncology the tumor was mobilized, proximal and distal control of the aorta in noninvolved tissue was obtained. The aorta was excised and the tumor was mobilized and retracted laterally allowing for aortic reconstruction with a Dacron tube graft. We then placed the patient on a veno-venous bypass and en-bloc resection of the tumor, aorta, IVC and right kidney was performed followed by IVC reconstruction with a PTFE tube graft.

**RESULTS:** The Post-operative course was uneventful and the patient was discharged on post-operative day 6. Most recent follow-up imaging demonstrated no recurrence of disease with patent aorto-caval bypass grafts.

**CONCLUSIONS:** Primary leiomyosarcoma of the IVC is estimated to have aortic involvement in <10% of cases. Patients in this category are often not offered surgery and managed conservatively resulting in lower survival rates. Concomitant aorto-caval resection and reconstruction is a reasonable option and can be well tolerated in good surgical candidates with optimal outcomes achieved through interdisciplinary collaboration between surgical oncology, anesthesiology, and vascular surgery.

## Full Program & Abstracts

Figure 1. (A) CT Angiogram demonstrating a large retroperitoneal mass found to be Leiomyosarcoma of the IVC on tissue biopsy; (B) en-bloc resection of Leiomyosarcoma, right kidney, inferior vena cava (forceps inside) and right aortic wall, 8.5 cm in largest length; (C) Aortic (16 mm Dacron) and IVC (20 mm PTFE) interposition graft reconstruction.



## Full Program & Abstracts

5:04 pm – 5:12 pm

48 (RF)

### **A Centralized Vascular Access Service Team for Tunneled Catheter Placement Reduces Time-to-Insertion in a Large Academic Medical Center**

Hanna J. Barnes, Mark J. Bailey, Daniel K. Han, Roopa Kohli-Seth, Amy Brito, Francis S. Nowakowski, David S. Lee, Barry A. Love, Peter L. Faries—Icahn School of Medicine at Mount Sinai, New York, NY

**INTRODUCTION AND OBJECTIVES:** Tunneled catheters (TCs) with and without subcutaneous ports are needed in patients who require prolonged vascular access. Delays in the placement of TCs can lead to increased lengths of stay and higher hospital costs. To increase placement of appropriate catheter type and decrease wait times, a centralized Vascular Access Service Team (VAST) was implemented at a large academic medical center. The objective of this review was to examine the efficiency of VAST.

**METHODS:** VAST is comprised of physicians from multiple departments in the hospital (Vascular Surgery, Interventional Radiology, Critical Care, Nephrology, Interventional Cardiology, and Surgical Oncology), nurses with advanced knowledge of intravenous access techniques, and operating room coordinators. A centralized consult service was created where patients undergo a uniform evaluation for appropriate vascular access. A retrospective review of prospectively collected data was performed for all patients undergoing TC placement from January 2018-December 2018 (n=415). Records from patients who underwent tunneled catheter placement from January 2016-November 2016 were retrospectively analyzed to form a comparison cohort (n=151).

**RESULTS:** Overall, 415 TCs were placed by VAST in 415 patients: 59 subcutaneous ports, 140 Hickman catheters, and 214 TCs permacaths for hemodialysis. Indications for TC placement included chemotherapy, hemodialysis, parenteral nutrition, and long-term intravenous antibiotics. Of the 415 patients, 375 (90.3%) underwent a TC placement within two business days of the initial consult and 262 (63.1%) patients underwent a TC placement within one business day. Prior to the implementation of VAST, 17.2% of patients waited longer than two business days; this number was reduced to 9.6% with VAST. Prior to VAST, mean wait time was 1.74 business days, compared with 1.35 business days with VAST (p<0.01).

**CONCLUSIONS:** A centralized Vascular Access Service Team is effective in expediting TC placements, evaluating patients for the appropriate catheter type, and improving hospital throughput.

## Full Program & Abstracts

5:12 pm – 5:24 pm

49

### **Gaussian Surface Curvature Mapping Indicating High Risk Type B Thoracic Aortic Dissections**

Sanjeev S. Dhara<sup>1</sup>, Michael Hermsen<sup>1</sup>, Erin Abbott<sup>1</sup>, Ross Milner<sup>1</sup>, Cheong Jun Lee<sup>2</sup>, Luka Pocivavsek<sup>1</sup>—  
<sup>1</sup>University of Chicago, Chicago, IL; <sup>2</sup>Northshore University Health System, Evanston, IL

**INTRODUCTION AND OBJECTIVES:** While type B thoracic aortic dissections (ADs) are typically medically managed, they can be surgically managed in a subset of higher-risk patients. We used the context of a type B AD becoming a type A to explore if the evolution of Gaussian surface curvature might yield a predictive tool to risk stratify “fragile” aortas.

