



WESTERN VASCULAR SOCIETY

36th Annual Meeting

October 16 – 19, 2021

Four Seasons Jackson Hole, Teton Village, WY

www.westernvascularsociety.org

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MISSION, VISION, AND VALUES STATEMENTS

MISSION

To promote education, research, advocacy and leadership in the art and science of compassionate vascular health in the Western United States, Canada and the Pacific Rim

VISION

To inspire excellence and innovation in vascular surgery

VALUES

Education

We strive to continue to produce a high quality, balanced scientific meeting to attract the best and brightest into our field, expanding incorporation of new science, techniques and practices

Research

We encourage multi-center collaboration on research initiatives in the Western United States, Canada and the Pacific Rim

Public Awareness

We endeavor to increase public awareness of the prevalence of vascular disease and promote optimizing vascular health through public outreach.

Preserving and promoting the very rich academic heritage and tradition of the Western Vascular Society is of paramount importance.

Advocacy

We encourage professionalism, diversity, and inclusiveness at the highest levels for ethical and compassionate care for patients.

Career Development

We promote leadership development to the WVS membership to cultivate future vascular surgery leaders locally, regionally, nationally, and internationally.

OFFICERS AND COMMITTEES

OFFICERS

Michael Conte, MD	President
Vincent Rowe, MD	President Elect
Matthew Mell, MD	Recorder
Ahmed Abou-Zamzam, MD	Secretary Treasurer
R. Eugene Zierler, MD	Historian
Misty Humphries, MD	VSIG Chair
Elina Quiroga, MD	DEI Chair
Benjamin W. Starnes, MD	Past President
York Hsiang, MD	Past President
E. John Harris, MD	Past President

PROGRAM COMMITTEE

Venita Chandra, MD	Chair
Omid Jazaeri, MD	
Elina Quiroga, MD	
Jade Hiramoto, MD	

Ex-Officio Program Committee Members

Michael Conte, MD	President
Vincent Rowe, MD	President Elect
Matthew Mell, MD	Recorder
Ahmed Abou-Zamzam MD	Secretary Treasurer

MEMBERSHIP COMMITTEE

Timothy Liem, MD
Ali Azzizadeh, MD
Robert Chang, MD

WVS REPRESENTATIVE TO THE SVS

Ahmed Abou-Zamzam, MD

LOCAL ARRANGEMENTS COMMITTEE CHAIRMAN

Mark Morasch, MD

PAST MEETINGS

1986	Dana Point, CA	Organizing Committee
1987	Tucson, AZ	W. Sterling Edwards, MD
1988	Monterey, CA	Robert B. Rutherford, MD
1989	Kauai, Hawaii	D. Eugene Strandness, Jr., MD
1990	Coronado, CA	Ronald J. Stoney, MD
1991	Rancho Mirage, CA	Victor M. Bernhard, MD
1992	Maui, Hawaii	Wesley S. Moore, MD
1993	Sonoma, CA	John M. Porter, MD
1994	Santa Barbara, CA	Eugene F. Bernstein, MD
1995	Phoenix, AZ	Robert L. Kistner, MD
1996	Dana Point, CA	Jerry Goldstone, MD
1997	Lana'I, Hawaii	Richard L. Treiman, MD
1998	Whistler, BC, Canada	Kaj H. Johansen, MD
1999	Lake Tahoe, NV	Ralph B. Dilley, MD
2000	Coeur d'Alene, ID	Peter F. Lawrence, MD
2001	Santa Fe, NM	William C. Krupski, MD
2002	Newport Beach, CA	Cornelius Olcott, IV, MD
2003	Kona, Hawaii	Lloyd M. Taylor, Jr., MD
2004	Victoria, BC, Canada	J. Dennis Baker, MD
2005	Park City, UT	Gregory L. Moneta, MD
2006	La Jolla, CA	George Andros, MD
2007	Kona, Hawaii	Jeffrey L. Ballard, MD
2008	Napa, CA	Alexander W. Clowes, MD
2009	Tucson, AZ	Fred A. Weaver, MD
2010	Sunriver, OR	Linda M. Reilly, MD
2011	Kauai, Hawaii	Ronald L. Dalman, MD
2012	Park City, UT	William J. Quinones-Baldrich, MD
2013	Jasper, AB, Canada	Joseph L. Mills, Sr., MD
2014	Coronado, CA	Peter A. Schneider, MD
2015	Wailea, Hawaii	Larry Kraiss, MD
2016	Colorado Springs, CO	William Pevac, MD
2017	Blaine, WA	Steven Katz, MD
2018	Santa Fe, NM	E. John Harris, MD
2019	Wailea, HI	York N. Hsiang, MB, MHSc
2020	Virtual	Benjamin W. Starnes, MD

SECRETARY-TREASURERS

1986 - 1990	Wesley S. Moore, MD
1990 - 1993	J. Dennis Baker, MD
1993 - 1996	P. Michael McCart, MD
1996 - 1999	Gregory L. Moneta, MD
1999 - 2000	Terence M. Quigley, MD
2000 - 2002	Julie A. Freischlag, MD
2002 - 2005	Jeffrey L. Ballard, MD
2005 - 2008	Joseph L. Mills, MD
2008 - 2011	Larry W. Kraiss, MD
2011 - 2014	E. John Harris, Jr., MD
2014 - 2017	York N. Hsiang, MB, MHSc
2017 - 2020	Roy Fujitani, MD
2020 - 2023	Ahmed Abou-Zamzam, MD

RECORDERS

1987 - 1989	Victor M. Bernhard, MD
1989 - 1992	Eugene F. Bernstein, MD
1992 - 1995	Peter F. Lawrence, MD
1995 - 1998	William C. Krupski, MD
1998 - 2001	Roy L. Tawes, MD
2001 - 2004	Ronald L. Dalman, MD
2004 - 2007	Peter A. Schneider, MD
2007 - 2010	William C. Pevec, MD
2010 - 2013	Steven Katz, MD
2013 - 2016	Benjamin W. Starnes, MD
2016 - 2019	Michael Conte, MD
2019 - 2022	Matthew Mell, MD

NEW MEMBERS ELECTED IN 2020

Shahram Aarabi, MD	Karthikeshwar Kasirajan, MD
Shipra Arya, MD	Owen Palmer, MD
Amir Azarbal, MD	Karen Quirk, MD
Yiu Che Chan, MD	Johnathon Rollo, MD
Warren Chow, MD	Jordan Stern, MD
Sukgu Han, MD	Christopher Washington, MD
Tazo Inui, MD	William Yoon, MD

WVS PRESIDENTIAL GUEST LECTURERS

1986	Emerick Szilagyi	2005	Kevin G. Burnand
1987	None	2006	Jean Pierre Becquemin
1988	James Stanley	2007	None
1989	Brian Thiele	2008	John H. N. Wolfe
1990	Frank Veith	2009	Jack L. Cronenwett
1991	Allan Callow	2010	None
1992	Malcolm Perry	2011	Germano Melissano
1993	Norman Hertzner	2012	Roy K. Greenberg
1994	Norman Browse		Hazim J. Safi
1995	Calvin Ernst	2013	Spence M. Taylor
1996	Anthony Whittemore	2014	Alan B. Lumsden
1997	None	2015	Peter Gloviczki
1998	None	2016	Alik Farber
1999	Jonathan Towne	2017	Bruce Perler
2000	R. Thomas Grayston	2018	Thomas Wakefield
2001	William Hiatt	2019	Thomas Forbes
2002	Thomas R. Russell	2020	Gustavo Oderich
2003	None	2021	Michael Belkin
2004	None		

GENERAL INFORMATION

EDUCATIONAL OBJECTIVES & METHODS

The 36th Annual Meeting of the Western Vascular Society was established with the specific purpose of advancing the art and science of vascular surgery, a goal that directly addresses competence, practice performance, and patient outcomes. The majority of the educational content includes scientific presentations by members, sponsored guests, and residents, selected by the WVS Program Committee.

OVERALL LEARNING OBJECTIVES

This activity is designed for: vascular surgeons, fellows, residents, and general surgeons who find the art and science of vascular surgery rapidly changing with respect to scientific discovery and surgical technology.

Reflecting this rapid advancement, the meeting will feature oral scientific presentations by members, sponsored guests, and residents.

Upon completion of this course, participants will be able to:

- Discuss and describe procedural planning, surgical techniques and outcomes of endovascular repair of complex thoracoabdominal, pararenal, and ruptured aortic aneurysms.
- Discuss long term outcomes, mortality rates and predictors of mortality following repair of aortic aneurysm.
- Describe techniques to treat endoleak following endovascular aneurysm repair.
- Discuss the role and outcomes of endovascular repair of aortic dissection.
- Describe strategies to reduce spinal cord ischemia from endovascular repair of thoracic aortic aneurysm.
- Explain the relationship between patient frailty and outcomes following vascular surgical intervention.
- Describe techniques to optimize patient outcomes in the medical and surgical treatment of peripheral artery disease.

GENERAL INFORMATION continued

- Implement new techniques for the creation and maintenance of hemodialysis fistulas.
- Discuss new scientific insights into the biology of lipids, atherosclerotic plaque and peripheral artery disease.
- Describe new strategies to prevent venous thromboembolic disease.
- Discuss the diagnosis, management and outcomes of lower extremity arterial injury.
- Discuss techniques and outcomes of endarterectomy and stenting for symptomatic and asymptomatic carotid occlusive disease.
- Describe causes of finger ischemia in hospitalized patients.
- Recognize predictors of blood pressure response to renal artery stenting.
- Implement strategies to reduce radiation exposure during endovascular intervention.

EDUCATIONAL METHODS

Authored papers are supported by PowerPoint presentations. Full papers have a primary discussant and ample time provided for questions and discussion from the audience. Panel and group discussions are encouraged using the WVS meeting app.

DISCLOSURE INFORMATION

In compliance with ACCME Accreditation Criteria, the American College of Surgeons, as the accredited provider of this activity, must ensure that anyone in a position to control the content of the educational activity has disclosed all relevant financial relationships with any commercial interest. All reported conflicts are managed by a designated official to ensure a bias-free presentation. Please see the insert to this program for the complete disclosure list.

CONTINUING MEDICAL EDUCATION CREDIT INFORMATION

Accreditation Statement



JOINTLY ACCREDITED PROVIDER™
INTERPROFESSIONAL CONTINUING EDUCATION

In support of improving patient care, this activity has been planned and implemented by Amedco LLC and Western Vascular 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.

Physicians (ACCME)

Amedco LLC designates this live activity for a maximum of **13.25 AMA PRA Category 1 Credits™**. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

ABS Self-Assessment Credit

This course is valid for up to **10.25** of SA-CME Self-Assessment credits. Learners should self-submit these credits to their boards.

INSTRUCTIONS FOR CME CREDIT COLLECTION

To claim the 13.25 *AMA PRA Category 1 Credits*[™]:

Physicians please sign in everyday at the registration desk and complete the meeting evaluation online using the link provided via email.

To claim the 10.25 credits for Self-Assessment please check your email for the link to the online self assessment quiz and complete the quiz within 30 days of the program.

Alternatively, you can visit the website www.westernvascularsociety.org and find the links on the annual meeting page.

INSTRUCTIONS TO AUTHORS

Authors presenting papers are reminded that the presentation of the paper shall be limited to the following:

FULL PRESENTATIONS

8 minutes presentation, 2 minutes invited discussion,
10 minutes moderated questions

MINI PRESENTATIONS

5 minutes presentation, 5 minutes moderated questions

RAPID FIRE PRESENTATIONS

5 minutes presentation, 2 minutes moderated questions

INSTRUCTIONS TO AUTHORS

ROBERT HYE MEMORIAL BEST RESIDENT PRESENTATIONS

To honor the contribution of member Dr. Robert Hye, each year Western Vascular Society Program Chair elects judges to evaluate the best full presentation by a medical student or resident. There are three cash prizes \$500, \$250, and \$100 and official commemorative certificates awarded at the final session of the meeting. In addition there is a certificate and \$100 award for the best Rapid Fire Presentation. Hye award eligible presentations are designated on the scientific program.

INVITED DISCUSSION

Two minutes and specifically critique the paper as presented. Visual aids may not be incorporated into the discussion. An electronic copy of the discussion is required to be submitted to the recorder.

MANUSCRIPTS

Authors of Full Presentations are **REQUIRED** to submit a manuscript of their presentation for possible publication in the Journal of Vascular Surgery Publications within one month of the Annual Meeting. The Editors of the Journal of Vascular Surgery Publications will determine the Journal in which accepted manuscripts will be published.

The guidelines for submission of your Manuscript(s) may be found on the Journal of Vascular Surgery Publications website www.editorialmanager.com/jvs. Please refer to the “Instructions for Authors.” Once the manuscript is submitted to the Journal by email, please send a confirmation of submission to Matthew Mell, MD, at mwmell@ucdavis.edu.

SPONSOR ACKNOWLEDGEMENT

Western Vascular Society is grateful for the following companies for their support of the educational program:

PLATINUM SPONSORS

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SILVER SPONSORS

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SCHEDULE OF EVENTS

SATURDAY, OCTOBER 16, 2021

11:00 AM – 8:00 PM	REGISTRATION
3:00 PM – 4:00 PM	EXECUTIVE COUNCIL MEETING
5:00 PM – 6:00 PM	RAPID FIRE SESSION Presiding: Venita Chandra, MD, Program Chair
6:00 PM – 7:30 PM	SPONSOR WELCOME RECEPTION
7:00 PM – 8:30 PM	PAST PRESIDENT’S DINNER

SUNDAY, OCTOBER 17, 2021

6:30 AM – 1:00 PM	REGISTRATION
7:00 AM – 8:00 AM	BREAKFAST
7:00 AM – 11:45 AM	EXHIBITS
7:30 AM – 9:00 AM	COMPANION BREAKFAST
7:45 AM – 8:00 AM	CALL TO ORDER & ANNOUNCEMENTS
8:00 AM – 9:50 AM	SCIENTIFIC SESSION I Presiding: Michael Conte, MD, President; Matthew Mell, MD, Recorder; Elina Quiroga, MD, DEI Committee Chair
9:50 AM – 10:20 AM	COFFEE BREAK WITH EDUCATIONAL EXHIBITORS
10:20 AM – 11:00 AM	PRESIDENTIAL GUEST LECTURER
11:00 AM – 12:30 PM	SCIENTIFIC SESSION II Presiding: Michael Conte, MD, President; Venita Chandra, MD, Program Chair; Nii-Kabu Kabutey, MD, DEI Committee

SCHEDULE OF EVENTS continued

12:30 PM – 2:00 PM	VSIG LUNCH SYMPOSIUM
2:00 PM	OPTIONAL ACTIVITY: FLY FISHING WALK AND WADE Preregistration required cost \$195.00
6:00 PM – 8:00 PM	WESTERN FAMILY DINNER Casual dinner buffet family welcome

MONDAY, OCTOBER 18, 2021

6:30 AM – 1:00 PM	REGISTRATION OPEN
7:00 AM – 8:00 AM	BREAKFAST
7:00 AM – 11:45 AM	EXHIBITS
7:30 AM – 9:20 AM	SCIENTIFIC SESSION III Presiding: Michael Conte, MD, President; Benjamin Starnes, MD, Past President; Leigh Ann O'Banion, MD, VSIG Committee
9:20 AM – 9:40 AM	COFFEE BREAK WITH EDUCATIONAL EXHIBITORS
9:40 AM – 10:15 AM	PRESIDENTIAL ADDRESS “Vascular Health—and the Health of Vascular Surgery”
10:15 AM – 10:30 AM	SVS UPDATE
10:30 AM – 11:50 AM	SCIENTIFIC SESSION IV Presiding: Vincent Rowe, MD, President; Omid Jazaeri, MD, Program Chair; LeAnn Chavez, MD, DEI Committee
11:50 PM – 12:30 PM	WVS BUSINESS MEETING
12:30 PM – 2:30 PM	DEI LUNCH SYMPOSIUM
12:30 PM – 2:00 PM	OPTIONAL ACTIVITIES: GROUP HIKE (\$25)

SCHEDULE OF EVENTS continued

6:00 PM – 7:00 PM	PRIVATE PRESIDENT’S RECEPTION
7:00 PM – 9:00 PM	PRESIDENTIAL BLACK-TIE BANQUET (Adults only) Denim and Diamonds Theme with DJ

TUESDAY, OCTOBER 19, 2021

7:00 AM – 8:30 AM	BREAKFAST WITH SPONSORS
7:00 AM – 11:45 AM	EXHIBITS
7:30 AM – 9:00 AM	SCIENTIFIC SESSION V Presiding: Vincent Rowe, MD, President; Matthew Mell, MD, Recorder; Jade Hiramoto, MD, Program Committee
9:00 AM – 9:30 AM	COFFEE BREAK WITH EDUCATIONAL EXHIBITORS
9:30 AM – 11:00 AM	SCIENTIFIC SESSION VI Presiding: Vincent Rowe, MD, President; Ahmed Abou-Zamzam MD, Secretary; Misty Humphries, MD, VSIG Chair
11:00 AM – 11:30 AM	AWARDS
11:30 AM	MEETING ADJOURNS

NOTES



SCIENTIFIC PROGRAM



Denotes Hye Resident Award
Competition Eligible



Denotes Founders Award
Competition Eligible

SATURDAY, OCTOBER 16, 2021

11:00 AM – 8:00 PM **REGISTRATION**

3:00 PM – 4:00 PM **EXECUTIVE COUNCIL MEETING**

5:00 PM – 6:00 PM **RAPID FIRE SESSION**

Presiding: Venita Chandra, MD, Program Chair

5:00 – 5:05

**P1. SPINAL CORD ISCHEMIA AND EINTERVENTIONS
FOLLOWING TEVAR FOR ACUTE TYPE B AORTIC
DISSECTIONS WITH A ZONE 3 ENTRY TEAR**

Helen Potter, MD, University of Southern California

5:05 – 5:10

**P2. VARIABLE NATIONAL PRESCRIBING PATTERNS
FOLLOWING SUPRAINGUINAL BYPASS TO TREAT
PERIPHERAL ARTERIAL DISEASE**

Devin Zarkowsky, MD, University of Colorado

5:10 – 5:15

**P3. SAPHENOUS VEIN ARTERIALIZATION WITH PEDAL
VENOUS VALVULOCLASTY - A PROMISING TECHNIQUE
FOR LIMB SALVAGE IN
UNRECONSTRUCTABLE PERIPHERAL ARTERIAL
DISEASE**

Michael Brewer, MD, Kaiser Permanente

5:15 – 5:20

**P4. DUPLEX AND CLINICAL OUTCOMES OF PEDIATRIC
LOWER EXTREMITY ARTERIAL THROMBOSIS (PLEAT)**

David Warner, MD, Oregon Health and Science University

5:20 – 5:25

**P5. PRIMARY PATENCY OF ENDOVASCULAR
FEMOROPOPLITEAL INTERVENTION IS SUPERIOR
IN INDUSTRY-SPONSORED CLINICAL TRIALS VS.
PHYSICIAN-INITIATED INVESTIGATIONS**

Rym El Khoury, MD, UCSF

5:25 – 5:30

P6. USE OF A NOVEL CATHETER ACCESS SYSTEM TO OBTAIN CENTRAL VENOUS ACCESS IN DIALYSIS PATIENTS WITH THORACIC VENOUS OBSTRUCTIONS. A SINGLE CENTER EXPERIENCE

Ehab Sorial, MD, Stanford University

5:30 – 5:35

P7. DISTRIBUTION OF VASCULAR SURGERY CASES AMONG DIFFERENT SPECIALTIES

Sherwin Abdoli, MD, Huntington Memorial Hospital

5:35 – 5:40

P8. ASSOCIATION OF DEEP VENOUS REFLUX WITH OUTCOMES OF ISOLATED MICROPHLEBECTOMY

Mark Ajalat, MD, University of California, Irvine

5:40 – 5:45

P9. LOWER EXTREMITY AMPUTATIONS AMONG VETERANS: HAVE AMBULATORY OUTCOMES AND SURVIVAL IMPROVED?