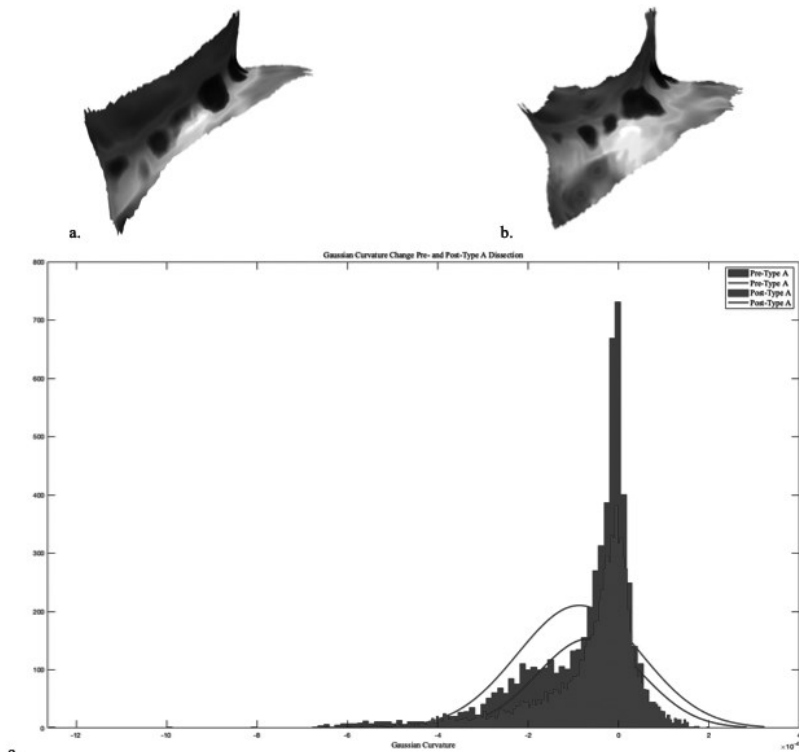
**METHODS:** Computed Tomography (CT) scans of a patient’s chest before and after a type A AD were uploaded to Simpleware Scan IP. The aortic arch was isolated and exported into MATLAB to calculate the region’s Gaussian curvature (K).

**RESULTS:** The K-value at a point is the product between the two principal surface curvatures. Recent work done in crumpling physics showed that lessening the absolute value of the Gaussian curvature at a point decreases the stress at that location. Initial results show an increase in the mean Gaussian curvature of the lesser curvature of the aortic arch from  $-8.7 \times 10^{-5}$  to  $-6.4 \times 10^{-5}$ . Figure 1 shows the Gaussian curvature distribution along these areas of interest. The decreased absolute magnitude of Gaussian curvature can be equated with a lower strain on the arch.

**CONCLUSIONS:** These results suggest that aortic remodeling is driven towards states of lower stress. Mapping the Gaussian curvature of dissections may help indicate aortas that are undergoing relaxation. In this patient this stress-relief motivated remodeling was accompanied by the development of a Type A AD. Thus, the development of high magnitude K-values underneath the lesser curvature of the thoracic aorta may predict a high-risk fragile aorta.

# Full Program & Abstracts

Figure 1. (a) Curvature map of region of interest before Type A (b) and after Type A AD (c) Distribution of  $K$ -values.



## Full Program & Abstracts

5:24 pm – 5:36 pm

50

### **Aortic Dilation after Thoracic Endovascular Aneurysm Repair for Blunt Aortic Injury**

Kenneth Tran, Ming Lai, Jordan Stern, Jason Lee—  
Stanford University, Stanford, CA

**INTRODUCTION AND OBJECTIVES:** Aortic dilation following TEVAR for blunt traumatic aortic injury (BTAI) is not well understood. This study aims to characterize changes in thoracic aortic diameter following TEVAR for BTAI.

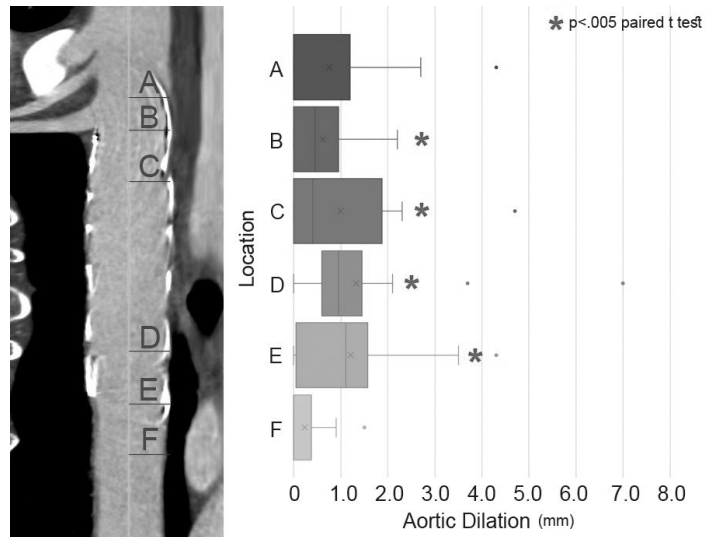
**METHODS:** A single-center, retrospective review was performed between 2011-2017 involving patients presenting with BTAI treated with TEVAR. Only patients with at least 12 months follow-up were included. Aortic diameter, defined as the outer-to-outer diameter on 3D center-line imaging, was measured at six locations along the proximal/mid thoracic aorta (FIGURE, left). The first post-operative CT ( $\leq 1$  month) served as a baseline from which interval measurements were compared.

**RESULTS:** Twenty patients had adequate imaging for review. Mean follow-up time was 46.8 (12-80, range) months. At latest follow-up, aortic dilation (AD) occurred at all measured locations within the endograft, starting from the proximal graft edge ( $0.62 \pm 0.69$ mm,  $p=.027$ ) to the distal graft edge ( $1.21 \pm 1.28$ mm,  $p=.003$ ). AD was most pronounced in the distal graft segment 2cm proximal to the distal edge, with a mean AD of  $1.32 \pm 1.59$ mm (+5.3%). At this location, AD was found to increase at each interval with an average of 0.44mm/year. The native aorta proximal and distal to the endograft was not found to significantly dilate during follow-up ( $p=.280-.897$ ) (FIGURE, right). 70% of patients were found to have AD  $>5\%$ . The amount of aortic dilation was not associated with either graft oversizing ( $p=.151$ ) or age ( $p=.340$ ). There were no cases of graft migration, erosion or endoleak.