Gabrielle Daso, BS, West Los Angeles VA

5:45 – 5:50

P10. COMMUNITY PRACTICE EXPERIENCE WITH RUPTURED ABDOMINAL AORTIC ANEURYSM: IMPACT OF AN ENDOVASCULAR FIRST APPROACH

Scott Berman, MD, Pima Heart and Vascular

5:50 – 5:55

P11. CLINICAL OUTCOMES OF A DIAGNOSTIC AND MANAGEMENT PROTOCOL FOR POPLITEAL ARTERY ENTRAPMENT SYNDROME AT A LARGE REFERRAL CENTER

Amir Ghaffarian, MD, University of Washington

6:00 PM – 7:30 PM

SPONSOR WELCOME RECEPTION

7:00 PM – 8:30 PM

PAST PRESIDENT'S DINNER

Invitation Only

SUNDAY, OCTOBER 17, 2021

6:30 AM – 1:00 PM **REGISTRATION**

7:00 AM – 8:00 AM **BREAKFAST**
Cottonwood Foyer

7:00 AM – 11:45 AM **EXHIBITS**

7:30 AM – 9:00 AM **COMPANION BREAKFAST**
Murie Ballroom, Hotel Terra

7:45 AM – 8:00 AM **CALL TO ORDER & ANNOUNCEMENTS**

8:00 AM – 9:50 AM **SCIENTIFIC SESSION I**
Presiding: Michael Conte, MD, President;
Matthew Mell, MD, Recorder;
Elina Quiroga, MD, DEI Chair



8:00 – 8:20

1. IMPACT OF HIGH-RISK FEATURES AND TIMING OF REPAIR FOR ACUTE TYPE B AORTIC DISSECTIONS

Helen Potter, MD, University of Southern California
Invited Discussant: Jordan Stern, MD

8:20 – 8:30

2. EARLY THORACIC ENDOVASCULAR AORTIC REPAIR IS SUPERIOR TO MEDICAL THERAPY IN ACUTE UNCOMPLICATED TYPE B AORTIC DISSECTION

Ryan Gupta, MD, University of Colorado



8:30 – 8:50

3. ROLE OF IN-SITU FENESTRATION AS THE TECHNIQUE OF CHOICE FOR ENDOVASCULAR REPAIR OF RUPTURED THORACOABDOMINAL AND SUPRARENAL AORTIC ANEURYSMS AT A REGIONAL AORTIC CENTER

Alyssa Pyun, MD, University of Southern California
Invited Discussant: Matthew Sweet, MD



Denotes Hye Resident Award
Competition Eligible

8:50 – 9:00

4. CAPTURING THE COMPLEXITY OF OPEN ABDOMINAL AORTIC SURGERY IN THE ENDOVASCULAR ERA

Rym El Khoury, MD, UCSF



9:00 – 9:20

5. REINTERVENTION DOES NOT INCREASE LONG-TERM MORTALITY AFTER FENESTRATED ENDOVASCULAR ANEURYSM REPAIR

Shernaz Dossabhoy, MD, MBA, Stanford

Invited Discussant: Gregory Magee, MD

9:20 – 9:30

6. SPINAL CORD ISCHEMIA AND OTHER CLINICAL OUTCOMES ASSOCIATED WITH THE STAGING OF TEVAR AND COMPLEX EVAR

Alyssa Pyun, MD, University of Southern California



9:30 – 9:50

7. WOMEN WITH THORACOABDOMINAL AORTIC ANEURYSMS HAVE INCREASED FRAILTY AND MORE CHALLENGING AORTIC ANATOMY COMPARED WITH MEN

Natasha Edman, MA, University of Washington

Invited Discussant: Shipra Ayra, MD

9:50 AM – 10:20 AM

COFFEE BREAK WITH EDUCATIONAL EXHIBITORS

10:20 AM – 11:00 AM

PRESIDENTIAL GUEST LECTURER

Michael Belkin, MD

“The Art and Science of Managing Critical Limb Ischemia”

Denotes Hye Resident Award
Competition Eligible

11:00AM – 12:30PM

SCIENTIFIC SESSION II

Presiding: Michael Conte, MD, President;
Venita Chandra, MD, Program Chair;
Nii-Kabu Kabutey, MD, DEI Committee



11:00 – 11:20

8. PEDAL ARTERIAL CALCIFICATION SCORE IS ASSOCIATED WITH HEMODYNAMIC CHANGE AND MAJOR AMPUTATION AFTER REVASCULARIZATION IN CHRONIC LIMB-THREATENING ISCHEMIA

Iris Liu, UCSF

Invited Discussant: Misty Humphries, MD

11:20 – 11:30

9. LOWER THAN EXPECTED FIVE-YEAR MORTALITY FOLLOWING AMPUTATION RELATED TO CHRONIC LIMB-THREATENING ISCHEMIA: A STATEWIDE REGISTRY ANALYSIS

Summer Beeson, BS, Brooke Army Medical Center

11:30 – 11:50

10. EARLY EXPERIENCE WITH VENOUS ARTERIALIZATION FOR LIMB SALVAGE IN NO-OPTION PATIENTS WITH CHRONIC LIMB-THREATENING ISCHEMIA

Jorge Miranda, MD, Baylor

Invited Discussant: LeighAnn O'Banion, MD

11:50 – 12:00

11. IN-NETWORK PRIMARY CARE: AN IMPORTANT AUGMENTATION TO PREOPERATIVE WORK-UP FOR PATIENTS UNDERGOING INFRAINGUINAL BYPASS

Colleen Flanagan, MD, UCSF



12:00 – 12:20

12. THE LOWER EXTREMITY AMPUTATION PROTOCOL (LEAP): A PATHWAY TO SUCCESSFUL AMBULATION

Leigh Ann O'Banion, MD, UCSF-Fresno

Invited Discussant: Ahmed Abou-Zamzam, MD



Denotes Founders Award
Competition Eligible



Denotes Hye Resident Award
Competition Eligible

12:20 – 12:30

**13. VALIDITY OF THE GLOBAL VASCULAR GUIDELINES
IN PREDICTING OUTCOMES IN A COMPREHENSIVE
WOUND CARE PROGRAM**

Vivian Lou, MD, Stanford

12:30 PM – 2:00 PM **VSIG LUNCH SYMPOSIUM**

6:00 PM – 8:00 PM **WESTERN FAMILY DINNER**

MONDAY, OCTOBER 18, 2021

6:30 AM – 1:00 PM **REGISTRATION**

7:00 AM – 8:00 AM **BREAKFAST**
Cottonwood Foyer

7:00 AM – 11:45 AM **EXHIBITS**

7:30 AM – 9:00 AM **COMPANION BREAKFAST**
Murie Ballroom, Hotel Terra

7:30 AM – 9:20 AM **SCIENTIFIC SESSION III**
PRESIDING: Michael Conte, MD, President;
Benjamin Starnes, MD, Past President;
Leigh Ann O'Banion, MD, VSIG Committee



7:30 – 7:50

14. LIVING IN A FOOD DESERT IS ASSOCIATED WITH INCREASED WOUND COMPLICATIONS AFTER MAJOR VASCULAR PROCEDURES

Eric Smith, BA, UCSF

Invited Discussant: LeAnn Chavez, MD

7:50 – 8:00

15. ACUTE AORTOILIAC ARTERIAL THROMBOSIS IN PATIENTS WITH THE NOVEL CORONAVIRUS DISEASE-2019: A CASE SERIES AND SYSTEMATIC REVIEW OF THE LITERATURE

Steven Tohmasi, MD, UC Irvine



8:00 – 8:20

16. FEASIBILITY AND UTILITY OF PEDAL ACCELERATION TIME (PAT) AS A NOVEL ASSESSMENT TOOL FOR LIMB ISCHEMIA

Alyssa Pyun, MD, University of Southern California

Invited Discussant: Eugene Zierler, MD



Denotes Hye Resident Award
Competition Eligible

8:20 – 8:30

17. PREDICTORS OF AMPUTATION-FREE SURVIVAL AND WOUND HEALING AFTER INFRAINGUINAL BYPASS WITH ALTERNATIVE CONDUITS

Zachary Matthay, MD, UCSF

8:30 – 8:50

18. RADIAL ARTERY ACCESS IS A SAFE ALTERNATIVE TO BRACHIAL ARTERY AND FEMORAL ARTERY ACCESS FOR ENDOVASCULAR LOWER EXTREMITY PERIPHERAL ARTERIAL DISEASE

Steven Maximus, MD, MS, UC Davis

Invited Discussant: Marcus Kret, MD

8:50 – 9:00

19. PERCUTANEOUS PROXIMAL AXILLARY ARTERY ACCESS VERSUS FEMORAL ARTERY ACCESS FOR AORTIC AND PERIPHERAL ENDOVASCULAR INTERVENTIONS

Alexa Mordhorst, BHSc, MD, University of British Columbia

9:00 – 9:20

20. THE VASCULAR QUALITY INITIATIVE (VQI) CHRONIC LIMBTHREATENING ISCHEMIA MORTALITY PREDICTION MODEL UNDERESTIMATES MORTALITY AFTER INFRAINGUINAL REVASCULARIZATION

Rym El Khoury, MD, UCSF

Invited Discussant: Karen Woo, MD

9:20 AM – 9:40 AM

COFFEE BREAK WITH EDUCATIONAL EXHIBITORS

9:40 AM – 10:15 AM

PRESIDENTIAL ADDRESS

Michael Conte, MD

“Vascular Health—and the Health of Vascular Surgery”

10:15 AM – 10:30 AM

SVS UPDATE

Ronald Dalman, MD

10:30 AM – 11:50 AM SCIENTIFIC SESSION IV

Presiding: Vincent Rowe, MD, President Elect;
LeAnn Chavez, MD, DEI Committee;
Omid Jazaeri, MD, Program Committee

**10:30 – 10:50****21. IMPACT OF SCALENE MUSCLE BOTULINUM TOXIN INJECTION WITH AND WITHOUT SURGERY IN NEUROGENIC THORACIC OUTLET SYNDROME**

Arash Fereydooni, MD, MS, MHS, Stanford

Invited Discussant: Hugh Gelabert, MD

10:50 – 11:00**22. PAGET SCHROETTER PATIENTS WITH CHRONIC VENOUS OCCLUSION BENEFIT FROM SURGICAL DECOMPRESSION**

Michael Cheng, MD, UCLA

**11:00 – 11:20****23. PREDICTING DIALYSIS FISTULA MATURATION USING THE “RULE OF 6’S” - NOT ALL ARE CREATED EQUAL**

Anne Hakim, BA, University of Utah

Invited Discussant: Allan Tulloch, MD

11:20 – 11:30**24. REOPERATIVE ANTERIOR LUMBAR SPINE ACCESS IS FEASIBLE AND SAFE**

Willis Wagner, MD, Cedars Sinai

11:30 – 11:50**25. VASCULAR TRAINEE PERCEPTIONS OF DIVERSITY, EQUITY, AND INCLUSION WITHIN VASCULAR SURGERY TRAINING PROGRAMS**

Ann Gaffey, MD, Hospital of the University of Penn

Invited Discussant: JC Jimenez, MD

11:50 AM – 12:30 PM WVS BUSINESS MEETING**12:30 PM – 2:30 PM DEI LUNCH SYMPOSIUM****7:00 PM – 9:00 PM PRESIDENTIAL BANQUET**

Westbank Grill



Denotes Hye Resident Award
Competition Eligible

TUESDAY, OCTOBER 19, 2021

7:00 AM – 8:30 AM BREAKFAST WITH SPONSORS

Cottonwood Foyer

7:00 AM – 11:45 AM EXHIBITS**7:30 AM – 9:00 AM SCIENTIFIC SESSION V**Presiding: Vincent Rowe, MD, President Elect;
Jade Hiramoto, MD, Program Committee;
Matthew Mell, MD, Recorder

7:30 – 7:50

**26. DECREASING TRENDS IN REINTERVENTION AND
READMISSION AFTER ENDOVASCULAR ANEURYSM
REPAIR IN A MULTIREGIONAL IMPLANT REGISTRY**

Sidney Le, MD, Kaiser Permanente

Invited Discussant: Mahmoud Malas, MD

7:50 – 8:00

**27. SHAGGY AORTIC SCORE IS ASSOCIATED WITH
POSTOPERATIVE LOWER EXTREMITY WEAKNESS
AFTER BRANCHED ENDOVASCULAR AORTIC
ANEURYSM REPAIR**

Cindy Huynh, MD, UCSF



8:00 – 8:20

**28. COST EFFECTIVENESS OF COMPUTED
TOMOGRAPHY VERSUS ULTRASOUND-BASED
SURVEILLANCE FOLLOWING ENDOVASCULAR
AORTIC REPAIR OF INTACT ABDOMINAL AORTIC
ANEURYSMS**

Vy Ho, MD, Stanford

Invited Discussant: Warren Chow, MD

8:20 – 8:30

**29. TURNDOWN FOR RUPTURED ABDOMINAL AORTIC
ANEURYSM REPAIR BASED ON SEX IN THE UNITED
STATES**

Kirsten Dansey, MD, MPH, UCSF

Denotes Hye Resident Award
Competition Eligible



8:30 – 8:50

30. COMPARISON OF TOTAL TRANSFEMORAL APPROACH TO UPPER EXTREMITY ACCESS IN BRANCHED AND FENESTRATED PHYSICIAN MODIFIED ENDOGRAFTS SHOWS CLEAR ADVANTAGE

Rohini Patel, MD, MPH, UCSD

Invited Discussant: Sukgu Han, MD

8:50 – 9:00

31. MONITORED ANESTHESIA CARE WITHOUT FOLEY PLACEMENT DECREASES HOSPITAL LENGTH OF STAY IN ELECTIVE ENDOVASCULAR ABDOMINAL AORTIC ANEURYSM REPAIR

Daniel Miles, MD, Cedars Sinai

9:00 AM – 9:30 AM

**COFFEE BREAK
WITH EDUCATIONAL EXHIBITORS**

9:30 AM – 11:00 AM

SCIENTIFIC SESSION VI

Presiding: Vincent Rowe, MD, President Elect;
Ahmed Abou-Zamzam MD, Secretary/Treasurer;
Misty Humphries, MD, VSIG Chair



9:30 – 9:50

32. PATIENT-REPORTED PHYSICAL FUNCTION PREDICTS POSTOPERATIVE RECOVERY AFTER VASCULAR SURGERY

Teryn Holeman, MS, University of Utah

Invited Discussant: David Kauvar, MD

9:50 – 10:00

33. DISPOSABLE LIGHTWEIGHT SHIELD ATTACHED TO LEADED OR NONLEADED GLASSES DECREASES OPERATOR EYE AND BRAIN RADIATION DOSE DURING FLUOROSCOPICALLY GUIDED INTERVENTIONS

Melissa Kirkwood, MD, University of Texas Southwestern Medical Center



Denotes Hye Resident Award
Competition Eligible



10:00 – 10:20

34. OPEN ABDOMINAL AORTIC SURGERY IN THE ENDOVASCULAR ERA - WILL WE HAVE ENOUGH VOLUME FOR VASCULAR TRAINEES?

Elizabeth George, MD, MS, Stanford University

Invited Discussant: Benjamin Starnes, MD

10:20 – 10:30

35. VASCULAR1: DEVELOPMENT OF A VIRTUAL REALITY TRAINING MODULE FOR ULTRASOUND GUIDED VASCULAR ACCESS

Suleman Khan, BA, Stanford



10:30 – 10:50

36. ACCURACY SUBANALYSIS OF A DEEP LEARNING NEURAL NETWORK SPECIFIC FOR THE IDENTIFICATION OF INFRARENAL ABDOMINAL AORTIC ANEURYSMS

Sharon Kiang, MD, Loma Linda University Medical Center

Invited Discussant: Oliver Aalami, MD

10:50 – 11:00

37. OUTCOMES OF CAROTID ENDARTERECTOMY IN A HIGH VOLUME PRACTICE IN THE MODERN ERA: IS AGE JUST A NUMBER?

Yazen Qumsiyeh, MD, UCSF Fresno

11:00 AM – 11:30 AM **AWARDS**

11:30 AM **MEETING ADJOURNS**



Denotes Hye Resident Award
Competition Eligible



Denotes Founders Award
Competition Eligible

NOTES



SCIENTIFIC SESSION ABSTRACTS

SCIENTIFIC SESSION ABSTRACTS

1. IMPACT OF HIGH-RISK FEATURES AND TIMING OF REPAIR FOR ACUTE TYPE B AORTIC DISSECTIONS

Helen A. Potter, MD, Li Ding, MD MPH, Sukgu M. Han, MD MS,
Fred A. Weaver, MD MMM, Gregory A. Magee, MD MSc.
University of Southern California, Los Angeles, CA, USA.

Objective: The new Society for Vascular Surgery reporting standards for type B aortic dissection (TBAD) categorize clinical presentations of aortic dissection into uncomplicated, high-risk features (HRF), and complicated groups. While it is accepted that complicated dissections require immediate repair, the optimal timing of repair for HRF has yet to be established. This study aims to identify the ideal timing of thoracic endovascular aortic repair (TEVAR) for HRF, as well as outcomes associated with specific HRF.

Methods: The Vascular Quality Initiative was queried for TEVARs performed for acute and subacute TBAD with HRF from 2014 - 2020. Rupture, malperfusion and uncomplicated patients were excluded. HRF were defined per SVS guidelines as refractory hypertension, pain, or rapid expansion/aneurysm > 40mm. The primary outcomes were in-hospital/30-day mortality and 1-year survival with primary exposure variables being days from symptoms to repair and number of HRFs. Secondary outcomes were spinal cord ischemia (SCI), myocardial infarction (MI), stroke, and retrograde type A dissection (RTAD).

Results: Of the 1,100 patients who met inclusion criteria, 811 had one high-risk feature, 249 had two and 40 had three. There were no significant differences in primary or secondary outcomes based on number of HRFs. 309 patients underwent repair at 0-2 days, 262 at 3-6 days, 270 at 7-14 days and 259 at ≥ 15 days. TEVAR performed at ≥ 15 days was independently associated with lower in-hospital/30-day mortality (OR=0.38, P=.0388) and improved 1-year survival (Figures 1, 2). Postoperative stroke was associated with earlier repair (0-2 days). There was no association of timing of repair with MI, SCI, RTAD or reintervention (Tables 1, 2).

Conclusions: TEVAR for TBAD with HRF delayed at least 15 days from symptom onset is associated with improved survival, supporting the theory that it is best to delay TEVAR to the subacute phase. Additionally, TEVAR delayed at least 3 days is associated with a decrease in stroke. Having more than one HRF was not associated with worse outcomes. As the classification of HRF is relatively new and without guidelines for repair, this study highlights the risks of early intervention for HRF and suggests that these patients appear to benefit from at least a short stabilization period prior to TEVAR.

SCIENTIFIC SESSION ABSTRACTS continued

Table 1: Univariate analysis of the impact of timing and high-risk features on outcomes after TEVAR

	One HRF, N = 811	Two HRFs, N = 249	Three HRFs, N = 40	P-value	
Spinal cord ischemia - N (%)	42 (5.2%)	8 (3.2%)	3 (7.5%)	.32	
Myocardial infarction - N (%)	15 (1.9%)	1 (0.4%)	1 (2.5%)	.17	
Stroke - N (%)	49 (6%)	11 (4.4%)	2 (5%)	.61	
Retrograde type A dissection - N (%)	14 (1.7%)	4 (1.6%)	0	.99	
	0-2 days to repair, N = 309	3-6 days to repair, N = 262	7-14 days to repair, N = 270	≥ 15 days to repair, N = 259	P-value
Spinal cord ischemia - N (%)	22 (7.1%)	8 (3.1%)	11 (4.1%)	12 (4.6%)	.12
Myocardial infarction - N (%)	5 (1.6%)	4 (1.5%)	4 (1.5%)	4 (1.5%)	.99
Stroke - N (%)	34 (11%)	11 (4.2%)	11 (4.1%)	6 (2.3%)	<.0001
Retrograde type A dissection - N (%)	4 (1.3%)	5 (1.9%)	3 (1.1%)	6 (2.3%)	.69

Table 2: Multivariate analysis of the impact of operative timing and high-risk features on outcomes

Related reintervention					In-hospital/30-day mortality				
	OR	95% CI		P-value		OR	95% CI		P-value
0-2 days to repair	Ref				0-2 days to repair	Ref			
3-6 days to repair	0.744	0.38	1.455	.3871	3-6 days to repair	1.015	0.499	2.063	.9674
7-14 days to repair	0.74	0.38	1.442	.3769	7-14 days to repair	0.465	0.199	1.083	.076
≥ 15 days to repair	0.558	0.272	1.142	.1104	≥ 15 days to repair	0.38	0.152	0.951	.0388
One HRF	Ref				One HRF	Ref			
Two HRFs	0.984	0.54	1.79	.957	Two HRFs	1.725	0.9	3.307	.1005
Three HRFs	0.931	0.21	4.121	.9245	Three HRFs	1.789	0.465	6.876	.3972

Figure 1: Kaplan-Meier curve depicting probability of 30-day survival by timing to repair

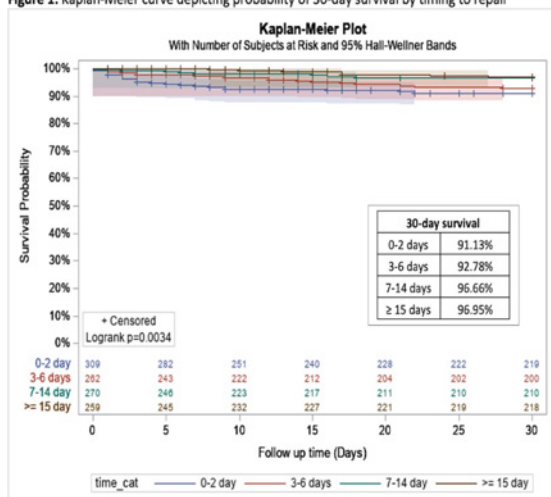
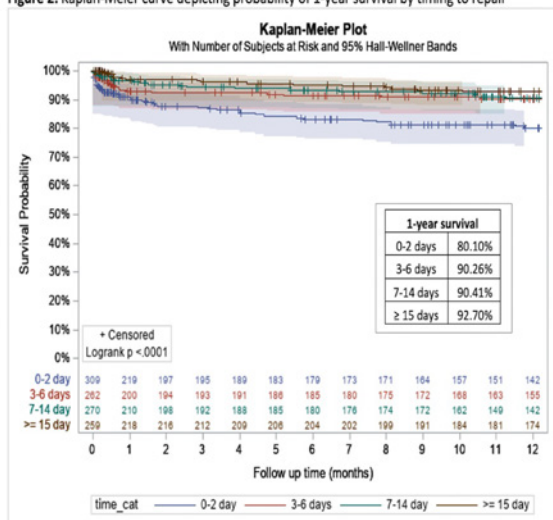


Figure 2: Kaplan-Meier curve depicting probability of 1-year survival by timing to repair



Author Disclosures: **H. Potter:** Nothing to disclose; **L. Ding:** Nothing to disclose; **S. Han:** Nothing to disclose; **F. Weaver:** Nothing to disclose; **G. Magee:** Nothing to disclose

2. EARLY THORACIC ENDOVASCULAR AORTIC REPAIR IS SUPERIOR TO MEDICAL THERAPY IN ACUTE UNCOMPLICATED TYPE B AORTIC DISSECTION

Jeniann A. Yi, MD1, Ryan Gupta, MD1, Quy Tat1, Helen A. Potter, MD2, Sukgu M. Han, MD2, Fernando Fleischman, MD2, Donald Jacobs, MD1, Mark Nehler, MD1, Gregory A. Magee, MD2. *1University of Colorado, Aurora, CO, USA, 2University of Southern California Medical Center, Los Angeles, CA, USA.*

Objectives: Historically, treatment of acute type B aortic dissection (TBAD) has been primarily medical management via impulse control, with intervention reserved for complicated presentations. Currently, there is growing early utilization of thoracic endovascular aortic repair (TEVAR) to treat TBAD. The primary aim of this study is to evaluate readmissions and treatment failure of TEVAR versus medical management alone as the initial treatment strategy for acute uncomplicated TBAD.

Methods: A multi-institutional retrospective review of all consecutive acute TBAD patients between 2015-2020 was performed, and 1-year outcomes data were obtained. Patients with previous aortic intervention or chronic, iatrogenic, or traumatic etiologies were excluded. The primary exposure was medical management alone versus TEVAR at index admission. Complicated TBAD was defined as malperfusion and/or rupture per SVS reporting guidelines. Bivariate and multivariate logistic regression (MLR) was performed for the primary outcomes of unplanned readmission and treatment failure – defined as unplanned operation after initial admission. Secondary outcomes were mortality and complications.

Results: 216 TBAD patients (47 complicated, 169 uncomplicated) from two centers were identified. Of the 169 uncomplicated TBAD patients, 86 had TEVAR and 83 were treated medically at initial admission. There was no difference in demographics, imaging features, or presentation (Table I). Medically managed patients had higher rates of unplanned readmission (34% vs. 9%, $p=.0001$) and treatment failure (28% vs. 8%, $p=.0007$), while TEVAR patients had longer lengths of stay (6.3 vs. 13.1 days, $p<.0001$). There was no difference in mortality or complications (Table II). On multivariate regression, initial medical management was independently associated with unplanned readmission (OR=8.3, $p=0.02$) and treatment failure (OR=4.56, $p=0.006$). There was no difference in outcomes based upon aortic zone involvement of dissection.

Conclusions: Patients initially treated with TEVAR for uncomplicated TBAD had lower rates of unplanned readmission and treatment failure than medically managed patients with no difference in mortality or complications. This suggests that early TEVAR is superior to medical management of acute uncomplicated TBAD.

SCIENTIFIC SESSION ABSTRACTS continued

Table I: Presentation of Acute Uncomplicated TBAD

	Medical Management (n=83)	TEVAR(n=86)	P-Value
Age	61.2 ± 12.7	61.4 ± 14.3	.640
Female %	41.0%	29.1%	.110
Baseline reported HTN	53.0%	60.5%	.320
Dissection extent (mean # of zones)		6.0	
5.7		.820	
Presenting SBP	158 ± 43.6	147.7 ± 37.9	.110
High-risk Dake Criteria	66.3%	74.4%	.240
Proximal dissection in zone 1-2	24.1%	19.8%	.490
Dissection extent 0-2 zones	19.0%	16.0%	.870
Dissection extent 3-6 zones	29.0%	29.0%	
Dissection extent 7+ zones	52.0%	55.0%	

Table II: Outcomes in Medical vs. TEVAR for Acute Uncomplicated TBAD

	Medical Management (N=83)	TEVAR(N=86)	P-Value
Unplanned readmission	33.7%	9.3%	<.001
Treatment Failure	27.7%	8.1%	<.001
Mortality	6.0%	4.7%	.690
Overall complication rate	31.3%	33.7%	.730
Myocardial Infarction	10.8%	2.3%	.020
Stroke	1.2%	1.2%	.990
Infection	13.1%	19.8%	.250
DVT/PE	3.6%	4.7%	.730
Retrograde type A Dissection	6.1%	4.7%	.690
Length of stay (mean)	6.4 ± 6.9	11.1 ± 8.6	<.001
ICU length of stay (mean)	3.17 ± 3.8	6.4 ± 7.1	.002

Author Disclosures: **J. Yi:** Nothing to disclose; **R. Gupta:** Nothing to disclose; **Q. Tat:** Nothing to disclose; **H Potter:** Nothing to disclose; **S. Han:** Nothing to disclose; **F. Fleischman:** Nothing to disclose; **D. Jacobs:** Nothing to disclose; **M. Nehler:** Nothing to disclose; **G. Magee:** Nothing to disclose

3. DECREASING TRENDS IN REINTERVENTION AND READMISSION AFTER ENDOVASCULAR ANEURYSM REPAIR IN A MULTIREGIONAL IMPLANT REGISTRY

Sidney T. Le, MD^{1,2}, Heather A. Prentice, PhD, MPH³, Jessica E. Harris, MS, RD³, Jeffrey H. Hsu, MD, FACS⁴, Thomas F. Rehring, MD, FACS⁵, Nicolas A. Nelken, MD⁶, Homayon Hajarizadeh⁷, Robert W. Chang, MD^{1,2}. *1Kaiser Permanente Division of Research, Oakland, CA, USA, 2The Permanente Medical Group, Oakland, CA, USA, 3Kaiser Permanente Surgical Outcomes and Analysis, San Diego, CA, USA, 4Southern California Permanente Medical Group, Fontana, CA, USA, 5Colorado Permanente Medical Group, Denver, CO, USA, 6Hawaii Permanente Medical Group, Honolulu, HI, USA, 7Northwest Permanente Physicians and Surgeons, Clackamas, OR, USA.*

Objective: As endovascular aortic aneurysm repair (EVAR) matures into its third decade, device integrity has become a focus of patient safety and quality improvement efforts.

However, reintervention rates reported by national registries do not distinguish between different types of procedures and indications.

Methods: We used prospectively collected data from a multiregional EVAR registry to perform a descriptive study of 3,464 adults who underwent conventional EVAR for infrarenal abdominal aortic aneurysm with non-recalled and non-investigational devices between 2010 to 2018. Three-year follow-up was 96.4%. Outcomes include 1- and 3-year graft revision (defined as a procedure involving placement of a new endograft component), secondary interventions (defined as a procedure necessary for maintenance of EVAR integrity, e.g. coil embolization and balloon angioplasty/stenting), conversion-to-open, interventions for type II leaks alone, and 90- day readmission. Cause-specific reintervention probabilities were calculated by operative year using the Aalen-Johansen estimate, with death as a competing risk and December 31, 2019 as the study end date.

Results: Excluding interventions for type II leak alone, 1-year secondary intervention incidence decreased from 5.9% for EVARs in 2010 to 2.6% in 2018 (Fig 1) and 3-year incidence decreased from 7.2% to 5.0% from 2010 to 2016. The 3-year incidences of graft revision (mean incidence 3.4%) and conversion-to-open remained fairly stable (mean incidence 0.6%). The 3- year incidence of interventions for type II leak alone also decreased from 3.4% in 2010 to 1.2% in 2016. 90-day readmission rates decreased from 19.2% for EVARs in 2010 to 10.3% in 2018.

Conclusions: Comprehensive data from a multiregional healthcare system demonstrates decreasing long-term secondary intervention and readmission rates over time. These trends are not explained by evolving management of type II leaks and suggest improving graft durability or surgical technique. Further study is needed to define implant and anatomic predictors of different types of long-term reintervention.

Figure 1: Time Trend in Annual Incidence of Reinterventions Following Endovascular Aneurysm Repair



Author Disclosures: **S. Le:** Nothing to disclose; **H. Prentice:** Nothing to disclose; **J. Harris:** Nothing to disclose; **J. Hsu:** Nothing to disclose; **T. Rehring:** Nothing to disclose; **N. Nelken:** Nothing to disclose; **H. Hajarizadeh:** Nothing to disclose; **R. Chang:** Nothing to disclose

4. CAPTURING THE COMPLEXITY OF OPEN ABDOMINAL AORTIC SURGERY IN THE ENDOVASCULAR ERA

Rym El Khoury, MD, Curtis Woodford, MD, Joel L. Ramirez, MD, Elizabeth M. Lancaster, Joyce Nacario, Jade S. Hiramoto, MD, Charles M. Eichler, MD, Linda M. Reilly, MD, James C. Iannuzzi, MD, Michael S. Conte, MD.

UCSF, San Francisco, CA, USA.

Objective: Volume and quality benchmarks for open abdominal aortic surgery and particularly open aortic aneurysm repair (OAR) in the endovascular era are actively debated. The Vascular Quality Initiative (VQI) OAR module fails to capture the full spectrum of complex OAR. We hypothesized that VQI-ineligible complex OAR is the dominant form of open repairs performed at a VQI-participating tertiary center.

Methods: All OAR cases performed from 2007 to 2019 were reviewed. The VQI OAR criteria were applied with exclusions (non-VQI) defined as concomitant renal bypasses, clamping above the SMA or celiac artery, repairs done for trauma, anastomotic aneurysm, isolated iliac aneurysm, or infected aneurysms. Linear regression was used to assess temporal trends.

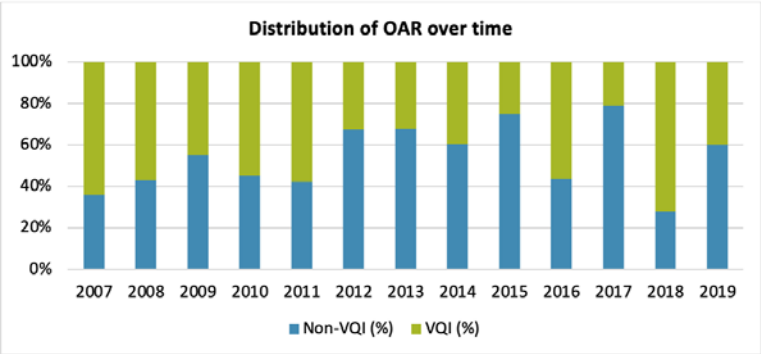
Results: Among a total of 456 open abdominal aortic operations, 330 (72%) were OAR. The average annual OAR volume remained stable over 13 years (25 ± 6 ; $R^2=0.05$, $p=0.45$). Non-VQI OAR comprised 54% of all cases and persisted over time ($R^2=0.03$, $p=0.85$; Figure). Both supra-renal (28%) and supra-celiac clamping (35%) were often necessary. The proportion of endograft explantation cases significantly increased over time from 4% to 20% (mean 14%; $R^2=0.47$, $p=0.01$). Infectious indications represented 21% ($n=68$) of cases. Visceral branch grafts were performed in 16% of all cases. OAR for ruptured aneurysm constituted 10% of all cases.

There was no statistically significant difference in 30-day mortality in non-VQI vs. VQI eligible OAR cases (8% vs. 4%; $p=0.11$).

Conclusions: Complex OAR comprises a majority of OAR cases in a contemporary tertiary referral hospital, yet these cases are not accounted for in VQI. Creation of a “complex OAR” VQI module would capture these cases in a quality-driven national registry and help to better inform benchmarks for volume and outcomes in aortic surgery.

SCIENTIFIC SESSION ABSTRACTS continued

Figure 1. VQI-eligible vs. VQI-ineligible open AAA repairs performed over time



Author Disclosures: **R. El Khoury:** Nothing to disclose; **C. Woodford:** Nothing to disclose; **J. Ramirez:** Nothing to disclose; **E. Lancaster:** Nothing to disclose; **J. Nacario:** Nothing to disclose; **J. Hiramoto:** Nothing to disclose; **C. Eichler:** Nothing to disclose; **L. Reilly:** Nothing to disclose; **J. Iannuzzi:** Nothing to disclose; **M. Conte:** Nothing to disclose

5. REINTERVENTION DOES NOT INCREASE LONG-TERM MORTALITY AFTER FENESTRATED ENDOVASCULAR ANEURYSM REPAIR

Shernaz S. Dossabhoy, MD, MBA, Sabina M. Sorondo, MD,
Kenneth Tran, MD, Jordan R. Stern, MD, Ronald L. Dalman, MD,
Jason T. Lee, MD.

Stanford University, Stanford, CA, USA.

Objective: Fenestrated endovascular aneurysm repair (FEVAR) is increasingly used in the treatment of juxta-renal aortic aneurysms. Reinterventions (REIs) occur frequently, contributing to patient morbidity and resource utilization. We sought to determine if REIs impact long-term survival after FEVAR.

Methods: A single-institution retrospective review of all Cook ZFEN repairs was performed. Patients with ≥ 6 months follow-up were included. REI was defined as any aneurysm, device, target branch, or access-related intervention after the index procedure. REIs were categorized by early < 30 or late ≥ 30 days, indication (branch, endoleak, limb, access-related, or other), and target branch/device component. Patients were stratified into REI vs No REI and Branch REI vs No-Branch REI.

Results: Of 219 consecutive ZFEN from 2012-2020, 199 patients met inclusion criteria. Fifty (25%) patients underwent a total of 63 REIs (12 early, 51 late) over a mean follow-up of 1.2 months. The most common indication for REI was branch-related 62% (39/63), with the renals most frequently affected 54% (34/63) (Fig 1). No differences were found in baseline, aneurysm, or device characteristics, except for a higher mean SVS comorbidity score in No REI (9.5 vs 7.9, $P=.02$). Technical success, operative characteristics, and length of stay were similar between groups, while the rate of early major adverse events (< 30 days) was higher in REI (24.0% vs 8.7%, $P=.005$), 30-day mortality was not statistically different (6.0% vs 1.3%, $P=.07$). On Kaplan-Meier analysis, there was no difference in 5-year mortality between REI and No REI (37.3% vs 39.1%, log-rank $P=0.97$) (Fig 2) and Branch REI and No-Branch REI (46.9% vs 51.9%, log-rank $P=.28$). In multivariate analysis, REI did not predict mortality; only the SVS comorbidity score increased the hazard of death (HR 1.10, 95% CI 1.03-1.17, $P=.003$).

Conclusions: Following ZFEN, 25% of patients required a total of 63 REIs with most occurring ≥ 30 days and 62% being branch-related, with no influence on 5-year survival. Only comorbidity independently predicted mortality, thus validating the SVS comorbidity score in this cohort. ZFEN mandates lifelong surveillance and protocols to maintain branch patency. Despite their relative frequency, REIs do not influence 5-year post-procedural survival.

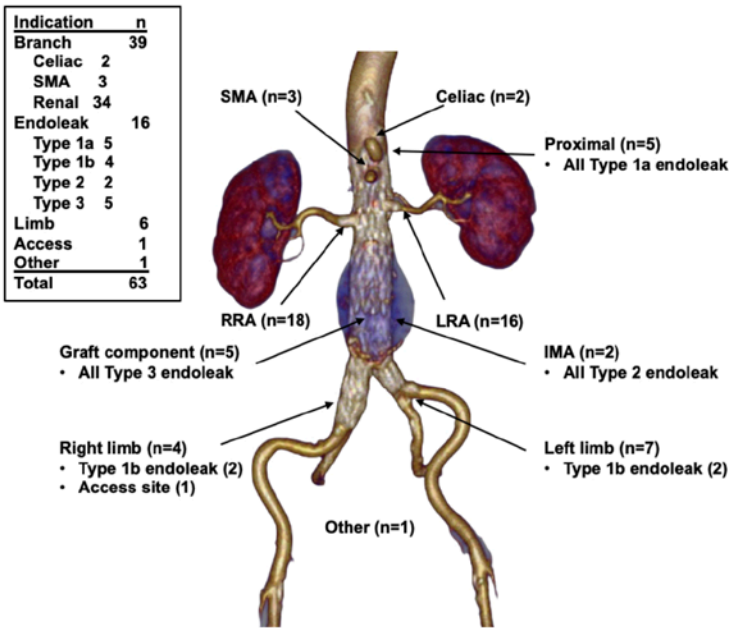


Fig 1. Reinterventions after Zenith Fenestrated (ZFEN) endovascular aneurysm repair, categorized by indication (branch, endoleak, limb, access-related, or other) and by target branch/device component (n=63). *SMA*, superior mesenteric artery; *IMA*, inferior mesenteric artery; *LRA*, left renal artery; *RRA*, right renal artery.

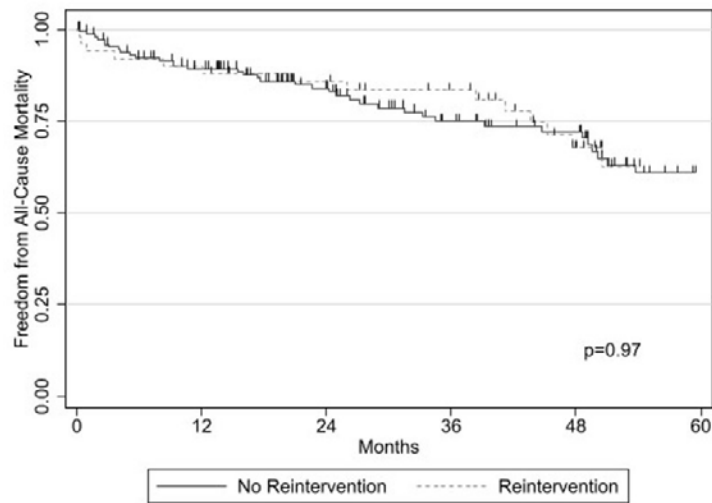


Fig 2. Kaplan-Meier estimate of 5-year survival, stratified by whether or not patients underwent reintervention (REI) after Zenith Fenestrated (ZFEN) endovascular aneurysm repair (REI n=50, No REI n=149; total N=199).

Author Disclosures: **S. Dossabhoj:** Nothing to disclose; **S. Sorondo:** Nothing to disclose; **K. Tran:** Nothing to disclose; **J. Stern:** Nothing to disclose; **R. Dalman:** Nothing to disclose; **J. Lee:** Nothing to disclose

6. SPINAL CORD ISCHEMIA AND OTHER CLINICAL OUTCOMES ASSOCIATED WITH THE STAGING OF TEVAR AND COMPLEX EVAR

Alyssa J. Pyun, MD, Fred A. Weaver, MD MMM, Li Ding, MD MPH, Sukgu M. Han, MD MS, Gregory A. Magee, MD MSc.
University of Southern California, Los Angeles, CA, USA.

Objective: Spinal cord ischemia (SCI) continues to be a devastating risk associated with endovascular aortic repair. Thus, a number of maneuvers such as staging aortic procedures have become increasingly utilized in attempts to mitigate this risk. While there is some evidence to show the potential for staging to decrease rates of SCI and mortality, there continues to be no consensus regarding its application. Thus, our study aims to evaluate the impact of staging during thoracic and complex abdominal endovascular aortic repair on SCI, perioperative mortality and other major adverse events using the national Vascular Quality Initiative (VQI) database.

Methods: The VQI TEVAR/complex EVAR module from July 2010 to October 2020 was evaluated. Patients whose device(s) landed within zones 2 through 11 spanning both the thoracic and abdominal aorta were included. Ruptures, malperfusion, and emergent cases were excluded. Patients who were staged and had at least two aortic devices, with no history of aortic repair were considered staged by primary intent (PS). Patients who were not staged and had at least two devices with no history of aortic repair were considered not staged (NS). Those with at least one device and a history of endovascular aortic repair in the descending thoracic or abdominal aorta were considered staged by secondary intent (SS). Primary outcomes were spinal cord ischemia, and secondary outcomes were all-cause mortality and other major adverse events.

Results: Of the 858 patients meeting criteria, 599 (69.8%) were NS, 215 (25.1%) SS, and 44 (5.1%) PS. SS patients were more likely to be older males with larger BMI, coronary artery disease, and hypertension, while PS patients were more commonly smokers (Table I). PS and SS patients primarily presented asymptomatic with aneurysms or aneurysms from dissection, while NS patients more commonly presented with dissections (Table I). Extent II aortic coverage and an increased number of aortic devices (>3) were more common in PS (70.5%) vs NS (24%). There was no significant difference in postoperative SCI, major adverse events (Table II) or 1- year survival between the three groups (Figure I).