**CONCLUSIONS:** Aortic dilation is a common benign finding after TEVAR for BTAI. AD is most pronounced at the location two cm proximal to the distal graft edge. In late-term follow-up, there were no known associated complications related to AD.

# Full Program & Abstracts

Figure 1.



A. proximal to left subclavian artery B. distal to left subclavian artery C. 2cm distal to proximal graft edge  
D. 2cm proximal to distal graft edge E. distal graft edge F. 2cm distal to distal graft edge

## Full Program & Abstracts

5:36 pm – 5:48 pm

51

### **Pedal Acceleration Time: A Novel Predictor of Limb Salvage**

Desarom Teso, Jill Sommerset, BeeJay Feliciano, Yolanda Vea, Riyad Karmy-Jones—Peacehealth Medical Southwest Medical Center, Vancouver, WA

**INTRODUCTION AND OBJECTIVES:** In the setting of Peripheral Arterial Disease (PAD), pedal arch interrogation by ultrasound has not been well described. Patients with non-compressible vessels and/or open wounds of the foot may preclude the use of ankle-brachial indices, toe pressure measurements, or TcPO<sub>2</sub>, respectively. We propose that pedal artery interrogations with Pedal Acceleration Time (PAT) is comparable to other physiologic testing in predicting wound healing for Chronic Limb-Threatening Ischemia (CLTI).

**METHODS:** A retrospective review of a prospectively kept database was performed from 2018-2019. Patients with pending amputation due to severe infection (WIFI infection class 2 and 3) were excluded from the study. We identified 73 limbs with CLTI that fit the inclusion criteria. Data included WIFI classification, age, gender, cardiovascular risk factors, PAT, ABI, and TBI when reliable were collected. PAT measurements were categorized into 4 classifications; 1 (40-120msec), 2 (121-180msec), 3 (181-224msec), and 4 (Greater than 225msec). Statistical analysis was performed using ANOVA testing.

**RESULTS:** Seventy-three limbs with CLTI were included in our study. All patients underwent arterial revascularization with either percutaneous technique or arterial bypass. Limb salvage was achieved in 59 (81%) of the 73 limbs. All 59 limbs had a 2-classification improvement in their PAT following interventions. 14 (19%) limbs without improvement in their PAT underwent above ankle level amputations. A change in 2 PAT classes is associated with limb salvage.

**CONCLUSIONS:** Patients with non-compressible ankle pressures or non-obtainable toe pressures poses a challenge in the complete assessment of WIFI classification. Our group have shown that PAT can be used in the scoring system for severity of ischemia in conjunction with current WIFI classification. Our data suggests that limb salvage correlates with post procedure PAT in category 1 and 2. Therefore we propose that PAT be included in the WIFI classification.



## Full Program & Abstracts

5:48 pm – 5:56 pm

52 (RF)

### **Long-Term Follow-Up of Occlusive Complications after EVAR**

Christopher M. Faries, Rami O. Tadros, David Oceau, Hanna J. Barnes, Joshua Harris, Peter L. Faries, Michael L. Marin—Icahn School of Medicine at Mount Sinai, New York, NY

**INTRODUCTION AND OBJECTIVES:** This study analyzed reinterventions for iliac limb or associated graft occlusion after EVAR.

**METHODS:** A retrospective review of a prospectively maintained database was conducted. From 1992 to 2019, 1638 patients underwent EVAR (145 procedures included the use of femorofemoral bypass grafts). 56 patients required reintervention for occlusion of an iliac limb or of a femorofemoral bypass performed as a component of the index EVAR procedure.

**RESULTS:** 33 patients were treated for iliac limb occlusion of the EVAR graft, 11 for iliac limb stenosis or kinking, 10 for occlusion of femorofemoral bypass grafts that were performed as a component of the index EVAR procedure, and 2 for acute aortic occlusion of AUI device (Table 1). Average follow-up was 51.95 +/- 51.17 months. Decreased survival in patients who received reinterventions for graft occlusion compared to patients without reinterventions was not significant (P=0.059). 2-year 1° and 2° patency rates for iliac limb occlusion treated with femorofemoral bypass were 75.2% and 80% respectively (Figure 1A). One patient in this group experienced limb amputation. All cases of iliac limb stenosis treated with angioplasty and stenting or femorofemoral bypass remained patent throughout follow-up. For treatment of femorofemoral bypass performed as a component of the index EVAR procedure, 2-year 1° and 2° patency rates of the reinterventions were 50% and 75% respectively (Figure 1B).

**CONCLUSIONS:** Femorofemoral bypass grafts and iliac stenting used to treat limb occlusion and stenosis each attain acceptable patency. Treatments of femorofemoral bypass performed during EVAR appear to have decreased patency.