Conclusions: Staging of endovascular repair was not associated with decreased rates of SCI, mortality, or other major adverse events.

Figure I. 1-year survival

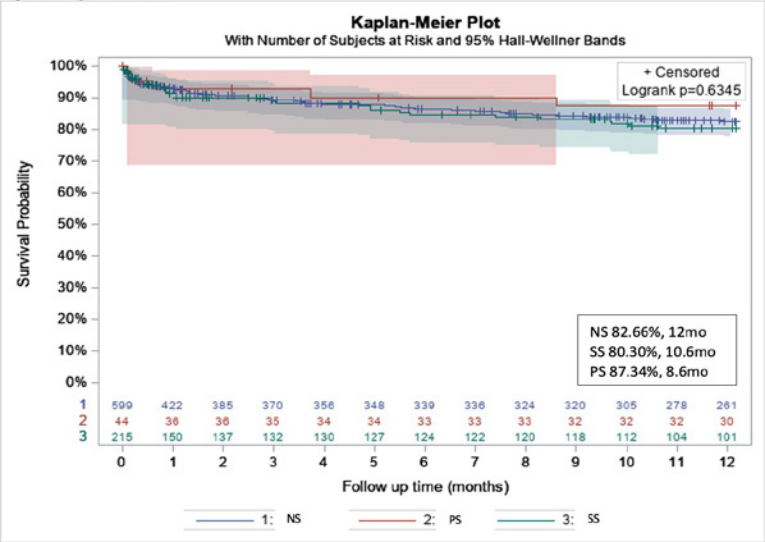


Table I Demographics and Presentation

	NS N=599	SS N=215	PS N=44	p-value
Male	317 (52.9)	150 (69.8)	21 (47.7)	<0.0001
Age (years, mean±SD)	70.2 ±10.9	72.5 ± 9.3	71.4 ±8.5	0.02
BMI (kg/m ²)	27.1±6.3	28.2±6.8	26±5.2	0.03
Coronary Artery Disease	115 (19.2)	62 (28.8)	8 (18.2)	0.01
Hypertension	524 (87.5)	203 (94.4)	41(93.2)	0.02
Smoking History	472 (78.8)	185 (86)	14 (93.2)	0.01
Aneurysm	429 (71.6)	174 (80.9)	35 (79.5)	
Dissection	106 (17.7)	14 (6.5)	3 (6.8)	
Aneurysm secondary to dissection	33 (5.5)	18 (8.4)	5 (11.4)	
Asymptomatic	381 (63.6)	156 (72.6)	35 (79.5)	
Symptomatic	217 (36.2)	59 (27.4)	9 (20.5)	

Table II
Outcomes

	NS N=599	SS N=215	PS N=44	p- value
PostoperativeComplications	434 (72.5)	157 (73)	30 (68.2)	0.8
MI	28 (4.7)	8 (3.7)	1 (2.3)	0.66
Stroke	24 (4)	7 (3.3)	3 (6.8)	0.54
Respiratory	58 (9.7)	17 (7.9)	4 (9.1)	0.74
New Dialysis	17 (2.8)	10 (4.7)	2 (4.5)	0.4
Limb Ischemia	20 (3.3)	6 (2.8)	2 (4.5)	0.82
Bowel Ischemia	17 (2.8)	6 (2.8)	1 (2.3)	0.98
Renal Ischemia	19 (3.)	12 (5.6)	2 (4.5)	0.28
Spinal Ischemia	30 (5)	10 (4.7)	3 (6.8)	0.84
Aorta-relatedmortality	36 (6)	10 (4.7)	2 (4.5)	0.99

Author Disclosures: **A. Pyun:** Nothing to disclose; **F. Weaver:** Nothing to disclose; **L. Ding:** Nothing to disclose; **S. Han:** Nothing to disclose; **G. Magee:** Nothing to disclose

7. WOMEN WITH THORACOABDOMINAL AORTIC ANEURYSMS HAVE INCREASED FRAILTY AND MORE CHALLENGING AORTIC ANATOMY COMPARED WITH MEN

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Objective: Repair of thoracoabdominal aortic aneurysms (TAAA) is a high-risk undertaking. Prior studies note lower rates of repair for women compared with men; the reasons for this are unknown. The aim of this study was to identify sex-related differences in physiologic and anatomic fitness for repair among an unselected cohort of patients with TAAA.

Methods: Patients with extent I-V TAAA confirmed by CT imaging between 2009 and 2019 at a single institution were reviewed, regardless of whether or not they received an operation. Demographics, comorbidities, and anatomic details were collected through retrospective chart review. Physiologic risk was assessed using the Society for Vascular Surgery clinical comorbidity score system for endovascular repair of complex aneurysms. Patients under 75 years old were assessed for anatomic risk for open and endovascular repair in a standardized fashion.

Results: Of the 485 identified patients, 195 (40%) were women. Women were less likely to be offered repair (56% vs. 70%, $p=0.009$) and less likely to undergo repair (43% vs. 59%, $p=0.002$). Women were more likely to be over 70 years old at time of diagnosis ($p=0.04$) but had similar comorbidities to men, with the exception of lower rates of coronary artery disease (36% vs. 47%, $p=0.04$) (Table I). SVS comorbidity scores did not differ between sexes. Metrics of clinical frailty were higher in women, including recent unintentional weight loss (12% vs. 4%, $p=0.02$), BMI <18.5 (8% vs. 2%, $p=0.0001$), limited physical activity tolerance (45% vs. 31%, $p<0.0001$), and need for ambulatory assistance (14% vs. 10%, $p<0.0001$). Women had more extensive aneurysms ($p=0.02$) and were less likely to have undergone prior aortic surgery (30% vs. 52%, $p<0.0001$) (Table II). Among patients with standard or increased anatomic risk for open repair, women were more likely to have major physiologic risk factors for open repair (81% vs. 49%, $p=0.008$). There was a similar trend for endovascular repair (71% vs. 50%, $p=0.12$).

Conclusion: Women with TAAA had similar comorbidities to men but had increased metrics of clinical frailty that were not captured by SVS comorbidity scoring. Frailty and anatomic barriers may explain the lower rates of intervention among women with TAAA. These findings suggest that treatment of frailty may play a key role in improving care for women with TAAA.

SCIENTIFIC SESSION ABSTRACTS continued

Table I. Demographics.

	Men (n=290)	Women (n=195)	P-value
Age	68±13	71±11	0.60
>80 years	4.5%	17%	0.04
Aortic dissection	32%	20%	0.04
Coronary artery disease	47%	36%	0.04
Congestive heart failure	20%	20%	0.92
Chronic obstructive pulmonary disease	36%	41%	0.18
CKD Stage 4-5 (eGFR <30mL/min)	7.6%	8.2%	0.85
Unintentional weight loss	4.5%	11%	0.02
Partially/completely dependent on others for ADLs	8.3%	11%	0.05
Nonambulatory/Need for ambulatory assistance	5.5%	13%	<0.0001
Limited physical activity tolerance <3 METS	31%	45%	<0.0001

Table II. Anatomic details. *Anatomic risk assessment performed on subset of 100 patients <75y.

	Men (n=290)	Women (n=195)	P-value
Aneurysm diameter, cm	6.5±1.3	6.2±1.2	0.12
Aortic size index	3.2±0.8	3.6±0.8	0.48
Crawford Extents 1-3 and 5	65%	76%	0.02
BMI <18.5	2.1%	8.2%	0.0001
BMI >40	2.1%	4.6%	0.0001
Prior open aortic repair	40%	21%	<0.0001
Prior endovascular aortic repair	18%	12%	0.06
Prohibitive/increased anatomic risk for open repair*	69%	63%	0.48
Prohibitive/increased anatomic risk for endovascular repair*	77%	88%	0.35

Author Disclosures: **N. Edman:** Nothing to disclose; **M. Dematteis:** Nothing to disclose; **S. Zettervall:** Nothing to disclose; **S. Shalhub:** Nothing to disclose; **M. Sweet:** Nothing to disclose

8. PEDAL ARTERIAL CALCIFICATION SCORE IS ASSOCIATED WITH HEMODYNAMIC CHANGE AND MAJOR AMPUTATION AFTER REVASCULARIZATION IN CHRONIC LIMB-THREATENING ISCHEMIA

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Objective: Pedal medial arterial calcification (pMAC) is associated with major amputation in patients with CLTI. We hypothesize this association is related to unresolved distal ischemia. We investigated relationships across pMAC score, hemodynamic change, and major amputation in patients with CLTI.

Methods: This is a single-institution retrospective study of 306 patients who underwent technically successful infrainguinal revascularization for CLTI (2011-2020) and had foot x-rays for blinded pMAC scoring (0-5). 137 (45%) had toe pressure measurements within 90 days before and 60 days after revascularization. Ischemia grade (0-3) was calculated using the SVS WIfI system.

Results: pMAC scores were trichotomized [0-1 (125; 41%), 2-4 (116; 38%), 5 (65; 21%)].

WIfI ischemia grade after revascularization was improved in 78/137 (57%) and unchanged/worsened in 59/137 (43%). Lower pMAC score was associated with hemodynamic improvement ($p=0.003$, Fig 1). Revascularization approach was open bypass (BPS) in 118 (38%) and endovascular (EV) in 188 (62%). In the EV group, 37 (20%) underwent major amputation. In a Cox proportional hazards model, factors independently associated with major amputation were WIfI stage 4 [HR 2.7 (1.3-5.7), $p=0.007$] and pMAC score [pMAC 2-4: HR 10.6 (1.4-80.7), $p=0.02$; pMAC 5: HR 15.5 (2.0-119), $p=0.008$] (Fig 2). WIfI ischemia grade was improved after EV in 43/90 (48%). In a multivariate logistic model, pMAC 5 was the only factor independently associated with unimproved ischemia grade after EV [OR 4.0 (1.1-16.6), $p=0.04$]. In the BPS group, 19 (16%) underwent major amputation. In a Cox model including bypass conduit, WIfI stage, and pMAC score; the only factor independently associated with major amputation was use of non-autologous graft [HR 5.6 (1.8-17.6), $p=0.003$]. WIfI ischemia grade was improved after BPS in 35/47 (74%) but was not independently associated with any baseline patient or limb characteristics.

Conclusion: The pMAC score is a simple and practical clinical tool independently associated with persistent distal ischemia and major amputation after technically successful endoluminal revascularization in CLTI. These data

suggest that pedal arterial calcification or its reflection of global microvascular disease burden may limit revascularization efficacy in patients with CLTI.

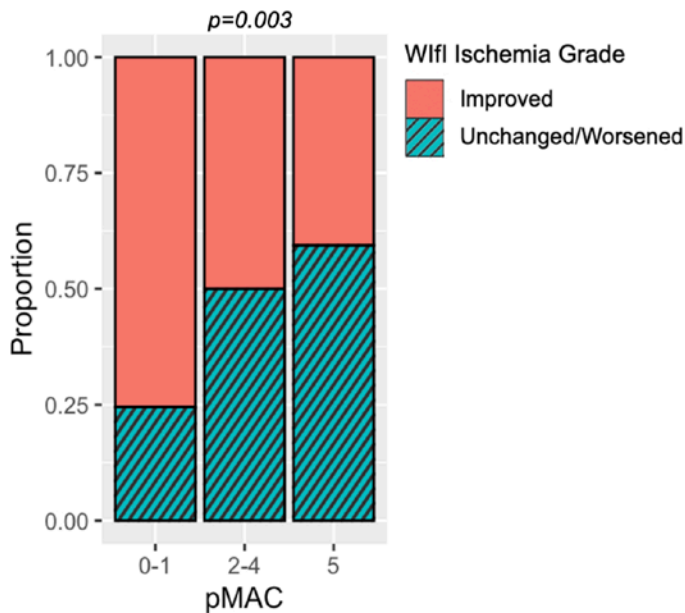


Figure 1. Higher pMAC score is associated with unchanged or worsened Wifl ischemia grade after technically successful infrainguinal revascularization in patients with CLTI

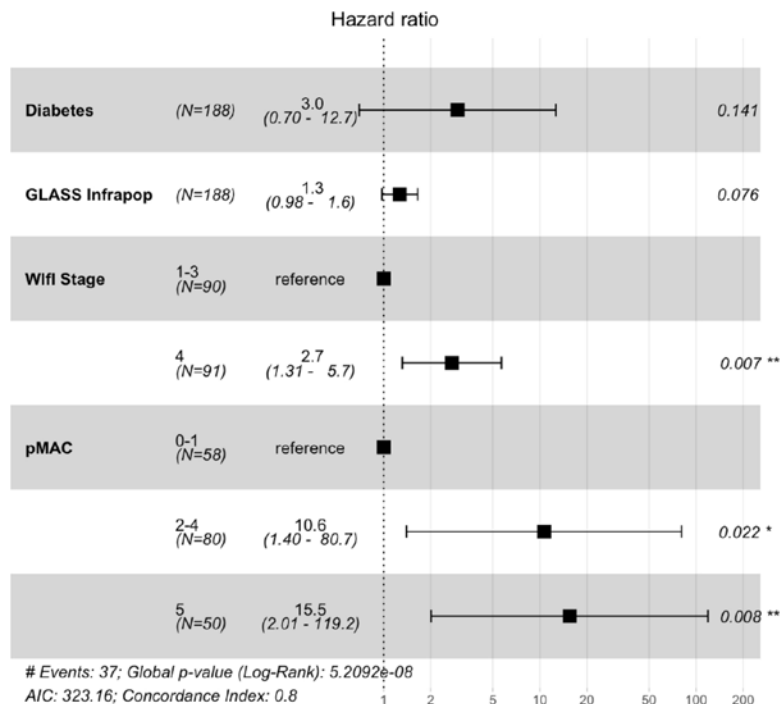


Figure 2. Wifl stage 4 and high pMAC score are independently associated with major amputation after endoluminal revascularization in patients with CLTI

Author Disclosures: **I. Liu:** Nothing to disclose; **B. Wu:** Nothing to disclose; **V. Krepiy:** Nothing to disclose; **R. El Khoury:** Nothing to disclose; **R. Ferraresi:** Nothing to disclose; **A. Reyzelman:** Nothing to disclose; **J. Hiramoto:** Nothing to disclose; **P. Schneider:** Nothing to disclose; **M. Conte:** Nothing to disclose; **S. Vartanian:** Nothing to disclose

9. LOWER THAN EXPECTED FIVE-YEAR MORTALITY FOLLOWING AMPUTATION RELATED TO CHRONIC LIMB-THREATENING ISCHEMIA: A STATEWIDE REGISTRY ANALYSIS

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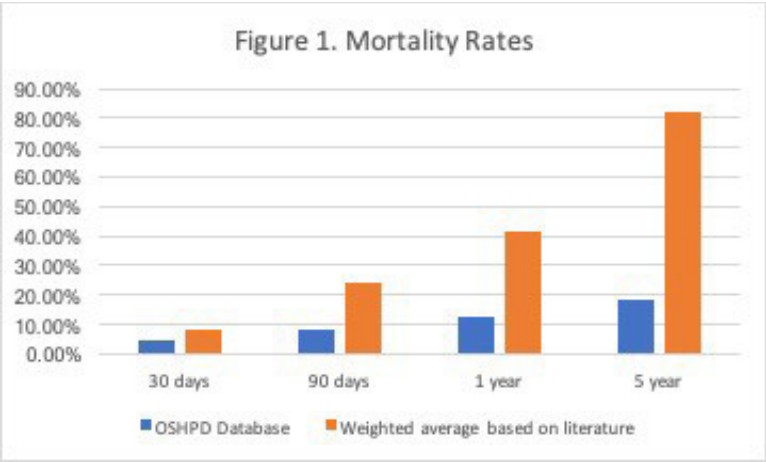
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Objective: High mortality has been historically associated with below and above knee amputations (BKA and AKA) performed for chronic limb-threatening ischemia (CLTI). While 30- day mortality rates have declined, reported 5-year mortality rates remain as high as 83%. We sought to investigate 5-year mortality following BKA and AKA in a modern cohort using a statewide registry.

Methods: The California Office of Statewide Planning and Development hospital database was queried for patients undergoing BKA or AKA secondary to CLTI between 2007 and 2018. Cases were selected using ICD-9-CM diagnosis and procedure codes and those undergoing amputation following traumatic injury and those with diabetes but without known arterial disease were excluded. Hospital readmission and mortality over a five-year period following amputation were the outcomes of interest.

Results: There were 26,669 patients identified; 67% had BKA and 33% had AKA. The average age at time of surgery was 67 years old for BKA and 74 years old for AKA. The most common complications during initial admission were heart failure (23.88%), dysrhythmias (20.35%), and sepsis (7.81%). The five-year hospital readmission rate was 71%. The 30-day, 90- day, 1-year and 5-year mortality rates were 4.82%, 8.62%, 12.47%, and 18% respectively (Figure). Women had statistically higher mortality when compared to males ($p = 0.037$) across all time periods. When broken down by amputation site, 5-year mortality was 16% for BKA and 23% for AKA. The mortality difference between AKA and BKA was robust to adjustment for age and comorbidities. Mortality risk associated with vascular disease after amputation was 11 times greater than the risk associated with amputation-specific complications.

Conclusions: These results challenge the traditionally ascribed high mid-term mortality rate of patients undergoing amputation for complications of CLTI, with an observed five-year mortality rate of 18%. Mortality remains higher following AKA than BKA, likely due to more advanced vascular disease and age at time of amputation. Further study is warranted to elucidate if this observed mortality reduction is from previously exaggerated rates or advances in patient care.



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10. EARLY EXPERIENCE WITH VENOUS ARTERIALIZATION FOR LIMB SALVAGE IN NO-OPTION PATIENTS WITH CHRONIC LIMB-THREATENING ISCHEMIA

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Objective: Chronic limb-threatening ischemia (CLTI) is associated with adverse limb outcomes and increased mortality. In a small subset of the CLTI population, there are no feasible conventional means of revascularization; venous arterialization (VA) provides an alternative for limb salvage. The objective of this study was to review the outcomes of venous arterialization (VA) at our institution.

Methods: This is a single institution review of 41 patients followed prospectively who underwent either superficial or deep VA. Data collected included: patient demographics, co-morbidities, VA technique (endovascular vs. hybrid) and WIfI (wound ischemia foot infection) limb staging. Data were collected at 1 month, 6 months and 1-year intervals and included the following outcomes: patency, wound healing, major adverse limb event (MALE), major amputation and death. Descriptive statistics were used for analysis.

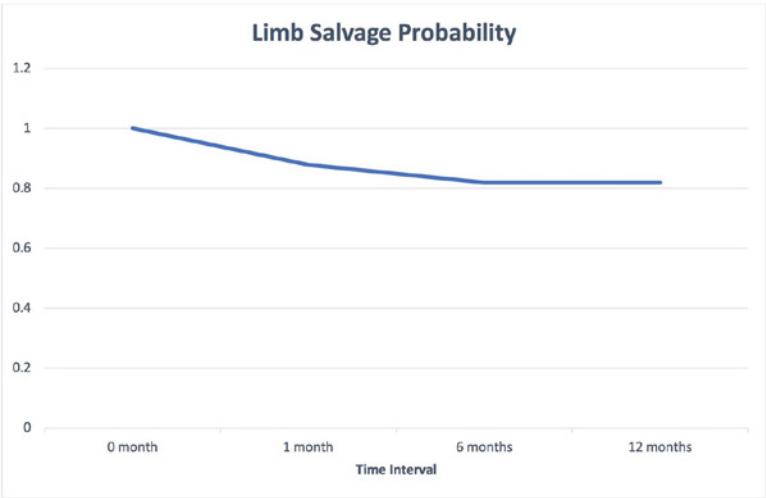
Results: The study group includes 41 patients who underwent successful open hybrid superficial or deep endovascular VA; 21 (51.2%) underwent a purely endovascular procedure and 20 (48.8%) had hybrid VA. The WIfI clinical stages were as follows: 33 (80.5%) stage 4, 6 (14.6%) stage 3, and 2 (4.9%) stage 2. At this time, 21 (51.2%) patients have completed follow-up at 6 months and 13 (31.7%) at 1 year. Among the 41 patients, 6 (14.6%) were lost to follow up after 1 month. VA patency (n=available for follow-up) was 80.5% (n=33) at 1 month, 71.4% (n=15) at 6 months and 69.2% (n=9) at 1 year (table 1). Wound healing rates were 39% (16) at 1 month; 71.4% (15) at 6 months; and 76.9% (10) at 1 year. Rates of MALE were 19.5% (8) at 1 month 7 33.3% (7) at 6 months and 38.4% (5) at 1 year. Major amputation at 1 month occurred in 5 (12.2%) limbs, 2 (9.5%) limbs at 6 months and 0 (0%) at 1 year. There were 0 (0%) deaths at 1 month, 4 (19%) deaths at 6 months, however, 2 (9.5%) deaths were attributed to COVID-19. There were no further deaths within 1 year. The limb salvage survival probability at 1 year was 87.5% (Figure 1).

Conclusions: These findings suggest that for a select subset of CLTI patients presenting with high WIfI clinical limb stage CLTI and no viable options for conventional open or endovascular arterial revascularization, superficial and deep venous arterialization are safe and effective options to achieve limb salvage.

SCIENTIFIC SESSION ABSTRACTS continued

Table 1: Venous arterialization outcomes at 1month, 6 months and 12 months

Variable	1 month	6 months	12 months
VA patency, % (n)	80.5% (33)	71.4% (15)	69.2% (9)
Wound healing, % (n)	39% (16)	71.4% (15)	76.9% (10)
MALE, % (n)	19.5% (8)	33.3% (7)	38.4% (5)
Limb salvage, % (n)	87.8% (36)	78.3% (32)	78.3% (32)
Mortality, % (n)	0	19% (4)	19% (4)



Author Disclosures: **J. Miranda:** Nothing to disclose; **J. Chung:** Nothing to disclose; **Z. Pallister:** Nothing to disclose; **J. Mills:** Nothing to disclose; **M. Montero-Baker:** Nothing to disclose

11. IN-NETWORK PRIMARY CARE: AN IMPORTANT AUGMENTATION TO PREOPERATIVE WORK-UP FOR PATIENTS UNDERGOING INFRAINGUINAL BYPASS

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Objective: Vascular surgery patients have the most comorbid chronic diseases of any surgical subspecialty that warrants consistent medical management through in-network primary care (PCP), yet there is a paucity of data about the role of PCP care in those requiring vascular surgery. This study assessed in-network primary care follow-up prior to infrainguinal bypass (LEB) and hypothesized that a majority of patients would not have PCP in-network visits and those with in-network PCP visits would have better capture of preoperative comorbidities.

Methods: This was a single center retrospective analysis of LEB cases performed from 2012 to 2021. Cases with an in-network PCP within one year prior to surgery were identified. Prescriptions and routine lab work (hemoglobin A1c, serum creatinine) within 90 days before surgery were recorded. Outcomes included 30-day mortality, length of stay, wound complication, and 30-day readmission, as well as non-home discharge, average hemoglobin A1c, and post-operative kidney injury, and troponin elevation. Chi-square, and t-tests were used for bivariate analyses, and logistic regression used for 30-day outcomes.

Results: Overall, 464 infrainguinal bypasses were included. Only 48 (10%) of patients were seen by an in-network PCP in the year prior to surgery. Those without an in-network PCP visit were more likely to be of non-white race, and have diagnoses of CAD, ESRD, and diabetes (Table I, $p<0.001$). This group was also more likely to have a serum creatinine and hemoglobin A1C value within 90 days of surgery ($p<0.001$). Patients without an in-network PCP were more likely to present urgently or emergently ($p=0.001$). Having an in-network PCP visit was not associated with significant differences in preoperative medications. In-network PCP visits were not associated with postoperative outcomes (Table II).

Conclusions: The majority (90%) of our patients do not receive primary care within our center's network, suggesting significant care fragmentation. Lack of an in-network PCP was associated with an emergent/urgent presentation, but, reassuringly, 30-day post-operative outcomes were not. Patients with in-network PCPs had more documented medical comorbidities that may be explained by unavailable medical information at the time of surgery for out-of-network patients.

SCIENTIFIC SESSION ABSTRACTS continued

Table I: Characteristics of LEB patients by in-network PCP status

Patient characteristics	No in-network PCP visit within 1 year (n=416)	PCP visit in-network within 1 year (n=48)	P value
Age (average, years)	66.2	68.4	0.15
Body mass index (average, k/m ²)	25.8	25.2	0.70
Male Gender	66%	60%	0.34
White/Caucasian	67%	54%	0.01

CAD	30%	54%	<0.001
ESRD	13%	27%	<0.001
Diabetes	35%	73%	<0.001
Emergent Admission	13%	19%	<0.001
Urgent Admission	35%	13%	

Preoperative medical management, postoperative outcomes for LEB patients by PCP status

Care Metric	No in-network PCP visit within 1 year (n=416)	PCP visit in-network within 1 year (n=48)	P value
Preoperative aspirin	87.5%	93.8%	0.20
Preoperative statin	71.9%	77.1%	0.44
Documented preoperative serum Cr	75.0%	91.7%	0.01
Documented preoperative hemoglobin A1C	10.8%	31.3%	<0.001
Hemoglobin A1C, average	6.8	7.2	0.41
Length of stay (average, days)	8.7	6.3	0.14
Readmission, 30 days	18.8%	22.9%	0.49
Mortality, 30 days	1.7%	2.1%	0.82
Wound complication, 30 days	13.2%	12.5%	0.89

Author Disclosures: **C. Flanagan:** Nothing to disclose; **Z. Matthay:** Nothing to disclose; **E. Smith:** Nothing to disclose; **M. Conte:** Nothing to disclose; **J. Iannuzzi:** Nothing to disclose

12. THE LOWER EXTREMITY AMPUTATION PROTOCOL (LEAP): A PATHWAY TO SUCCESSFUL AMBULATION

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Objective: Vascular patients account for >80% of major lower extremity amputations (trans-tibial/femoral) in the US. These patients are older, frail, and with numerous co-morbidities, thereby predisposing them to deconditioning faster than traumatic and oncologic amputees. Retrospective data shows that early physical therapy (PT) and discharge to an acute rehabilitation facility decreases post-operative length of stay (PO-LOS) and expedites ambulation. This study aims to demonstrate that patients following the Lower Extremity Amputation Protocol (LEAP) have improved outcomes.

Methods: A non-randomized prospective study enrolled vascular patients undergoing amputations from 1/2019-2/2020. Patients who were non-ambulatory or had previous contralateral major amputation were excluded. LEAP is a multidisciplinary team approach to the peri-operative care of amputees following an outlined protocol. Figure 1. Prospective patients were compared to historic controls prior to initiation of LEAP (1/16-12/18). Primary outcomes included PO-LOS, time to receipt of prosthetic, and time to ambulation.

Results: 141 patients were included: 130 retrospective and 11 LEAP patients. Demographics and co-morbidities were similar. All LEAP patients underwent below knee amputations (BKA), one requiring revision to an above knee amputation (AKA). 117 (90%) retrospective patients had a BKA, one requiring revision to an AKA. LEAP patients were more likely to be discharged to acute rehabilitation (100% vs 27%; $p<0.001$), receive a prosthetic (100% vs 45%; $p<0.001$), and ambulate with the prosthetic (100% vs 43%, $p<0.001$). LEAP patients received PT 2 days faster than retrospective controls ($p=0.006$) with decreased PO-LOS (3 vs 6 days, $p<0.001$). Table 1. They also received a prosthetic and ambulated faster (87 vs 137 days, $p=0.002$; 86 vs 146 days, $p=0.002$; respectively). There were no differences in surgical site complications or unplanned readmissions between the two groups. Average quality of life score in the LEAP cohort was 8.4 ± 1.7 .

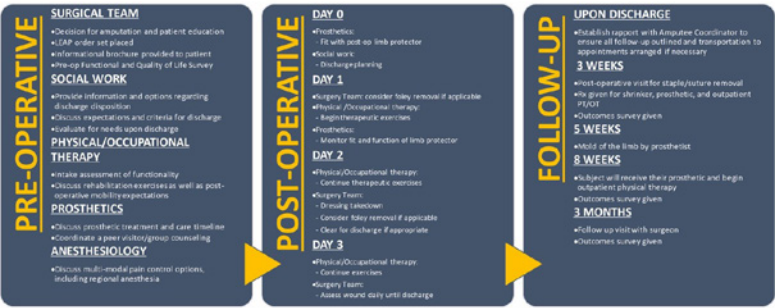
Conclusions: This pilot study demonstrates LEAP significantly decreases PO-LOS and expedites time to independent ambulation with a prosthetic in vascular patients undergoing major amputation suggesting the powerful ability to improve a healthcare gap in this high-risk population.

SCIENTIFIC SESSION ABSTRACTS continued

Table 1. Comparison of amputees before and after institution of LEAP

*	Retrospective (n = 130)	Prospective (n = 11)	P value
Male Gender	95 (73%)	8 (73%)	0.98
Age	57 ± 13	59 ± 14	0.43
Follow-up days	360 ± 348	251 ± 172	0.36
Post-op time to physical therapy (days)	0 ± 4	-2 ± 4	0.006
Post-op length of stay (days)	6 ± 5	3 ± 2	<0.001
Received prosthetic	58 (45%)	11 (100%)	<0.001
Time to prosthetic (days)	137 ± 97	81 ± 39	0.002
Ambulated	56 (43%)	11 (100%)	<0.001
Time to ambulation (days)	146 ± 104	86 ± 53	0.002

Lower Extremity Amputation Protocol (LEAP)



Author Disclosures: L.A. O'Banion: Nothing to disclose; Y. Qumsiyeh: Nothing to disclose; R. Dirks: Nothing to disclose; C. Rome: Nothing to disclose; A. Prentice: Nothing to disclose

13. VALIDITY OF THE GLOBAL VASCULAR GUIDELINES IN PREDICTING OUTCOMES IN A COMPREHENSIVE WOUND CARE PROGRAM

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Objective: The Global Vascular Guidelines (GVG) recommend selecting an endovascular vs open-surgical approach to revascularization for chronic limb-threatening ischemia (CLTI), based on the Global Limb Anatomic Staging System (GLASS) and Wound, Ischemia, and Foot Infection (WIFI) classification systems. We assessed the utility of GVG-recommended strategies in predicting patient outcomes.

Methods: We conducted a single-center, retrospective review of first-time lower-extremity revascularizations within a comprehensive limb-preservation program from 2010- 2018. Procedures were stratified by 1) treatment concordance with GVG-recommended strategy (concordance vs non-concordance groups), 2) GLASS stages I-III, and 3) WIFI stages 1-4. The primary outcome was major adverse limb events (MALE), defined as reintervention or major amputation, and all-cause mortality at 5 years.

Results: Of 281 first-time revascularizations, 251 (89.3%) were endovascular and 186 (66.2%) were in the concordance group, with a mean clinical follow-up of 36.3 months. The concordance group had a higher rate of chronic kidney disease (60.8% vs 45.3%, $P=.02$), WIFI foot infection score (0.81 ± 1.1 vs 0.56 ± 0.80 , $P=.03$), and WIFI stage (3.1 ± 0.79 vs 2.8 ± 1.2 , $P<.01$) compared to the non-concordance group. After Kaplan-Meier and multivariate analyses, there were no significant differences in 5-year MALE (54.7% vs 49.3%, Fig 1) or overall survival (47.9% vs 50.6%, Fig 2) between concordance and non-concordance groups. For a cohort with defined wound care outcomes (since 2014, 1/3 of total), wound-healing was comparable between concordance and non-concordance groups (wound-closure 31.9% vs 20.2%; decrease in wound area $47.2\%\pm82.6\%$ vs $77.2\%\pm44.9\%$). Outcomes did not differ significantly based on GLASS stage (Table I); however, MALE increased at WIFI stage 4 (HR 2.48, 95% CI 1.08-5.69, $P=.03$).

Conclusions: In this review, treatment outcomes for CLTI did not differ significantly based on concordance with GVG-recommended strategy (endovascular vs open-bypass). While open revascularization continues to play an important role in the management of these complex patients, this study validates an endovascular-centric approach augmented by multidisciplinary wound care.

SCIENTIFIC SESSION ABSTRACTS continued

Table I. Clinical Outcomes and Wound Healing Stratified by Concordance with GVG Guidelines and GLASS

	Concordance (N=186)	Non-Concordance (N=95)	GLASS Stage I (N=81)	GLASS Stage II (N=95)	GLASS Stage III (N=105)
Survival (5-year)	47.9%	50.6%	52.3%	44.1%	50.3%
Survival (Hazard Ratio [95% CI])	ref	0.82 [0.55-1.22]	ref	1.09 [0.70-1.69]	0.99 [0.63-1.56]
Major Amputation (5-year)	25.8%	16.1%	22.4%	27.4%	17.7%
Major Amputation (Hazard Ratio [95% CI])	ref	0.53 [0.27-1.07]	ref	1.55 [0.80-2.98]	0.82 [0.39-1.76]
Reintervention (5- year)	38.2%	37.5%	39.8%	35.7%	37.7%
Reintervention (Hazard Ratio [95% CI])	ref	0.90 [0.56-1.45]	ref	1.00 [0.56-1.76]	0.83 [0.69-2.01]
MALE (5-year)	54.7%	49.3%	54.8%	52.6%	50.3%
MALE (Hazard Ratio [95% CI])	ref	0.72 [0.48-1.09]	ref	1.20 [0.76-1.89]	1.05 [0.66-1.68]
Wound Closed	31.9%	20.2%	17.0%	18.1%	17.0%
Change in Wound Area, Mean (SD)	-47.2% (± 82.6)	-77.2% (± 44.9)	-60.0% (± 72.6)	-45.4% (± 86.6)	-72.0% (± 49.9)
Change in Wound Volume, Mean (SD)	54.3% (± 553)	-75.5% (± 51.4)	76.6% (± 731)	-7.32% (± 196)	-58.6% (± 88.7)

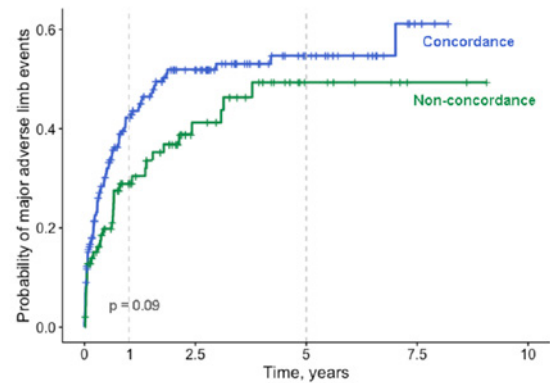


Fig 1. Kaplan-Meier Estimates of Major Adverse Limb Events (MALE) Stratified by Concordance with GVG Recommended Treatment Guidelines. The concordance group received treatment in concordance with GVG recommended revascularization strategies, whereas the non-concordance group did not. 5-year MALE was 54.7% in the concordance group vs 49.3% in the non-concordance group (log-rank $P=0.09$). Multivariate analysis showed no significant difference between the concordance and non-concordance groups (HR 0.72 95% CI 0.48-1.09, $P=.12$). *HR*, hazard ratio; *CI*, confidence interval.

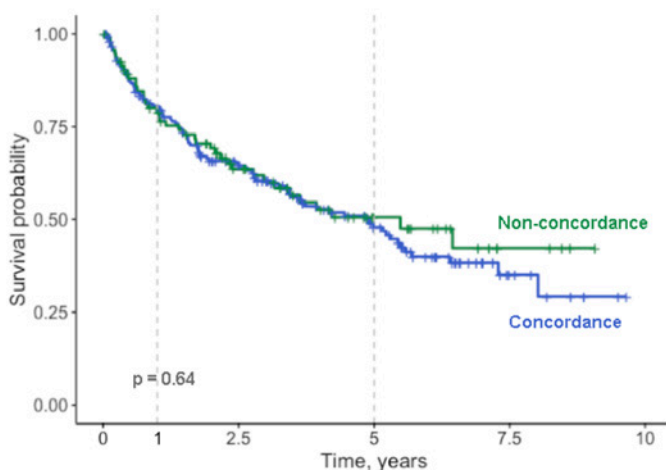


Fig 2. Kaplan-Meier Estimates of overall survival Stratified by Concordance with GVG-Recommended Treatment Guidelines. The concordance group received treatment in concordance with GVG-recommended revascularization strategies, whereas the non-concordance group did not. 5-year survival was 47.9% in the concordance group vs 50.6% in the non-concordance group (log-rank $P=0.64$). Multivariate analysis showed no significant difference between the concordance and non-concordance groups ($HR\ 0.82$, 95% CI 0.55-1.22, $P=.32$). *HR*, hazard ratio; CI, confidence interval.

Author Disclosures: **V. Lou:** Nothing to disclose; **K. Tran:** Nothing to disclose; **S. Dossabhoy:** Nothing to disclose; **F. Yawary:** Nothing to disclose; **E. Ross:** Nothing to disclose; **J. Stern:** Nothing to disclose; **J. Lee:** Nothing to disclose; **E.J. Harris:** Nothing to disclose; **R. Dalman:** Nothing to disclose; **V. Chandra:** Nothing to disclose

SCIENTIFIC SESSION ABSTRACTS continued

14. LIVING IN A FOOD DESERT IS ASSOCIATED WITH INCREASED WOUND COMPLICATIONS AFTER MAJOR VASCULAR PROCEDURES

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Objective: Food Deserts (FD) are regions with a lack of grocery stores, unaffordable healthy options, or a density of poor-quality food choices. Living in a FD is associated with metabolic risks, but its relationship to wound complications after major vascular surgery remains unexplored. We hypothesized that FD status would be associated with increased wound complications following major vascular surgery.

Methods: This was a single-center retrospective analysis of open vascular procedures from 2012-2020. FD status was determined by matching patient census tract location to low- income and low-food access metrics from the USDA Food Access Research Atlas. Major vascular procedures included infra-inguinal bypass, femoral endarterectomy, aorto-femoral bypass graft (AFBG), lower extremity bypass, open abdominal aortic repair (AAA), and thoracoabdominal aortic repairs. The Area Deprivation Index (ADI), a validated marker of socioeconomic status, was used to distinguish the impact of food desert status from other markers of social disadvantage such as education and housing. Multivariable logistic regression assessed the independent association of FD status with wound complications.

Results: Among 1,417 cases, 8% (n=119) resided in a FD. Overall, wound complications occurred in 9% (n=124) of cases: 15% femoral endarterectomy, 14% AFBG, 13% infra-inguinal bypass, 10% TAA, 4% AAA, ($p<0.01$). Patients in an FD were younger (61 vs 67 years, $p<0.01$), more frequently had COPD (28% vs. 17%, $p=0.02$), and had twice the rates of wound complications (24% vs 12%, $p<0.01$). On multivariable analysis, FD status was independently associated with increased odds of wound complications (1.9 CI: 1.0-3.5, $p=0.04$) (Table I). On sensitivity analysis FD status and diabetes interacted, and FD and diabetes combined resulted in a 2.8-fold (CI: 1.1-7.0) increased odds of wound complications compared to those without either risk factor.

Conclusion: Living in a Food Desert was associated with twice the odds of wound complications following major vascular operations. This study suggests food insecurity may impact wound healing and should be considered as a potential modifiable perioperative risk factor. Future study on interventions aimed at addressing access to healthy foods is warranted.

SCIENTIFIC SESSION ABSTRACTS continued

Table I. Multivariable Analysis of Wound Complications

Covariate	AOR	95% CI	p-value
Food Desert	1.9	1.0-3.5	0.04
Obesity	1.6	1.0-2.5	0.03
CAD	1.7	1.1-2.6	0.01
Area Deprivation Index.			
Medium	1.7	1.0-2.9	0.03
High	1.3	0.7-2.2	0.42
Adjusted for: Age≥70, DM, CAD, ADI, COPD, Obesity, Aspirin, Postop RBC transfusion, CKD Stage V, Operative Indication, and Procedure type .Compared to an ADI reference group of Low			

Author Disclosures: **E. Smith:** Nothing to disclose; **Z. Matthay:** Nothing to disclose; **J. Ramirez:** Nothing to disclose; **H. Seligman:** Nothing to disclose; **W. Gasper:** Nothing to disclose; **J. Hiramoto:** Nothing to disclose; **M. Conte:** Nothing to disclose; **J. Iannuzzi:** Nothing to disclose

15. ACUTE AORTOILIAC ARTERIAL THROMBOSIS IN PATIENTS WITH THE NOVEL CORONAVIRUS DISEASE-2019: A CASE SERIES AND SYSTEMATIC REVIEW OF THE LITERATURE Steven Tohmasi, BS1, Nii-Kabu Kabutey, MD2, Shelley Maithel, MD2, Samuel L. Chen, MD2, Isabella J. Kuo, MD2, Carlos E. Donayre, MD2, Roy M. Fujitani, MD2, Anthony H. Chau, MD2. *1University of California, Irvine School of Medicine, Irvine, CA, USA, 2University of California, Irvine Medical Center, Orange, CA, USA.*

Objective: Venous thrombosis has been widely described in the setting of SARS-CoV-2 infection; however, arterial thrombosis has rarely been reported. This study aims to assess the incidence, risk factors, interventions, and outcomes of acute aortoiliac arterial thrombosis in patients with active SARS-CoV-2 infections.

Methods: We present 7 SARS-CoV-2-positive patients from our institution who acutely developed thrombi in the aortoiliac arterial system. A systematic review of the literature on aortoiliac arterial thrombosis in patients with SARS-CoV-2 infections was performed. The available data from all reported cases in the literature and at our institution were analyzed.