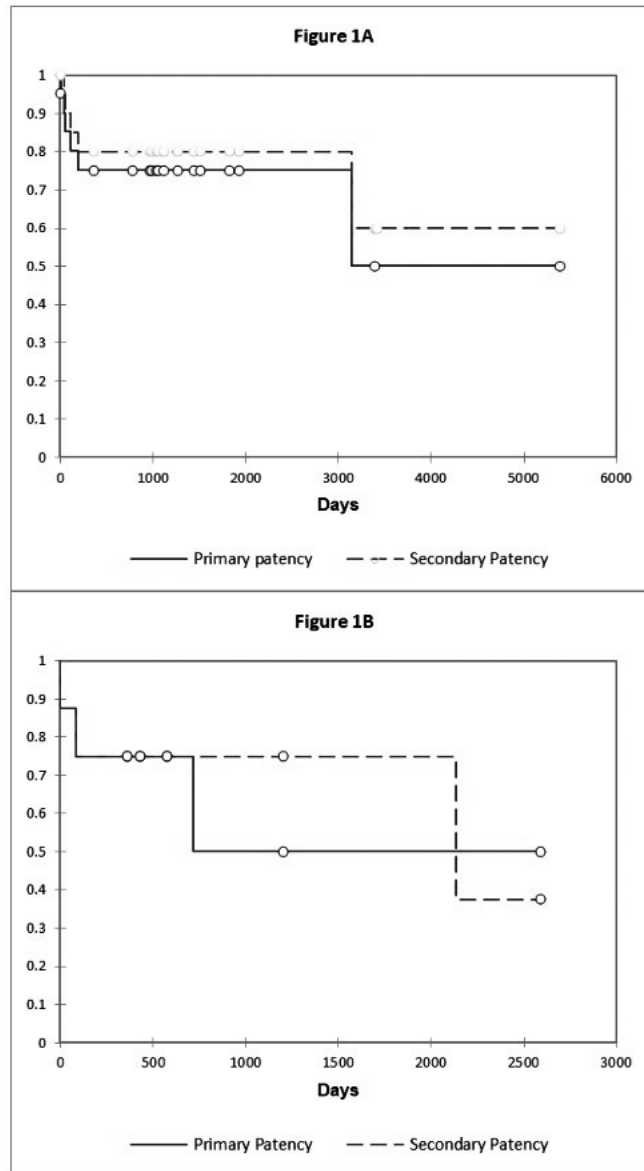
## Full Program & Abstracts

Table 1. Indications for reintervention and reintervention type

Indication	Reintervention	N
<b>EVAR Limb Occlusion (N = 33)</b>		
	Fem-Fem Bypass	23
	Angioplasty/Stent	5
	Ax-Fem Bypass	2
	Ileofemoral Bypass	1
	External Iliac-Profunda Bypass	1
	Thrombectomy	1
<b>EVAR Limb Stenosis/Kink (N = 11)</b>		
	Angioplasty/Stent	9
	Fem-Fem Bypass	1
	Ileofemoral Bypass	1
<b>Fem-Fem Bypass Occlusion (N = 10)</b>		
	Bypass Revision	5
	Ax-Fem Bypass	3
	Ax-SFA Bypass	1
	Iliac-Profunda Bypass	1
<b>Aortic Occlusion (N = 2)</b>		
	Ax-Fem Bypass	2

# Full Program & Abstracts

Figure 1. (A) 1° and 2° patency of femorofemoral bypass grafts performed to treat iliac limb occlusion of bifurcated EVAR device. (B) 1° and 2° patency of reinterventions to treat occlusion of femorofemoral bypass performed during the index EVAR procedure. Solid lines indicate primary patency and dashed lines indicate secondary patency.



## Full Program & Abstracts

5:56 pm – 6:04 pm

53 (RF)

### **Comparison of Radiation and Contrast Exposure in Transfemoral Versus Transcarotid Stenting**

David O'Connor, Lifan Cao, Jacqueline Steinman, Stanton Nielsen, Kristin Cook, Anjali Ratnathicam, Michael Wilderman, Gregory Simonian, Massimo Napolitano—Hackensack University Medical Center, Hackensack, NJ

**INTRODUCTION AND OBJECTIVES:** The major risk of the carotid artery stenting (CAS) procedure involves stroke occurring during or immediately after the procedure. TransCarotid Artery Revascularization (TCAR) was developed to avoid aortic arch and using flow reversal to reduce stroke, which has the potential to make stenting of equivalent safety to carotid endarterectomy. In this study we compared the radiation exposure between TCAR and traditional transfemoral CAS procedures.

**METHODS:** A retrospective analysis was performed in patients underwent TCAR and CAS procedures by a single surgeon at a single tertiary care hospital from 01/01/2016 to 04/01/2019. Patients radiation dose structured reports, contrast use and films were reviewed.

**RESULTS:** A total of 31 patients underwent TCAR procedures and 15 patients with traditional transfemoral CAS procedures during this period that had radiation data available. Significantly less overall fluoroscopic time (5.13 min vs. 27.74 min,  $P < 0.0001$ ), dose area product (7466 mGy.m<sup>2</sup> vs. 20569 mGy.m<sup>2</sup>,  $P = 0.0039$ ), peak skin dose (783 mGy vs. 1660 mGy,  $P = 0.0206$ ), contrast use (36.81 cc vs. 165.4 cc,  $P = 0.0011$ ), number of runs > 45 degrees (0.87 vs. 13.07,  $P < 0.0001$ ) and digital subtraction angiography runs (10.52 vs. 25.79,  $P = 0.0004$ ) were noted in TCAR patients compared with traditional transfemoral CAS patients. There was no difference for number of un-subtracted digital angiography runs between the two groups (2.87 vs. 3.14,  $P = 0.8338$ ).

**CONCLUSIONS:** Transcarotid artery revascularization requires significantly less radiation and contrast exposure compared to traditional transfemoral carotid stenting.