Results: In total, 59 SARS-CoV-2-positive patients were found to have acute aortoiliac thrombosis. The abdominal aorta was the most frequent location for the development of a thrombus (Table I). Baseline demographics and medical comorbidities were not significantly different between the symptomatic and asymptomatic cohorts. 71% of patients were symptomatic (lower limb ischemia: 75.0%, renal infarction: 20.0%, stroke: 12.5%, mesenteric ischemia: 10.0%). All patients with thrombus involving the ascending aorta, aortic bifurcation, or iliac artery developed complications. All patients received systemic anticoagulation (Table II). 53% of all patients were managed medically. 94% of the asymptomatic patients were managed medically. One asymptomatic patient underwent endovascular aspiration of a mobile thrombus. Three (23.1%) deaths occurred in the asymptomatic cohort from hypoxic respiratory failure. Fourteen (36.8%) deaths occurred in the symptomatic cohort. The in-hospital mortality rate was 33.3% overall and 43.8% for patients with thrombi involving more than one aortoiliac segment.

Conclusions: The presence of thrombi in the aortoiliac arterial system appears to be a poor prognostic indicator for patients with active SARS-CoV-2 infections. The presence of thrombi involving the ascending aorta, aortic bifurcation, or iliac artery may warrant consideration for operative intervention due to the risk for thromboembolic or ischemic complications. Further study is needed to fully delineate the risk factors, optimal treatment, and outcomes of arterial thrombosis in the setting of SARS-CoV-2 infection.

SCIENTIFIC SESSION ABSTRACTS continued

Table I. Arterial territories affected by acute thrombosis in the setting of SARS-CoV-2 infection.

	All Patients (n=59)	Asymptomatic Patients (n=16)	Symptomatic Patients (n=40)	P- Value
Ascending Aortic Thrombus	5 (8.5%)	0 (0.0%)	5 (12.5%)	0.138
Aortic Arch Thrombus	12 (20.3%)	7 (43.8%)	4 (10.0%)	0.004
Descending Aortic Thrombus	17 (28.8%)	10 (62.5%)	7 (17.5%)	0.001
Abdominal Aortic Thrombus	27 (45.8%)	2 (12.5%)	23 (57.5%)	0.002
Aortic Bifurcation/ Iliac Artery Thrombus	20 (33.9%)	0 (0.0%)	20 (50.0%)	0
Concomitant Intrainguinal Arterial Thrombosis	16 (27.1%)	0 (0.0%)	16 (40.0%)	0.003
Concomitant Infrapopliteal Arterial Thrombosis	13 (22.0%)	0 (0.0%)	13 (32.5%)	0.009

Table II. Management strategies utilized and in-hospital mortality.

	All Patients	Valid n	Asymptomatic Patients	Valid n	Symptomatic Patients	Valid n	P- Value
Managed Medically	29 (52.7%)	55	15 (93.8%)	16	14 (35.9%)	39	0
Received Systemic Anticoagulation	43 (100%)	43	14 (100%)	14	29 (100%)	29	-
Required an Operation	24 (42.9%)	56	1 (6.3%)	16	23 (57.5%)	40	0
Open Surgery Performed	22 (91.7%)	24	0 (0.0%)	1	22 (95.7%)	23	-
Endovascular Therapy Performed	5 (20.8%)	24	1 (100.0%)	1	4 (17.4%)	23	-
Received Thrombolytic Agents	6 (10.9%)	55	1 (6.3%)	16	5 (12.8%)	39	0.478
In-Hospital Mortality	17 (33.3%)	51	3 (23.1%)	13	14 (36.8%)	38	0.363

Author Disclosures: **S. Tohmasi:** Nothing to disclose; **N. Kabutey:** Nothing to disclose; **S. Maithel:** Nothing to disclose; **S. Chen:** Nothing to disclose; **I. Kuo:** Nothing to disclose; **C. Donayre:** Nothing to disclose; **R. Fujitani:** Nothing to disclose; **A. Chau:** Nothing to disclose

16. FEASIBILITY AND UTILITY OF PEDAL ACCELERATION TIME (PAT) AS A NOVEL ASSESSMENT TOOL FOR LIMB ISCHEMIA

Alyssa J. Pyun, MD, David G. Armstrong, DPM MD PHD, Gregory A. Magee, MD MSc, Kenneth R. Ziegler, MD, Tanzim Khan, DPM, Raffi Akay, BS, Sukgu M. Han, MD MS, Vincent L. Rowe, MD. *University of Southern California, Los Angeles, CA, USA.*

Objective: There are currently a number of diagnostic tools to evaluate tissue perfusion in patients with peripheral artery disease (PAD). However, it is not uncommon, for patients to have noncompressible vessels, concomitant inflammation, or prior minor amputations which preclude the use of these metrics accurately and reproducibly. Recently, pedal acceleration time (PAT) has been proposed as a novel predictor of limb ischemia. Thus, our study aims to evaluate the feasibility of using PAT as an alternative measure of limb ischemia.

Methods: We abstracted data from patients undergoing evaluation for PAD with PAT measurements from June 2020 to December 2020. Demographics, comorbidities, clinical history and symptoms were captured from electronic medical records. PAT values were obtained on five predetermined pedal vessels by certified vascular lab technicians. The primary outcome was PAT correlation with ankle brachial indices (ABI), ankle pressures (AP), toe brachial indices (TBI), and toe pressures (TP). Secondary outcome was PAT correlation with symptoms. Statistical analysis was performed using Pearson's correlation, linear regression and analysis of variance testing.

Results: Fifty-eight patients (74.1% male, 82.8% diabetes, 74.1% hypertension, 29.3% renal disease, and 39.6% tobacco use) with 71 lower extremities underwent arterial duplex with PAT measurements for evaluation of PAD. 42% percent of the extremities had prior revascularizations and 22.5% had prior podiatric interventions. 39% presented with rest pain or foot wounds, while 28% had claudication and 31% were asymptomatic. While ABI and AP did demonstrate a negative correlation with maximum, minimum, and average PAT values, TP and TBI also demonstrated negative correlation to individual pedal PAT, the strongest correlation being with maximum (TP $r(64) = -.51$, $p < .001$, TBI $r(64) = -.48$, $p < .001$) and average (TP $r(64) = -.51$, $p < .001$, TBI $r(64) = -.47$, $p < .001$) PAT values. ABI, AP, TBI, and TP did not correlate with angiosome PAT for limbs with foot wounds. There was no significant correlation between symptoms and PAT.

Conclusions: Pedal acceleration time increases with decreased ABI, AP, TP and TBI, thus may be an alternative metric for assessing limb ischemia severity, especially in those with highly calcified tibial and pedal arteries.

Author Disclosures: **A. Pyun:** Nothing to disclose; **D. Armstrong:** Nothing to disclose; **G. Magee:** Nothing to disclose; **K. Ziegler:** Nothing to disclose; **T. Khan:** Nothing to disclose; **R. Akay:** Nothing to disclose; **S. Han:** Nothing to disclose; **V. Rowe:** Nothing to disclose

17. **PREDICTORS OF AMPUTATION-FREE SURVIVAL AND WOUND HEALING AFTER INFRAINGUINAL BYPASS WITH ALTERNATIVE CONDUITS**

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Objective: Inadequate vein quality or prior harvest precludes use of autologous single segment greater saphenous vein (ssGSV) in many patients with CLTI. How clinical characteristics and use of alternative (non-ssGSV) conduits relate to patient outcomes after infrainguinal bypass is not well understood. We hypothesized that limb presentation, bypass target, and conduit type would be associated with amputation-free survival (AFS) after infrainguinal bypass using alternative conduits.

Methods: A single center retrospective study (2013-2020) was performed including 139 CLTI patients undergoing infrainguinal bypass with cryopreserved GSV (Cryo) (n=71), PTFE (n=23), or arm/spliced vein (n=45). Characteristics, WIFI stage, and outcomes were recorded. Multivariable cox proportional hazards and classification and regression tree analysis (CART) modeled predictors of AFS.

Results: Mean age was 71 years, 59% were male, and 51% were non-elective. More patients undergoing bypass with Cryo were WIFI stage 4 (41%) compared to PTFE (13%) or arm/spliced vein (27%) (p=0.04). Across groups, AFS was 80% for spliced/arm, 83% for PTFE, and 61% for cryovein (adjusted hazard ratio [aHR] for cryovein: 2.7, p=0.01) (Figure 1).

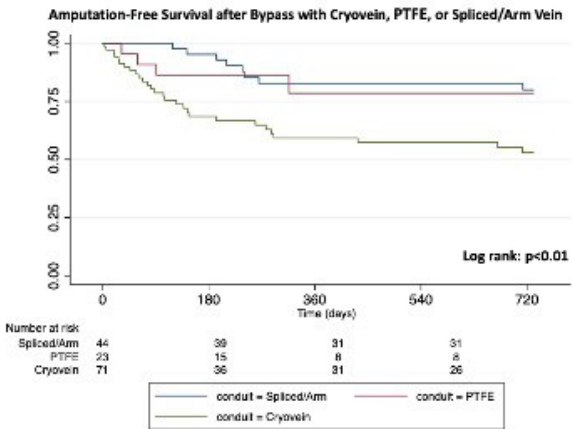


Figure 1. Kaplan Meier estimates for time to major amputation or death (amputation-free survival) after infrainguinal bypass with spliced/arm vein, PTFE, or cryovein.

SCIENTIFIC SESSION ABSTRACTS continued

Additional multivariable predictors of poor AFS included bypass to a distal target (n=81 tibial/peroneal and n=5 pedal) (aHR 2.1, p=0.05), CKD-5 (aHR 3.5, p<0.01), and a trend for WIfI stage 4 (aHR 4.3, p=0.06). Among Cryo bypass patients, CART showed that WIfI stage 3 or 4, age>70, and prior failed bypass were predictive of the lowest AFS at 2 years of 36% vs AFS of 58-76% among subgroups with <2 of these factors (Figure 2).

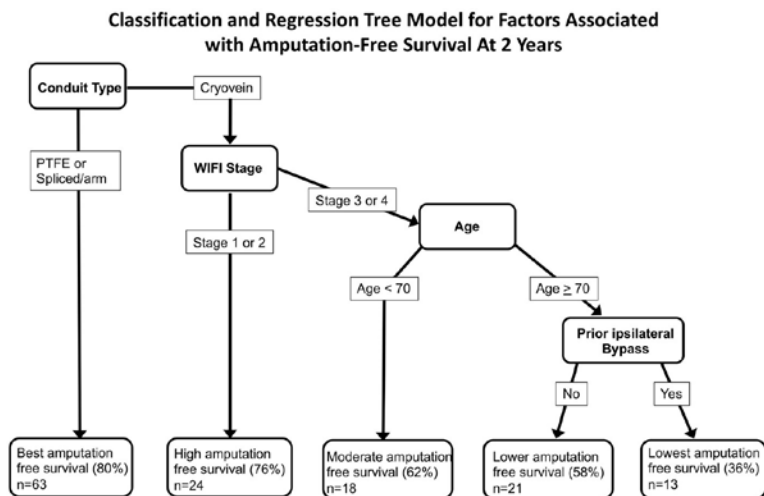


Figure 2. Gini coefficient used to determine splits with cost complexity pruning to develop the optimal trimmed classification tree. Data was divided into a training set (90%) and a test set (10%) for validation purposes. Area under the receiver operator characteristic curve=0.80

While secondary patency at 2 years was worse in the Cryo group (43% vs 77% in arm/spliced and PTFE groups, p<0.01), in patients with tissue loss, 72% of wounds healed in the Cryo group vs 87% in the other groups (p=0.12).

Conclusions: In patients with CLTI lacking suitable ssGSV, bypass with autogenous arm/spliced vein is superior to Cryo; data beyond one year are limited with PTFE conduits especially for distal targets. Despite poor patency with Cryo, wound healing is achieved in a majority of patients. However, Cryo should be used with caution in older patients with high WIfI stage and prior failed bypass given the low rates of amputation free survival.

Author Disclosures: **Z. Matthay:** Nothing to disclose; **E. Smith:** Nothing to disclose; **R. Gutierrez:** Nothing to disclose; **W. Gasper:** Nothing to disclose; **J. Hiramoto:** Nothing to disclose; **L. Reilly:** Nothing to disclose; **M. Conte:** Nothing to disclose; **J. Iannuzzi:** Nothing to disclose

18. **RADIAL ARTERY ACCESS IS A SAFE ALTERNATIVE TO BRACHIAL ARTERY AND FEMORAL ARTERY ACCESS FOR ENDOVASCULAR LOWER EXTREMITY PERIPHERAL ARTERIAL DISEASE** Steven Maximus, MD, Mimmie Kwong, MD, Matthew Mell, MD
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Objective: Radial artery access is a technique proven to be safe in percutaneous cardiac intervention. It has been used with increased frequency in the treatment of lower extremity peripheral arterial disease (LE-PAD); however, the overall safety has not yet been well described in vascular surgery literature. We sought to evaluate the safety of this technique compared with retrograde femoral artery access and brachial artery access in the treatment of PAD.

Methods: The Vascular Quality Initiative Database was used to identify all patients who underwent single site percutaneous access (retrograde femoral access (FA), brachial artery access (BA), radial access (RA)) for treatment LE-PAD from September 2016 through September 2019. Patients who underwent multiple access sites for intervention were excluded. Primary outcome was significant access site complications (ASC), defined as those requiring treatment (blood transfusion, interventional treatment, or surgical treatment). Minor ASC were also reported.

Results: The cohort comprised 61,203 patients (270 RA, 1,210 BA, and 59,723 FA) with an average age of 69 +/- 11 years and 59.6% male. RA and BA Radial and brachial access groups had higher rates of prior endarterectomy or bypass compared with FA (66.7% RA, 86.0% BA, 50.2% FA; $p < .001$). RA was more often utilized for treatment of single segments (82% vs. 74%; $p < .020$ and aortoiliac arterial segments (59.6% vs. 21.0%; $p < .001$). ASC occurred in 1329 (2.7%), including minor ASC (996, (1.6%) and significant ASC (333, 0.54%). Significant ASC were less common after FA and RA compared with BA (RA 1 (0.37%), FA 307 (0.51%), BA 25 (2.1%) BA, $p < .001$). On multivariate analysis BA was the strongest predictor of significant ASC (OR 2.77, 95% CI 1.74-4.40, $p < .001$). Risk for significant ASC was no different after RA compared with FA (OR 0.74, 95% CI 0.10 - 5.29, $p = .8$). Other factors independently associated with significant ASC were sex, age, diabetes, COPD, dialysis, and closure device usage (TABLE).

Conclusions: Primary radial artery access vessel for endovascular treatment of lower extremity peripheral arterial disease is safe when compared with other traditional access sites. When femoral access is not possible or desirable, radial approach may be suitable for treatment with a better safety profile than brachial access.

SCIENTIFIC SESSION ABSTRACTS continued

MULTIVARIATE ANALYSIS OF FACTORS ASSOCIATED WITH SIGNIFICANT ACCESS SITE COMPLICATIONS

Factor		Odds Ratio	95% Confidence Interval	p-value
Access Site	Femoral		Referent	
	Brachial	2.77	1.74 – 4.40	<.001
	Radial	0.74	0.10 – 5.29	.8
Male sex		0.50	0.40 – 0.63	<.001
Age		1.02	1.005 – 1.03	.005
COPD		1.35	1.05 – 1.72	.018
Diabetes		0.74	0.58 – 0.94	.013
Dialysis		1.63	1.14 – 2.33	.008
Use of closure device		0.62	0.49 – 0.79	<.001

Adjusted for cardiac disease, protamine use, body mass index, anti-platelet use, smoking, race

COPD: chronic obstructive lung disease

Author Disclosures: **M. Mell:** Nothing to disclose; **M. Kwong:** Nothing to disclose; **S. Maximus:** Nothing to disclose

19. PERCUTANEOUS PROXIMAL AXILLARY ARTERY ACCESS VERSUS FEMORAL ARTERY ACCESS FOR AORTIC AND PERIPHERAL ENDOVASCULAR INTERVENTIONS

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Objective: This study's objective is to describe and illustrate the technique of ultrasound guided percutaneous proximal axillary artery access (AA), and secondarily to evaluate the versatility and safety of this approach in endovascular interventions.

Methods: This is a single-centre retrospective review of endovascular interventions using either AA or femoral artery (FA) access between January 2019 and February 2021. Access entry success, complications, major adverse events, and procedural details were analyzed.

Results: A total of 115 procedures were completed, with 59 AA and 56 FA accesses. Demographics were not significantly different with the exception of BMI, which was 27.03 kg/m² for AA access and 24.70 kg/m² for FA access ($p=0.03$). Access success was achieved in 58 (98.3%) and 56 (100%) of AA and FA accesses, respectively ($p=1.000$). There were no significant differences in access-site complications (13.6% vs. 7.1%, $p=0.2598$) (Table 1) nor major adverse events (10.2% vs. 8.9%, $p=1.000$) between the AA and FA groups. Overall, 140 vessels were intervened on from the AA approach, and 114 from FA access. There were no significant differences in the mean number of vessels intervened on per case between groups (2.37 ± 1.10 vs. 2.02 ± 0.90 , $p=0.0603$) (Table 2). A wide range of target vessels were intervened on in both groups including the subclavian artery, aorta, mesenteric and renal vessels, and all major lower extremity vessels. There were statistically significantly more interventions completed on celiac (6.4% vs. 0.9% $p=0.024$) and superior mesenteric (5.7% vs. 0.9% $p=0.0445$) vessels from the AA approach. AA cases had significantly more bilateral cases (28.8% vs. 12.5%, $p=0.00394$) (Table 2). AA access had a significantly longer mean procedure time (103.2 min vs. 57.9 min, $p<0.001$) and fluoroscopy time (18.2 min vs. 12.9 min, $p=0.024$).

Conclusions: The AA is a feasible, versatile, and safe percutaneous access option for endovascular intervention.

SCIENTIFIC SESSION ABSTRACTS continued

Table 1: Access-site related complications among patients who underwent axillary or femoral access

Complication	Axillary Artery Access n=59 (%)	Femoral Artery Access n=56 (%)	p-value
Hematoma	5 (8.5)	1 (1.8)	0.2116
Pseudoaneurysm	1 (1.7)	2 (3.6)	0.6119
New limb ischemia	0 (0)	1 (1.8)	0.4870
Dissection	1 (1.7)	0 (0)	1.0
Failed access	1 (1.7)	0 (0)	1.0
Arteriovenous fistula	0 (0)	0 (0)	1.0
Neurologic complication	0 (0)	0 (0)	1.0
Total access-site related complications	8 (13.6)	4 (7.1)	0.2598

Table 2: Procedural details among patients who underwent axillary or femoral artery access

Procedural Details	Axillary Artery Access n=59 (%)	Femoral Artery Access n=56 (%)	p-value
1 vessel procedure	15 (25.4)	20 (35.7)	0.3108
2 vessel procedure	18 (30.5)	16 (28.6)	0.8409
3 vessel procedure	17 (28.8)	18 (32.1)	0.8396
4 vessel procedure	7 (11.9)	2 (3.6)	0.1636
5 vessel procedure	2 (3.4)	0 (0)	0.4960
Mean number of vessels intervened on	2.37 (1.10)	2.02 (0.90)	0.0603
Left leg interventions only	12 (20.3)	27 (48.2)	0.0029
Right leg interventions only	11 (18.6)	19 (33.9)	0.0886
Bilateral leg interventions	17 (28.8)	7 (12.5)	0.0039

Author Disclosures: **A. Mordhorst:** Nothing to disclose; **T. Yan:** Nothing to disclose; **J. Gagnon:** Nothing to disclose; **K. Kazemi:** Nothing to disclose

20. THE VASCULAR QUALITY INITIATIVE (VQI) CHRONIC LIMB-THREATENING ISCHEMIA MORTALITY PREDICTION MODEL UNDERESTIMATES MORTALITY AFTER INFRAINGUINAL REVASCULARIZATION

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Objective: Perioperative mortality remains high in patients undergoing revascularization for chronic limb-threatening ischemia (CLTI). To facilitate decision-making, a mortality prediction model derived from the VQI database has stratified patients into low, medium, and high risk, defined as a 30-day and 2-year mortality of $\leq 3\%$ and $\leq 30\%$, 3-5% or 30-50%, and $\geq 5\%$ or $\geq 50\%$, respectively. The purpose of this study was to compare expected mortality derived from this model with observed outcomes in a tertiary center.

Methods: Consecutive patients treated between 2016 and 2019 were analyzed. Baseline demographics, approach, and mortality events were reviewed. Observed mortality was obtained using life-table methods and compared using a log-rank test. Expected mortality was calculated using the VQI model.

Results: This cohort consisted of 195 revascularized limbs in 169 patients stratified into 128 (66%) low, 50 (26%) medium, and 17 (8%) high-risk limbs based on the VQI model. 90% of revascularizations were performed for tissue loss. Compared with the VQI population, comorbidities were prevalent and included unstable angina or myocardial infarction within 6 months (6% vs. 2.4% in VQI; $p < 0.001$), congestive heart failure (30% vs. 23%; $p = 0.018$), and dialysis dependence (15% vs. 0.9%; $p < 0.001$). Patients were also older (31% vs. 21% > 80 years old; $p < 0.001$) and frailer (45% vs. 64% independent; $p < 0.001$). High-risk patients were more prevalent in the endovascular group (11% of 132 endovascular interventions vs. 3% of 63 bypasses; $p = 0.056$). The VQI model adequately stratified the studied population into risk groups ($p = 0.007$), but observed mortality was not significantly different between medium and high-risk ($p = 0.339$; Figure 1). 30-day observed mortality exceeded expected mortality in all groups (4.1% \pm 0.7% vs. 1.8% \pm 0.1% for low; 8.1% \pm 1.8% vs. 4.7% \pm 0.2% for medium; and 18.2% \pm 4.8% vs. 11.9% \pm 0.9% for high risk). Observed mortality at 2-years in the medium-risk group (43.5% \pm 6.3%) was similar to that of high-risk patients (45.1% \pm 27.4%; Figure 2).

Conclusions: The VQI CLTI mortality prediction model discriminates mortality risk after revascularization. However, it was not well calibrated for the medium-risk group and may underestimate mortality in a tertiary referral population with higher comorbidity burden.

SCIENTIFIC SESSION ABSTRACTS continued

Figure 1. Observed survival after infrainguinal revascularization (n=169) for chronic limb-threatening ischemia stratified by VQI CLTI mortality risk prediction model ($p=0.007$ between low, medium, and high-risk; $p=0.339$ between medium and high-risk)

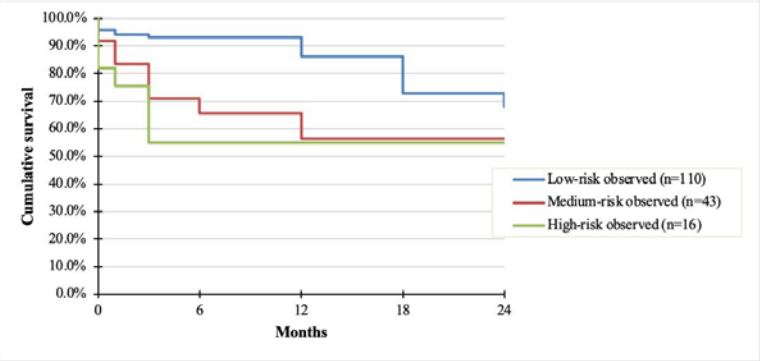
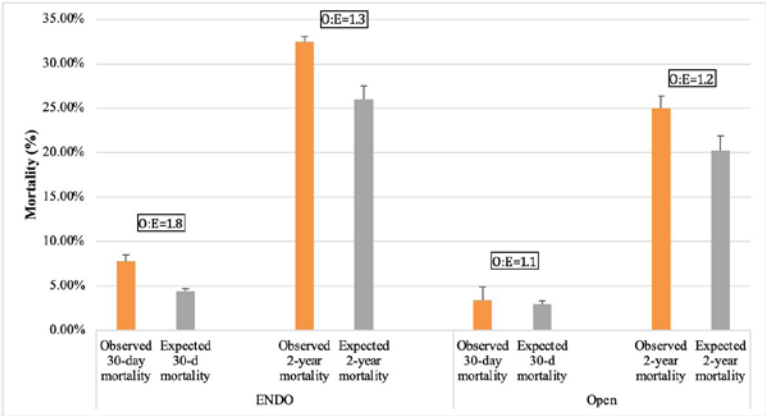


Figure 2. Observed vs. expected mortality plot (mean±standard error from the mean) after endovascular and open revascularization, based on VQI CLTI mortality model calculations with O:E ratios



Author Disclosures: **R. El Khoury:** Nothing to disclose; **B. Wu:** Nothing to disclose; **S. Kupiec- Weglinski:** Nothing to disclose; **L. Eyler:** Nothing to disclose; **E. Lancaster:** Nothing to disclose; **J. Hiramoto:** Nothing to disclose; **S. Vartanian:** Nothing to disclose; **P. Schneider:** Nothing to disclose; **J. Simons:** Nothing to disclose; **M. Conte:** Nothing to disclose

21. IMPACT OF SCALENE MUSCLE BOTULINUM TOXIN INJECTION WITH AND WITHOUT SURGERY IN NEUROGENIC THORACIC OUTLET SYNDROME

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Objective: Scalone blocks are part of both the diagnostic and treatment algorithm for patients presenting with symptoms of neurogenic thoracic outlet syndrome (nTOS). However, there is a paucity of data on the utility of scalene botulinum toxin injection (BTI) prior to surgical decompression. We sought to determine the therapeutic impact of botulinum toxin (Botox) scalene chemodenervation, with and without surgery, at a multidisciplinary referral center.

Methods: A retrospective chart review of consecutive patients who had scalene muscle BTI for nTOS was performed. Demographics, treatment details, and outcomes of those who had BTI alone were compared to those who had BTI followed by supraclavicular first rib resection and neurolysis.

Results: From 2000 to 2020, 77 patients (47 female, 61%), with a mean age of 31.4 years, had BTI for symptoms of nTOS. Overall, 26% were collegiate athletes, 62.3% had chronic symptoms, and 26% had a history of head and neck orthopedic injuries. All patients initially underwent physical therapy for a mean duration of 3.4 months prior to BTI. 72.7 % had dynamic vascular compression on duplex ultrasound with provocative maneuvers and 85.7% had a positive physical exam finding based on SVS guidelines. After BTI, 90.9% reported subjective relief, confirmed by improved QDASH disability score. 31 patients (40.3%) then went on to have recurrent or persistent symptoms and proceeded with first rib resection. Of these, 93.3% had initially reported relief after BTI. A comparison of the BTI and the BTI+Surgery groups is shown in Figure 1. After BTI+Surgery, 96.8% reported symptomatic relief, and had a median QDASH score improvement of 21 (range: 10-40), with all reaching minimal clinically important differences (MCID) in QDASH score after combination therapy.

Conclusions: This is the largest reported series of scalene chemodenervation with botulinum toxin in nTOS patients. In this cohort, BTI was helpful in alleviating symptoms prior to definitive surgical decompression. BTI followed by first rib resection provided additional symptom improvement over BTI alone. Further research is needed to identify which patients undergoing BTI would benefit from subsequent surgical intervention.

SCIENTIFIC SESSION ABSTRACTS continued

Patients who underwent botulinum toxin injection with and without surgery

Variable		BTI alone (N=46)	BTI+ Surgery (N=31)	P-value
Sex	Female	60.9% (28)	61.3% (19)	0.97
	Male	39.1% (18)	38.7% (12)	
Age at presentation (mean \pm SD)		33.2 \pm 13	29.9 \pm 11.1	0.252
Collegiate varsity athletes		26.1% (12)	25.8% (8)	0.978
Prior head and neck orthopedic injury		21.7% (10)	32.3% (10)	0.302
Symptom duration (years median, IQR)		0.6 (0.02-1.42)	1 (0.05-1.5)	0.436
QDASH before BTI (median, IQR)		43 (29.5-55)	56 (43-65)	0.029*
Positive physical exam finding		80.4% (37)	93.6% (29)	0.107
Dynamic vascular compression on ultrasound		78.6% (33)	82.1% (23)	0.714
Anterior scalene area on ultrasound (cm ²)		1.11 (1.02-1.29)	0.94 (0.77-1.2)	0.041*
Duration of physical therapy prior to BTI (months mean \pm SD)		3.4 \pm 1.90	3.4 \pm 1.98	0.95
Completed Edgelow protocol		76.3% (29)	89.3% (25)	0.177
Botulinum toxin dose (units mean \pm SD)		46.5 \pm 7.1	45.5 \pm 5.7	0.851
Relief after BTI		72.7% (32)	93.3% (28)	0.026*
MCID QDASH Change after BTI		78.3% (18)	82.4% (14)	0.749

Author Disclosures: **A. Fereydooni:** Nothing to disclose; **V. Ho:** Nothing to disclose; **E. Olson:** Nothing to disclose; **P. Dyrek:** Nothing to disclose; **T. Harris:** Nothing to disclose; **A. Kussman:** Nothing to disclose; **E. Roh:** Nothing to disclose; **J. Lee:** Nothing to disclose

22. PAGET SCHROETTER PATIENTS WITH CHRONIC VENOUS OCCLUSION BENEFIT FROM SURGICAL DECOMPRESSION

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Objective: Management of Paget Schroetter syndrome (PSS) with first rib resection (FRR) and venoplasty is successful in re-establishing subclavian vein (SCV) patency in most cases. However, in cases with chronic venous occlusion SCV patency may not be achieved. Because of this, the role for FRR remains controversial in cases of chronic occlusion. Our goal is to determine whether FRR is beneficial in PSS patients with an occluded SCV.

Methods: A prospectively maintained thoracic outlet syndrome database was searched for patients undergoing FRR and who were identified as having SCV occlusion (OCC) on pre-operative venography between 2005-2020. These were compared to a contemporary group of patients who were identified as having patent/compressed veins prior to FRR (PAT). Pre-op and post-op venous patency was determined by venography. Standardized functional outcomes were assessed using QUICK Disability Arm, Shoulder, Hand (DASH), Somatic Pain Scale (SPS), and Derkash Outcome Score (DKS).

Results: Of 107 patients who met entry criteria, 30 (28%) were OCC; 77 (72%) were PAT. Average age was 33, with 56% male. Among the 30 OCC patients, 12 (33%) remained occluded and 18 were patent (66%) post-operatively. Of the 77 PAT patients, 11 (14%) were occluded and 66 (86%) were patent post-operatively.

OCC patients experienced significant improvement in DASH and SPS, all DKS outcomes were excellent and good, with none fair or poor.

Fig 1. DASH of OCC patients

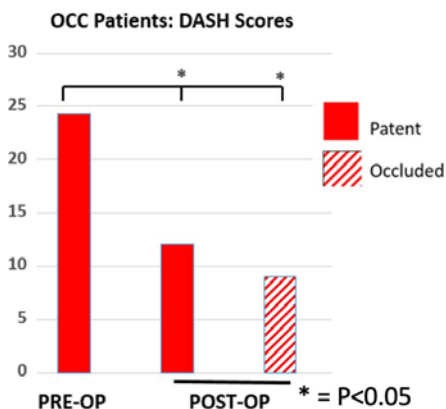
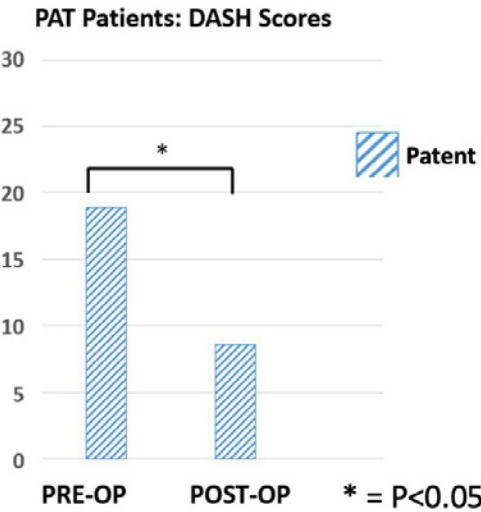


Fig 2. DASH of PAT patients



Pre-operative DASH and SPS were more severe in OCC than PAT: mean DASH=24.3 vs 18.8 and mean SPS=1.84 vs 1.71. When OCC final outcomes were compared with PAT, there was no significant difference: mean DASH 10.5 vs 8.6, mean SPS 0.5 vs .05, DKS Excellent 66% vs 84%, Good 16% vs 33%. The magnitude improvement was greater in OCC patients than PAT as recorded by DASH (64% vs 38%) and SPS (74% vs 69%).

Conclusions: Patients with pre-operative SCV occlusion benefit from surgical decompression regardless of whether venous patency is successfully re-established or not. Final outcomes for patients with pre-operatively occluded SCVs were equivalent to those with pre-operatively patent SCVs. These results indicate that all PSS patients treated with FRR derive significant improvement regardless of pre-operative SCV patency.

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23. PREDICTING DIALYSIS FISTULA MATURATION USING THE “RULE OF 6’S” - NOT ALL ARE CREATED EQUAL

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Objective: The Rule of 6’s (Ro6; flow volume >600 mL/min, vein diameter >6 mm, vein depth <6 mm) is a widely used informal guide to determine when an arteriovenous fistula (AVF) will support dialysis. We tested the utility of the Ro6 in clinical practice.

Methods: We retrospectively reviewed AVFs created at a single center from 2016-2019 in patients who received dialysis in the same network. For each AVF, we reviewed clinical records and postoperative ultrasound studies (including flow measurement) for Ro6 criteria.

Maturation was defined as use of the AVF with two needles for 75% of dialysis sessions over a continuous 4-week period with mean flow of 300 mL/min or Kt/V of 1.2. Predictors of maturation were assessed using logistic regression and receiver operating curves (ROCs) after stratifying AVFs by type. $P < 0.05$ was considered significant.

Results: 202 AVFs of 3 different types met inclusion criteria (radiocephalic $n=49$, brachiocephalic $n=87$, brachio basilic $n=66$). Maturation occurred in 150 (74%) AVFs [primary $n=101$ (50%); assisted $n=49$ (24%)] while 52 (26%) failed to mature. Maturation did not vary by AVF type, sex or diabetes status, but higher BMI was associated with failure to mature ($P=0.004$). For all types, ≥ 1 Ro6 criteria were satisfied in significantly more mature AVF than those that failed (55% v 36%; $P=0.009$). Only 16 (11%) mature AVF met all 3 Ro6 criteria but all mature AVF met >1 criteria. By multivariable analysis (Table 1), each Ro6 criterion was independently associated with maturation; if all 3 were met, the AVF was 10x more likely to be mature vs an AVF meeting no criteria. BMI correlated strongly with vein depth ($P < 0.001$) yet both characteristics independently predicted maturation. The chance of maturation was highest if flow and depth criteria were met (PPV=93), marginally better than if all 3 criteria were met (PPV=92; Table 2). ROC-area under curve (AUC) values for meeting flow volume and vein depth criteria together were slightly higher than if all 3 Ro6 criteria were met [also true for each AVF type (not shown)].

Conclusions: The Ro6 predicts AVF maturation but only a small minority of mature AVF meet all criteria. Flow volume and vein depth together predict maturation equally as well as meeting all 3 criteria. Vein diameter seems less important. Higher BMI is associated with failure independent of vein depth.

SCIENTIFIC SESSION ABSTRACTS continued

Table 1. Multivariable Logistic Regression - Independent Predictors of Functional AVF Maturation

Variable	OR	95% CI	P-value
Any Flow Volume >600 mL/min	6.77	3.09-14.86	<0.001
Any Depth <6mm	3.30	1.31-8.29	0.011
Any Diameter >6mm	4.05	1.53-10.76	0.005
All 3 Ro6 Criteria	9.80	4.40-21.82	<0.001
BMI	0.93	0.89-0.98	0.003
Age	1.01	0.98-1.04	0.581

Table 2. Test Characteristics and ROC-AUC Analysis for Functional AVF Maturation

Variable	Sensitivity	Specificity	PPV	NPV	ROC-AUC
Any Flow Volume >600 mL/min	80	73	90	56	0.765
Any Depth <6mm	87	44	82	54	0.655
Any Diameter >6mm	91	27	78	50	0.588
All 3 Criteria	68	83	92	47	0.754
Flow + Diameter Only	74	73	89	49	0.735
Flow + Depth Only	74	83	93	52	0.784
Diameter + Depth Only	77	67	87	51	0.732

Author Disclosures: **A. Hakim:** Nothing to disclose; **B. Brooke:** Nothing to disclose; **J. Beckstrom:** Nothing to disclose; **M. Sarfati:** Nothing to disclose; **L. Kraiss:** Nothing to disclose

24. REOPERATIVE ANTERIOR LUMBAR SPINE ACCESS IS FEASIBLE AND SAFE

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Objective: During the last two decades the number of anterior lumbar spine reconstructions have increased significantly, as have the need for revisions and treatment of adjacent levels. The objective of this study is to determine the feasibility of reoperative anterior lumbar spine exposure.

Methods: This is a retrospective analysis of patients who underwent a repeat anterior extraperitoneal exposure of the lumbar spine between January 2009 and March 2021. Cases were excluded if the reoperation occurred within one month of the index procedure or if the re-exposure was performed by a lateral approach. Demographic data and details about the operative procedure were analyzed.

Results: During the study period, 6130 procedures for anterior, oblique or lateral exposure of the lumbar spine were performed. Within this cohort, 137 anterior re-operations were performed on 135 patients (mean age 55.7, range 19-83). The mean BMI was 25.7 (range 17-43). The majority of operations were remote from the index disc level (61%). The main indications for reoperation were adjacent level disease (84), failed artificial disk (ADR) (25), and nonunion (16). The approach was via the contralateral retroperitoneal space in 74, ipsilateral in 61, both sides in one and retro- and trans-peritoneal in one. The median estimated blood loss of the 61 procedures performed without concomitant posterior reconstructions was 150 cc. (range 10-2050 cc). The procedure was aborted in 7 cases (5%) due to intraoperative anatomic findings. The levels successfully treated were L2-3 in 16, L3-4 in 26, L4-5 in 30, L5-S1 in 88 and L6-S1 in 1. ADR was performed at 33 levels and fusions at 128 levels. There were 2 minor ureteral injuries. Twenty venous injuries (15%) were primarily repaired. One patient required a venous stent for iatrogenic stenosis. Two internal iliac artery injuries were treated with ligation or repair. There was no mortality.

Conclusions: Reoperative anterior spine exposure is successful in 95% of cases with relatively low morbidity and no mortality. Primary exposure of the L5-S1 level should be performed in the right retroperitoneal space to preserve the left side for adjacent level exposure. Ureteral catheters are recommended to assist in identifying the ureters when ipsilateral retroperitoneal exposure is required.

Author Disclosures: **W. Wagner:** Nothing to disclose; **D. Cossman:** Nothing to disclose; **R. Rao:** Nothing to disclose; **A. Tulloch:** Nothing to disclose; **R. Haqq:** Nothing to disclose; **R. Moridzadeh:** Nothing to disclose

25. VASCULAR TRAINEE PERCEPTIONS OF DIVERSITY, EQUITY, AND INCLUSION WITHIN VASCULAR SURGERY TRAINING PROGRAMS

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Objective: Vascular Surgery training programs face multiple pressures, including attracting and retaining trainees. Current knowledge of trainees' view with respect to diversity and equity in vascular training programs is limited. We sought to understand US vascular surgery trainees' perceptions and expectations regarding diversity, equity, and inclusion.

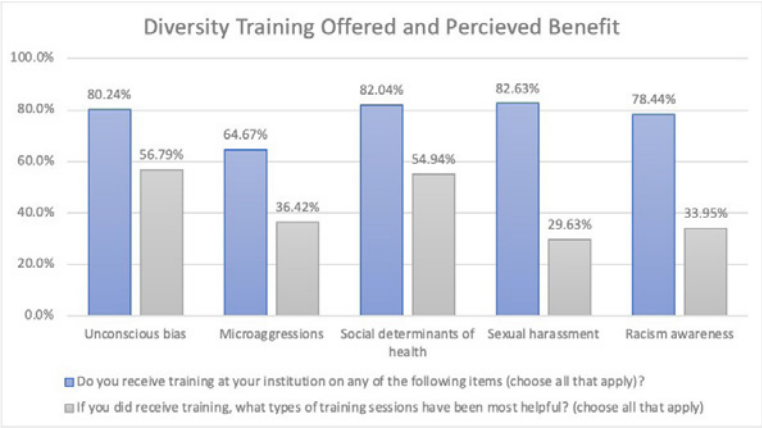
Method: The Association of Program Directors in Vascular Surgery (APDVS) designed and administered the Annual Training Survey to all trainees (Integrated Residents/Fellows, n= 637) at 122 institutions in August 2020.

Results: Of the 637 vascular trainees, 227 (35%) responded. The respondents included 115 male and 62 female trainees, with 50 not disclosing. The majority of respondents (96.9%) believed their programs incorporated a diverse background of trainees (Table I). 89.8% of trainees felt that the faculty were similarly comprised of a diverse background (Table I). The majority of respondents (63.6%) felt that their training program was both more diverse and focused on inclusion compared to other institutional training programs. However, 20% of respondents had experienced discrimination (Table I). 73% (n = 143) of trainees feel empowered to disagree or engage in a discussion should they observe a faculty member make a disparaging remark about a patient's background/race/gender. Although, 35 trainees expressed fear of retaliation as a reason to not engage. Trainees view their program director (82.6%), faculty mentor (60.9%), and GME office (52.7%) as potential resources for support. As shown in Figure 1, institutions are providing various trainings for diversity awareness. Overall, 83.7% (n=160) of trainees believe that their program has been more open to discussion of racial relations within the medical community.

Conclusions: Trainees are committed to multifaceted diversity and inclusion. The perception of trainees regarding these matters appears to be positive; however, trainees did describe discrimination and witnessing gender biases in their institution. Improving institutional education of faculty and trainees about

SCIENTIFIC SESSION ABSTRACTS continued

the multidimensional levels of diversity and how awareness and incorporation of this philosophy can assist in the recruitment of diverse vascular surgeons and will better serve our patient population.