7:00 pm – 10:00 pm

**PRESIDENT'S DINNER**  
(Tickets Required)



## Notes

## Newly Elected Active Members ('19)

Rana Afifi ..... McGovern Medical School at UTHealth  
 Hasan Aldailami ..... New York Presbyterian Hospital  
 Shahriar Alizadegan ..... Medical College of Wisconsin  
 James Ballard ..... Utah Valley Vascular Surgery  
 Michael Barfield ..... NYU  
 Philip Batista ..... Thomas Jefferson University Hospital  
 William Beckerman ..... Mount Sinai Hospital  
 Kyla Bennett ..... University of Wisconsin-Madison  
 Emelia Bittenbinder ..... TAMHSC  
 Michael Bounds ..... University of Kentucky  
 Nina Bowens ..... Harbor-UCLA Medical Center  
 Christopher Boyes ..... Sanger Heart & Vascular Institute  
 Justin Brown ..... University of Arkansas Medical Sciences  
 Samantha Cox ..... University of Maryland  
 Cassidy Duran ..... Texas Health Resources Presbyterian  
 Grant Fankhauser ..... University of Texas Medical Branch  
 David Finlay ..... Mount Sinai Hospital  
 Edgar Luis Galinanes ..... Miami Vascular Surgery  
 Matthew Gibson ..... UNC Rex  
 Oleksiy Gudz ..... Ivano-Frankivsk National Medical University  
 Prateek Gupta ..... Methodist Healthcare  
 Laurel Hastings ..... Louisiana State University  
 Caitlin Hicks ..... Johns Hopkins  
 Michael Hong ..... San Francisco Vein & Vascular Institute  
 Kathryn Howe ..... University Health Network/University of Toronto  
 Senthil Jayarajan ..... Washington University/Barnes Jewish Hospital  
 Patrick Kelly ..... Sanford USD Medical Center  
 Sharon Kiang ..... Loma Linda University School of Medicine  
 Hyein Kim ..... MedStar Georgetown Univ. Hospital/Washington Hospital Ctr.  
 Jordan Knepper ..... Henry Ford Allegiance Vascular Health  
 Brian Kuhn ..... TriHealth Heart Institute  
 Nathan Liang ..... UPMC  
 Sarah Lucas ..... Memphis VA Medical Center  
 Graeme McFarland ..... Stanford University  
 Bernardo Mendes ..... Mayo Clinic  
 Dimitrios Miserlis ..... UTHSCSA  
 Ryan Nolte ..... OSF St. Francis Cardiovascular Institute  
 Leigh Ann O'Banion ..... CCFMG/UCSF-Fresno  
 John Ohman ..... Washington University in St. Louis  
 Andre Ramdon ..... Albany Medical Center  
 Christopher Ramos ..... Emory University  
 Animesh Rathore ..... Sentara Vascular  
 Johnathon Rollo ..... University of Washington

## Newly Elected Active Members *(continued)*

Taimur Saleem ..... UCLA  
Jennifer Sanford ..... Saint Louis University  
Samuel Schwartz ..... Massachusetts General Hospital  
Parth Shah ..... Hartford Healthcare Medical Group  
Afzal Siddique ..... Combined Military Hospital  
Allie Sohn ..... University of South Florida  
Jeffrey Stein ..... Peripheral Vascular Associates  
Chandu Vemuri ..... University of Michigan  
Claudiu Vlada ..... Washington University in Saint Louis  
Tahlia Weis ..... Marshfield Medical Center  
Sean Wengerter ..... Mount Sinai  
Christopher Werter ..... University of Maryland  
William Yoon ..... Loyola University Medical Center

## Newly Elected Candidate Members (‘19)

Nida Ahmed	Loyola University Medical Center
Taqwa Ahmed	Vascular Institute of New York
Mark Ajalat	UCLA
Joseph Anderson	Medical University of South Carolina
Nkiruka Arinze	Boston Medical Center
Chris Audu	University of Michigan
Daniel Badia	University of Kentucky
Saagar Bakshi	Emory University
Jonathan Barnes	Dartmouth-Hitchcock Medical Center
Peter Bartline	University of Wisconsin-Madison
Jocelyn Beach	Cleveland Clinic
Joseph Besho	University of Texas Health Science Center at Houston
Jeremy Bolin	University of California Davis Medical Center
Shayna Brathwaite	Ohio State University
Tommaso Cambiaghi	McGovern Medical School at the UTSC
Sergio Casillas-Berumen	Heartland Regional Medical Center
Jesse Chait	Undisclosed
James Chang	Emory University
Ronald Chang	McGovern Medical School
Matthew Chia	Northwestern Memorial Hospital
Daisy Chou	Ohio State University Wexner Medical Center
Christopher Clark	Wake Forest Baptist Health
Neal Cooper	Grand Strand Medical Center
Justin D'Addario	St. Louis University
Kathryn DiLosa	LSUHSC New Orleans
Mead Ferris	University of Vermont Medical Center
Tim Fuller	Good Samaritan Hospital (TriHealth)
Katherine Giuliano	Johns Hopkins Hospital
Leah Gober	Mercer University
Andrew Gonzalez	University of Michigan
Brian Grant	Howard University Hospital
Mickey Graphia	Southern Illinois University School of Medicine
Cindy Ha	UT Southwestern
Scott Hardouin	Boston University
Donald Harris	University of Wisconsin
Kai Hata	San Antonio Military Medical Center
Katherine Hekman	Northwestern University
Jake Hemingway	University of Washington
Elica Inagaki	Boston Medical Center
Wajeeh Irfan	LSUHSC - New Orleans
Margaret Jackson	University of Texas at Houston
Momodou Jammeh	Washington University/Barnes Jewish Hospital
Brian Jones	Greenville Health System
Amandeep Juneja	SIUH
Amit Kainth	Saint Louis University
Kevin Kenney	New York Medical College
Amber Kernodle	Johns Hopkins Hospital
Adil Khan	Emory University Hospital
Gloria Kim	University of Michigan
Justin King	Indiana University
Scott Levin	Boston University
Carlton Lewis	New York Presbyterian
Chong Li	New York University Medical Center
Tiffany Liang	Indiana University School of Medicine
Satinderjit Locham	UCSD



## Newly Elected Candidate Members *(continued)*

George Makkar.....	University of Maryland Medical Center
Jeanette Man.....	University of Iowa Hospitals and Clinics
Jacob Mandel.....	Icahn School of Medicine & Mt. Sinai
Richard Meena.....	Emory University
Ranan Mendelsberg.....	University of Oklahoma, Tulsa
Christopher Mitromaras.....	UT Health San Antonio
Farah Mohammad.....	Henry Ford Hospital
John Myers.....	Brooke Army Medical Center
Abdallah Naddaf.....	Southern Illinois University School Of Medicine
Ruhani Nanavati.....	SIU School of Medicine
Tammy Nguyen.....	University of Massachusetts
Cole Nishikawa.....	UC Davis Medical Center
Edward Oh.....	USF Health Morsani College of Medicine
Brad Oriel.....	Boston Medical Center
Priya Patel.....	Rutgers NJMS
Rhusheet Patel.....	UCLA
Laura Peck.....	St. Louis University
John Perry.....	Cleveland Clinic Foundation
Steven Pike.....	Boston Medical Center
Anastasia Plotkin.....	University of Colorado
Joel Ramirez.....	University of California, San Francisco
Katherine Reitz.....	University of Pittsburgh
Cheryl Richie.....	University of Kentucky
Scott Robinson.....	University of Michigan
Kara Rothenberg.....	UCSF-East Bay
Nicholas Saguan.....	MCW
Gregory Salzler.....	UPMC
Melinda Schaller.....	University of California, San Francisco
David Schechtman.....	Brooke Army Medical Center
Jacob Schwartzman.....	Rutgers - New Jersey Medical School
Kyla Shelton.....	University of Arkansas for Medical Sciences
Christine Shokrzadeh.....	UBM
Joshua Sibille.....	McLeod Vascular Associates
Abindra Sigdel.....	University of Louisville
Meryl Simon.....	UC Davis Medical Ctr./David Grant Medical Ctr.
Renganaden Sooppan.....	Johns Hopkins Hospital
Rebecca Sorber.....	Johns Hopkins Hospital
Michael Soult.....	Loyola University
Andrew Sticco.....	Greenville Health System
Adam Strickland.....	Wake Forest University
Tia Sutton Loyola.....	University Medical Center
Akiko Tanaka.....	McGovern Medical School at UTHealth
Jonathan Thompson.....	University of Michigan
Jesus Ulloa.....	UCLA
Matthew Vuoncino.....	Uniformed Services University
Heather Waldrop.....	Wake Forest Baptist
Gabriel Wallace.....	Northwestern University
Zachary Wanken.....	Dartmouth-Hitchcock Medical Center
Zachary Williams.....	New Hanover Regional Medical Center
Ingrid Woelfel.....	Ohio State University
Halim Yammine.....	Atrium Health - Sanger Heart and Vascular Institute
Yang Yang.....	Drexel University College of Medicine
Taehwan Yoo.....	Ohio State

## **Newly Elected Associate Members ('19)**

Charles Marquardt .....Loyola Hospital

# VESS Bylaws

## ARTICLE I – NAME

The name of this organization shall be the "Vascular and Endovascular Surgery Society" (hereinafter the "Society"). Formerly Peripheral Vascular Surgery Society, Established in 1976.

## ARTICLE II – OBJECTIVES

1. The objectives of this Society shall be:
  - a. To improve the science and art of vascular surgery and endovascular therapies;
  - b. To promote basic and clinical research for improving the quality and safety of vascular care;
  - c. To engage in educational purposes beneficial to the membership as a whole or to the society in general;
  - d. To provide a forum for the young vascular surgeon, to promote the field of vascular and endovascular surgery through education, scholarship, advocacy, and leadership.
  - e. To do any and all things which may be necessary or incidental to these Bylaws.

The Society shall carry on activities:

1. As a corporation exempt from Federal income tax under Section 501 (C) (3), of the Internal Revenue Code of 1954 (or the corresponding provision of any future United States Internal Revenue Law), or;
2. As a corporation, contributions to which are deductible under Section 170; Furthermore, no part of the net income of the Society or its property or assets shall at any time inure to the benefit of any individual member, or of any private individual, or be used to promote the candidacy of any person seeking political office.

## ARTICLE III – MEMBERSHIP

There shall be six types of membership:

- a. Active
  - b. Active Senior
  - c. Inactive Senior
  - d. Honorary
  - e. Candidate
  - f. Associate
- a) Active Membership of this Society shall be limited to physicians of good professional standing who have completed an ACGME-approved vascular surgical residency or fellowship, or equivalent foreign advanced training, who have a sustained major interest and active practice in vascular and endovascular surgery and who are certified by the American Board of Surgery or its equivalent. Active Members shall be required to pay annual

# VESS Bylaws

- dues. Active members have voting privileges, can serve on committees, sponsor new member applications as well as submit and sponsor papers for presentation at the annual meeting.
- b) Active Senior Membership shall be granted to members who have been in practice for greater than 15 years. Active Senior Members may complete terms of elected office, and are required to pay dues. Active Senior Members can sponsor papers for fellows and residents, participate in the business meeting as well as vote, but do not present papers and are not eligible for re-election as Society officers.
  - c) Inactive Senior Membership shall be granted to Senior Members upon receipt of written request. Inactive Senior members will no longer receive a subscription to the Journal. Inactive Senior Members are not required to pay annual dues nor are they allowed to sponsor new member applications or papers and presentations submitted to the annual meeting. Inactive Senior Members may become Active Senior Members by requesting in writing reactivation and paying all back dues or three times the current year's dues.
  - d) Honorary Membership shall be granted to individuals at the discretion of the Executive Council. Honorary Members pay no dues and are not eligible for election as Society officers.
  - e) Candidate Membership shall be granted to participants who are in good professional standing in an ACGME accredited general surgery, vascular surgery residency, or other vascular residency recognized by the Society. Also students in accredited osteopathic and allopathic medical schools can participate in this membership group. Candidate Members must be sponsored by an active or senior active Society member. Candidate Members may serve on Committees but shall have no voting rights. Candidate Members can present papers at the annual meeting if sponsored by an Active Member. Candidate Members may be promoted to Active Membership upon completion of their vascular surgery residency (or equivalent) and upon receipt by the society office of a copy of the vascular surgery training certificate (or equivalent). At this time, the newly promoted Active Member will be bound by the requirements of active membership in the society.
  - f) Associate Membership shall be limited to non-vascular trained physicians and surgeons with either an MD or DO degree, scientists active in vascular medicine or surgical research, physician extenders in vascular specialties (RN's, PA's, NP's) and vascular technologists. These members shall pay half dues, have no voting rights, cannot be elected as officers of the society, but may submit abstracts and papers to the meetings.

## ARTICLE IV – ELECTION OF MEMBERS

- a. The process of election of active members to the Society shall be as follows:
- b. Membership enrollment in the Society shall be completed via electronic application through the website.
- c. Completed applications shall be submitted 3 months prior to any scheduled business meeting, at which time the candidate shall be considered for election. One letter of recommendation from an active society member is required to complete the application.
- d. The names of the applicants recommended for membership by the

# VESS Bylaws

Executive Committee shall be submitted to the members at the business meeting.

- e. Election to membership shall be by secret ballot, by a three-fourths (3/4) affirmative vote of the membership present.
- f. An applicant who fails to be elected at one meeting may be reconsidered at the next two business meetings of the Society.

## ARTICLE V – DUES AND FEES

- a. Dues and fees shall be levied by the Executive Committee and approved by the membership at the annual meeting.
- b. Any member whose dues remain unpaid for a period of three years shall be dropped from membership, provided that notification of such lapse is given at least three months prior to its effective date. The member may be reinstated on approval of the Executive Committee following payment of the dues in arrears.

## ARTICLE VI – RESIGNATIONS, EXPULSIONS

- a. Resignations of members otherwise in good standing shall be accepted by a majority vote of the Executive Committee.
- b. Charges of unprofessional or unethical conduct against any member of the Society, if proffered in writing and submitted to the Executive Committee, must be acted upon within one year. The Executive Committee's concurrence or disallowance of the charges shall be presented to the membership at the annual meeting. A three-fourths (3/4) affirmative vote of the members present shall be required for expulsion.

## ARTICLE VII – OFFICERS: ELECTIONS AND DUTIES

- a. The officers of this Society shall consist of a president, president-elect, secretary, treasurer, and recorder; all to be elected as provided in these bylaws.
- b. The president shall preside at Executive Committee meetings and the Annual Meeting. Successors to vacated offices of the Society shall be appointed by the president until the position is filled at the next annual meeting.
- c. The president and president-elect of the Society shall be elected for terms of one year each. The secretary, treasurer, recorder, and councilors-at-large shall be elected for three-year terms.
- d. The president-elect, in the absence or incapacity of the president, shall perform the duties of the president's office.
- e. In the absence of both the president and president-elect, the chair shall be assumed by a president pro tem, elected by such members of the Executive Committee as are present.
- f. The secretary shall keep minutes at the meetings of the Society and the Executive Committee, update the Executive Committee on membership database and new applicant files and conduct correspondence of the Society. The Secretary will issue an annual written report at the Annual Meeting.
- g. The Treasurer shall receive all monies and funds belonging to the Society,

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- pay all bills, render bills for dues and assessments, and report to the membership at the annual meeting. The treasurer will prepare an annual report for audit.
- h. The Recorder shall receive all papers presented before the Society. The recorder shall be responsible for assuring prompt editorial review of manuscripts in concert with other Society members.
  - i. The Councilors-at-large shall be elected for three-year terms, with election of one councilor occurring annually so as to provide overlapping terms.

## ARTICLE VIII – EXECUTIVE COMMITTEE

- a. There shall be an Executive Committee consisting of the president, president-elect, secretary, treasurer, recorder, councilors-at-large, and the two most recent past presidents.
- b. Committee Chairs shall be non-voting members of the EC are invited to attend the Executive Committee Meetings and Conference Calls at the direction of the President.
- c. The Executive Committee shall be the governing body of the Society and shall have full power to manage and act on all affairs of the Society.
- d. Executive Committee meetings shall be held at the call of the president of the Society.
- e. A majority of the members of the Executive Committee shall constitute a quorum for the transaction of business.
- f. All members of the executive committee will be required to complete a conflict of interest declaration prior to their appointment. This declaration must be approved by a majority of the remaining executive committee members. If the executive committee requests, the member must divest themselves of a designated conflict of interest prior to assumption of the appointment. A conflict of interest is defined as any direct financial reimbursement to an individual or their spouse. It does not include non-specified research contributions to an institution.

## ARTICLE IX – COMMITTEES AND REPRESENTATIVES

Standing committees of the Society shall consist of a nominating committee, a spring program committee, a winter program committee, a grants & scholarship committee, a fundraising committee, a bylaws committee, a membership development committee, a women & diversity committee, a vascular resident education committee and a communications committee.

The Nominating Committee shall consist of the current president in office, the president-elect and the two most recent past presidents. Its functions shall be to make up a slate of officers for the Society, and to nominate representatives to affiliated societies to be presented to the Executive Committee at the annual meeting. The proposed slate shall then be presented for vote during the Annual Member Business Meeting.

Representatives shall be appointed by the nominating committee in concert with the Executive Committee to serve on American College of Surgeons Board of Governors, American College of Surgeons Advisory Council for Surgical Specialties and the Council of the American Association for Vascular Surgery.

## **VESS Bylaws**

Each representative shall serve a three-year term unless otherwise noted by the Executive Committee. From time to time, other organizations may seek representation from the Society. Additional representatives shall be appointed in the same manner outlined above.

The Spring Program Committee shall work in concert with the SVS Program Committee to select papers and make up the program for upcoming meetings. The Spring Program Chair shall be named by the Executive Committee and serve a term of two years. The Committee will consist of 6 additional society members serving a term of two years each, with three members alternating years to allow for overlap.

The Winter Program Committee shall solicit papers and other presentations from members and other individuals and make up the programs for upcoming meetings. The Winter Program Chair shall be named by the Executive Committee and serve a term of one year. The Executive Committee will also name a Vice Chair for the Winter Program Committee for continuity. The Vice Chair will advance to the Chair. The Committee will consist of no less than 6 and no more than 10 additional Society members serving staggered terms of two years to allow for overlap.

The Grants & Scholarships Committee shall consist of six members, a chairman, selected by the Executive Committee, 3 Councilors-at-Large, and 2 remaining at-large committee members selected by the committee chairman. This committee shall serve for two years. Its function shall be to review educational grant award applications and to report award recipients to the executive committee at the annual meeting.

The Fundraising Committee shall consist of ten members. Its function shall be to research and implement comprehensive fundraising campaigns to support the society. A committee chairman shall be appointed by the Executive Committee to serve a two-year term. Other committee members shall be the president-elect, the treasurer, the secretary and the newly appointed councilor-at-large. The committee chairman will select up to 4 additional society members to assist with this task. In addition, the current society president shall be an Ex-Officio member.

The Bylaws Committee shall consist of three members to serve overlapping terms of three years each. A new member shall be appointed annually by the Executive Committee. The most senior member of the By-Laws Committee shall serve as Chair. The By-Laws Committee shall review By-Laws from time to time as directed by the Council and when appropriate, make recommendations regarding amendments.

The Membership Development Committee shall consist of a chair and four members serving two year terms. The Secretary shall serve as ex-officio. New members shall be appointed annually by the Executive Committee. The committee shall review all applications and present their nominations for membership to the Executive Committee for review and ratification at the Annual Business Meeting. The Committee shall also assist the Secretary with membership development and expansion campaigns.

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The Women and Diversity Committee shall consist of four members to serve overlapping terms of four years each. The most senior member shall serve as chair for one year. Open positions shall be appointed by the executive committee. The purpose of this committee is to identify and promote ways to address minority issues in vascular surgery, and encourage women and minorities to actively participate in the society and its committees. The Communications Committee shall consist of one Chair serving a three-year term, and is responsible for organizing, coordinating, and implementing all communication to the membership and along with the Secretary will oversee subcommittee functions. The Communication Chair is appointed by the Executive Committee for a maximum three-year term renewed annually. The Committee shall consist of two subcommittees:

1. Website sub-committee consisting of one chair serving a two-year term and two sub-committee members appointed for 2 year terms, and is responsible for all web-based and electronic communication, and maintenance of the Society website.
2. Newsletter sub-committee consisting of one chair serving a two-year term and a minimum of two sub-committee members appointed for 2 year terms, and is responsible for a membership newsletter at intervals defined by the Communication Chair.

The Vascular Resident Education Committee shall consist of six members. Four members to serve overlapping terms of two years each. Its function shall be to organize and execute the Fellows Program and the Technology Forum at the VESS Annual Meeting. Two new members shall be appointed annually by the Executive Committee. The two most senior members of the Vascular Resident Education Committee shall serve as Co-Chairs. The two out-going co-chairs shall be Ex-Officio members.

## **ARTICLE X – MEETINGS**

- a. The Society shall hold an annual meeting, customarily in winter, and held at a time and place selected by the Executive Committee.
- b. The business meeting of the Society shall be conducted during the annual meeting.
- c. All active members are encouraged to attend the annual meeting one year out of every three years. There is no attendance requirement for any other member category.
- d. Special meetings may be called at any time by the president, or a simple majority of the Executive Committee.

## **ARTICLE XI – QUORUM**

The members present at any official meeting of the society shall constitute a quorum necessary to change the constitution and bylaws of the Society, to make assessments, to authorize appropriations or expenditures of money other than those required in the routine business of the Society, to elect officers and members, and to expel members.



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## **ARTICLE XII – ALTERATIONS, REPEAL**

Bylaws may be altered or repealed at the annual meeting by a two-thirds (2/3) affirmative vote of the members present.

## **ARTICLE XIII – PROCEDURE**

Proceedings of the Society shall be conducted under Robert's Rules of Order.

*Amended – August, 2012*  
*Amended – February, 2013*  
*Amended – January, 2014*  
*Amended – February, 2016*  
*Amended – February 2018*  
*Amended – February 2019*



# Notes



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# Member Update Form

Please help the VESS keep your membership information current. We require an email address from all members for communication purposes, as well as your preferred mailing address.

Please return to the VESS Registration Desk or fax to the National Office at 978-927-7872.

## MEMBER INFORMATION (Required For All Members)

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Name

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Institution

City

State

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Email Address

## MAILING INFORMATION

Preferred Mailing Address:       Work       Home

Please provide preferred mailing address below:

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Mailing Address

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Mailing Address (*continued*)

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City

Country

State

Postal Code

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Daytime Telephone

Thank you!