Annual Training Survey of the Association of Program Directors in Vascular Surgery Views

Question	Gender	Age	Race/ Ethnic- ity	Background (rural vs. urban)	Regional Variation	LG- BTQ	Socioeco- nomic	Reli- gion	Other
	% (n)	% (n)	% (n)	% (n)	% (n)	% (n)	% (n)	% (n)	% (n)
Please describe the diverse back- ground of trainees (choose all that apply)	84.7 (177)	67.9 (142)	91.9 (192)	67.0 (140)	70.3 (147)	18.7 (39)	55.0 (115)	62.7 (131)	1.9 (4)
Please describe the diverse back- ground of faculty (choose all that apply)	82.1 (147)	92.7 (166)	18.9 (7)	64.8 (116)	63.7 (114)	14.0 (25)	36.9 (66)	57.5 (103)	2.8 (5)
Please describe the discrimina- tion you have experienced at your institution(choose all that apply)	67.6 (25)	18.9 (7)	18.9 (7)	13.5 (5)	-	-	10.8 (4)	10.8 (4)	-

Author Disclosures: **A. Gaffey:** Nothing to disclose; **E. Chou:** Nothing to disclose; **J. Bronson:** Nothing to disclose; **M. Shames:** Nothing to disclose; **M. Humphries:** Nothing to disclose; **G. Velazquez:** Nothing to disclose; **U. Sachdev-Ost:** Nothing to disclose; **W. Robinson:** Nothing to disclose; **N. Singh:** Nothing to disclose

26. ROLE OF IN-SITU FENESTRATION AS THE TECHNIQUE OF CHOICE FOR ENDOVASCULAR REPAIR OF RUPTURED THORACOABDOMINAL AND SUPRARENAL AORTIC ANEURYSMS AT A REGIONAL AORTIC CENTER

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Objectives: Emergent endovascular repair of suprarenal (SRAA) and thoracoabdominal aortic aneurysms (TAAA) poses a significant challenge due to branch vessel incorporation, time constraints and lack of dedicated devices. At our center, techniques to incorporate branch vessels have included parallel grafting (PG), physician modified endografts (PMEG), double-barrel/reversed iliac branch endoprosthesis (DB/rIBE), and in-situ fenestration (ISF) (Figure 1). This study describes our experience utilizing these techniques in ruptured SRAA and TAAA and their associated outcomes.

Methods: A retrospective review of patients who underwent endovascular repair of ruptured SRAA and TAAs from 2014-2021 with branch vessel incorporation was performed. Clinical presentations, intraoperative details, and postoperative outcomes of ISF were compared against the remaining techniques.

Results: Forty-two patients underwent endovascular repair for ruptured SRAA and TAAA, 18 of which received ISF. Seventy-two percent of ISF patients were hypotensive prior to surgery, compared to the other techniques (PMEG/PG/DB/rIBE) at 58%. The procedural times, fluoroscopy times and time from admission to surgery were similar between the two groups despite ISF incorporating more branch vessels than the other techniques (3.1 vs. 2.2 per patient). The rate of serious complications was 57% across all techniques, with postoperative renal dysfunction being most frequent. In-hospital mortality was 19% for all ruptures, and 25% for ruptures with hypotension. In-hospital mortality was the lowest with ISF (11% vs. 25%), and this advantage became more pronounced among hypotensive patients (8% vs 45%) (Table II). Later in the study period, ISF became more commonly utilized due to improved outcomes in patients with ruptured aneurysms (Figure 2).

Conclusions: While emergent endovascular repair of SRAA/TAAA remains a challenge, a number of techniques are available for expeditious treatment. Of these, ISF has become an attractive technique due to improved mortality and the ability to rapidly achieve hemorrhage control prior to branch vessel incorporation. These advantages were particularly apparent in ruptures with hypotension. Further experience is required to validate these encouraging initial results and assess durability.

SCIENTIFIC SESSION ABSTRACTS continued

Table I: Pre-operative characteristics and intraoperative details of ISF vs. other techniques

	ISF, N=18	PMEG+PG+DB/rIBE, N=24
Mean age, years (\pm StdDev)	73 (\pm 13)	72 (\pm 12)
Current smoker - N (%)	6 (33%)	7 (29%)
Maximum aortic diameter, mean mm (\pm StdDev)	85 (\pm 29)	70 (\pm 16)
Time from admission to repair, median hours (\pm StdDev)	10.4 (\pm 118)	9.7 (\pm 116)
Hypotensive prior to surgery - N (%)	13 (72%)	11 (58%)
Procedural time, mean minutes (\pm StdDev)	261 (\pm 132)	287 (\pm 168)
Fluoroscopy time, mean minutes (\pm StdDev)	70 (\pm 48)	62 (\pm 38)
Contrast used, mean mL (\pm StdDev)	119 (\pm 42)	176 (\pm 114)
Mean branch vessels incorporated/patient (\pm StdDev)	3.1 (\pm 1.0)	2.2 (\pm 1.3)
Patients who required coverage of \geq 1 branch vessel - N (%)	6 (33%)	12 (50%)

Table II: Postoperative outcomes of ISF vs. other techniques

	ISF, N=18	PMEG+PG+DB/rIBE, N=24
In-hospital mortality - N (%)	2 (11%)	6 (25%)
In-hospital mortality among patients with hypotension - N (%)	1/13 (8%)	5/11 (45%)
Postoperative MI - N (%)	1 (6%)	1 ^a (5%)
Respiratory failure - N (%)	4 (22%)	5 ^a (23%)
Renal dysfunction - N (%)	10 (56%)	9 ^a (41%)
Postoperative SCI - N (%)	4 (22%)	1 ^a (5%)
Stroke - N (%)	1 (6%)	1 ^a (5%)
Bowel ischemia - N (%)	1 (6%)	4 ^a (18%)
Decompressive laparotomy - N (%)	1 (6%)	4 (17%)
Patients who required reintervention - N (%)	11 (61%)	12 ^a (55%)

a: N = 22 due to intraoperative mortality

Figure 1: Various endovascular branch incorporation techniques used for ruptured TAAA and SRAA repair at our center. Physician modified endograft (A), in-situ fenestration (B), double barrel excluder/reversed iliac branch endoprosthesis (C), parallel grafting (D)

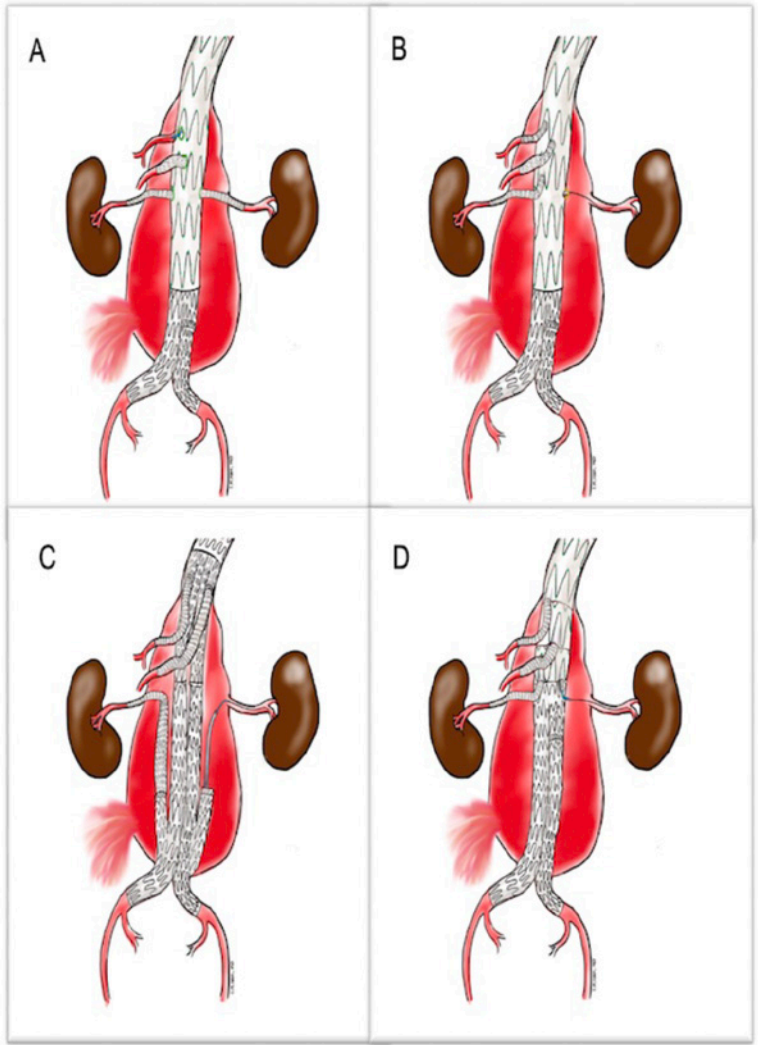
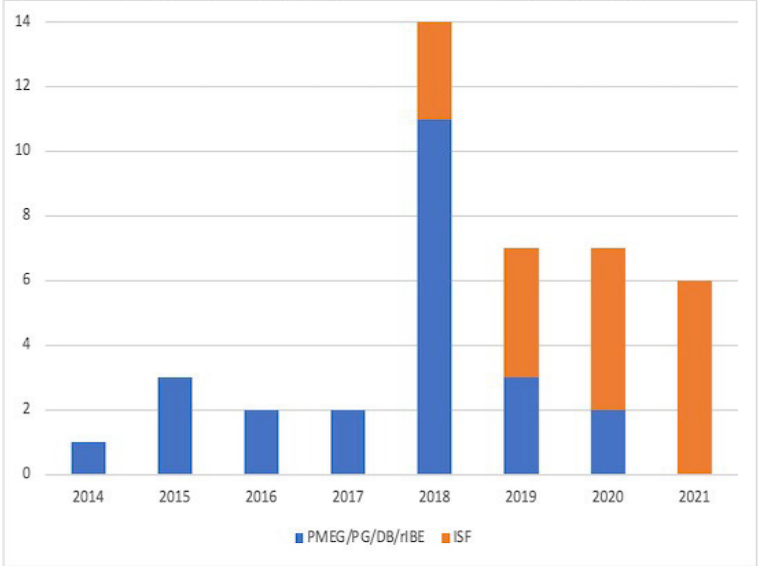


Figure 2: Endovascular techniques utilized for ruptured TAAA/SRAA over time



Author Disclosures: **H. Potter:** Nothing to disclose; **G. Magee:** Nothing to disclose; **A. Pyun:** Nothing to disclose; **M. Manzur:** Nothing to disclose; **F. Weaver:** Nothing to disclose; **K. Ziegler:** Nothing to disclose; **J. Paige:** Nothing to disclose; **S. Han:** Nothing to disclose

27. SHAGGY AORTIC SCORE IS ASSOCIATED WITH POSTOPERATIVE LOWER EXTREMITY WEAKNESS AFTER BRANCHED ENDOVASCULAR AORTIC ANEURYSM REPAIR

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Objective: Paraplegia is one of the most feared complications after thoracoabdominal aortic aneurysm (TAAA) repair. The purpose of this study is to determine whether aortic thrombus characteristics are associated with lower extremity weakness (LEW) after branched endovascular aneurysm repair (BEVAR).

Methods: From 4/2011-4/2020, 62 patients underwent elective BEVAR for TAAA and pararenal aortic aneurysms using a low-profile device and had a pre-operative computed tomography angiography of the aorta from the sinotubular junction to the aortic bifurcation. Aortic thrombus was evaluated for: thrombus thickness ≥ 5 mm, thrombus $> 2/3$ of aortic circumference, and presence of ulcer-like thrombus. One point was assigned at each 5mm axial image if all 3 criteria were met, resulting in a total “shaggy score” for the entire aorta (Figure 1). Data on demographics, procedural details, and outcomes were collected prospectively. All patients underwent a standard spinal cord protection protocol, including routine cerebrospinal fluid drainage. In 7/2016, an insulin infusion protocol (IIP) was initiated to maintain postoperative blood glucose levels <120 mg/dL for 48 hours. The primary clinical endpoint was postoperative lower extremity weakness (LEW).

Results: 10 (16%) patients developed postoperative LEW: 6 with transient paraparesis, 2 with persistent paraparesis, and 2 with persistent paraplegia. Patients with LEW were older, had higher shaggy scores, and were less likely to have been on an IIP (Tables 1, 2). There were no significant differences in demographics, aneurysm type, or operative parameters. In a logistic multivariate regression model for LEW, age [OR 1.2 (1.1-1.4), $p=0.02$] and shaggy score [OR 1.2 (1.1-1.4), $p=0.02$] were independently associated with increased risk of LEW, while treatment with the IIP was associated with lower risk of LEW [OR 0.04 (0.006-0.50), $p=0.05$]. Of the individual components of the shaggy score, higher descending thoracic aortic ulcer scores were the most strongly associated with postoperative LEW ($p=0.009$).

Conclusions: Preoperative characterization of aortic wall thrombus is an important adjunctive tool for individualized clinical decision making and patient counseling about risk of LEW after BEVAR.

SCIENTIFIC SESSION ABSTRACTS continued

Table 1. Preoperative characteristics and univariate association with LEW

	Total Cohort(n=62)	LEW(n=10; 16%)	No LEW(n=52; 84%)	p-value
Age (years)	72.4 ± 8.3	78.6 ± 6.1	71.3 ± 8.2	0.005
Sex = Male	45 (72%)	9 (90%)	36 (69%)	0.33
Heart disease	41 (66%)	7 (70%)	34 (65%)	1
Diabetes	11 (18%)	2 (20%)	9 (17%)	1
Prior stroke/TIA	10 (76%)	2 (20%)	8 (15%)	1
Smoking history (any)	57 (92%)	10 (100%)	47 (90%)	0.70
Shaggy score	4.9 ± 5.9	9.3 ± 7.5	4.1 ± 5.2	0.06
Crawford type 4 TAAA and pararenal aortic aneurysm	28 (45%)	4 (40%)	24 (46%)	0.99

Table 2. Operative factors of patients and univariate association with LEW

	Total Cohort(n=62)	LEW(n=10; 16%)	No LEW(n=52; 84%)	p-value
Fluoroscopy time (min)	124 ± 39	130 ± 40	123 ± 39	0.62
Contrast volume (mL)	122 ± 53	133 ± 46	120 ± 55	0.43
Estimated blood loss (mL)	450 ± 411	439 ± 237	453 ± 437	0.89
Surgery duration (min)	387 ± 101	413 ± 98	382 ± 102	0.38
Postoperative insulin infusion protocol	27 (44%)	1 (10%)	26 (50%)	0.047

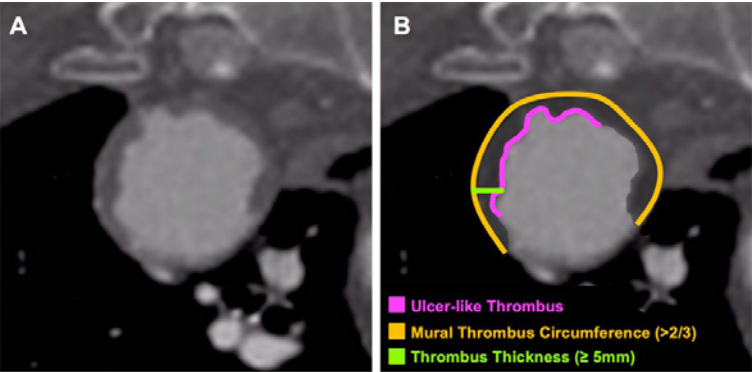


Figure 1. Aortic thrombus was evaluated for maximal thrombus thickness ≥ 5 mm, mural thrombus $> 2/3$ of aortic circumference, and presence of ulcer-like thrombus. The shaggy score was calculated from (A) preoperative CT imaging based on these components, and (B) 1 point was assigned to each axial image at 5 mm intervals if all 3 criteria were met, and a total shaggy score was reported for the entire aorta.

Author Disclosures: C. Huynh: Nothing to disclose; I. Liu: Nothing to disclose; L. Menke: Nothing to disclose; L. Reilly: Nothing to disclose; W. Gasper: Nothing to disclose; J. Hiramoto: Nothing to disclose

28. COST EFFECTIVENESS OF COMPUTED TOMOGRAPHY VERSUS ULTRASOUND-BASED SURVEILLANCE FOLLOWING ENDOVASCULAR AORTIC REPAIR OF INTACT ABDOMINAL AORTIC ANEURYSMS

Vy T. Ho, MD, Ann T. Nguyen, BS, Jordan R. Stern, MD, Steven M. Asch, MD MPH, Douglas K. Owens, MD, MS, Joshua A. Salomon, PhD, Ronald L. Dalman, MD, Jason T. Lee, MD. *Stanford University, Stanford, CA, USA.*

Objectives: While Society for Vascular Surgery guidelines recommend computed tomography angiography (CTA) or ultrasound for surveillance following endovascular aortic repair (EVAR), there no consensus regarding optimal timing and modalities. The differential costs, risks, and diagnostic utility of CT angiogram (CTA), color duplex ultrasound (CDU), and contrast enhanced ultrasound (CEU) merit cost-effectiveness analysis to estimate the outcomes of various strategies.

Methods: We developed a decision tree with nested Markov models to compare 5 strategies: yearly CTA, yearly CDU, yearly CEU, CTA at first year followed by CDU, and CTA at first year followed by CEU. We undertook a literature review to estimate model parameters, which included test sensitivity, specificity, risk of acute kidney injury following CTA, baseline mortality risk, and baseline healthcare costs (Figure 1). The model was implemented on a monthly cycle over a 30-year time horizon for a 74-year-old male, with a willingness-to-pay threshold of \$50,000 per quality-adjusted life year (QALY) and 3% annual discount.

Results: Under base case assumptions, the hybrid CTA-CDU strategy is cost-effective with a lifetime cost of \$77950 for 7.74 QALYs (Figure 2). A CDU only strategy yielded fewer QALYs (7.58) at reduced cost (\$78460), but the incremental benefit of pursuing a CTA-CDU strategy was below the willingness to pay threshold (\$3130/QALY). All other strategies yielded fewer QALYs for increased cost. In sensitivity analyses, the hybrid CTA-CDU strategy was cost-effective when CEU specificity was less than 95%, and up to a 20% incidence of acute kidney injury following CT scan. At diagnostic sensitivities below 75% for CEU and 55% for CDU, a yearly CTA strategy maximized QALYs.

Conclusion: An EVAR surveillance strategy in which CTA is performed in the first year and CDU is performed annually thereafter is cost-effective under base case assumptions.

Sensitivity analyses favored this approach up to a 20% risk for contrast-induced nephropathy, at which point a CDU only strategy is cost-effective. Conversely, if the sensitivity of CEU and CDU are at the lower end of plausible estimates, a strategy of yearly CT is reasonable. Further research should model additional patient features to inform an individualized surveillance strategy.

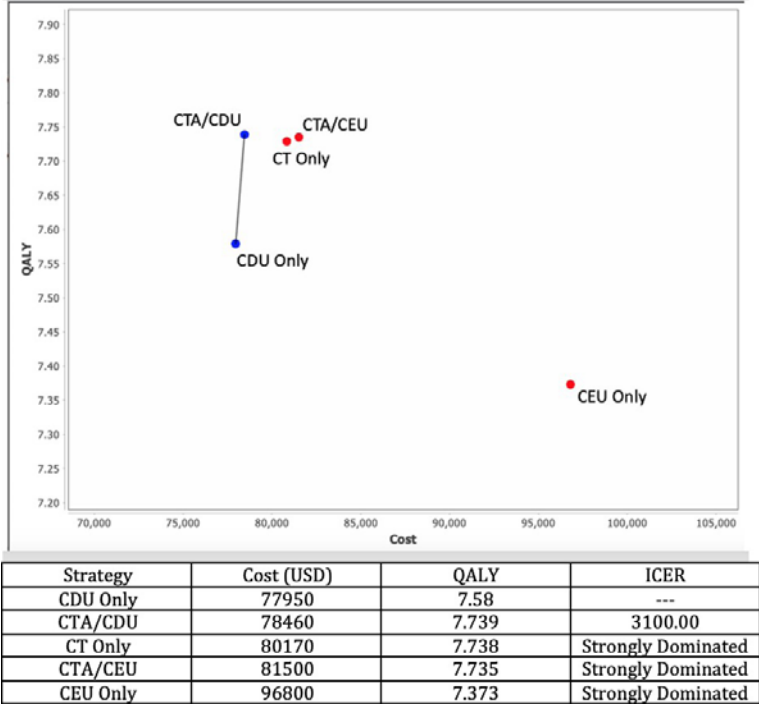
SCIENTIFIC SESSION ABSTRACTS continued

Figure 1. Parameters included in base-case scenario analysis with sources.

PARAMETER	VALUE	SOURCE
Diagnostic Features		
CTA sensitivity	0.7	Systematic review and meta-analysis of CEU/CDU/CTA for detection of endoleak (Karthesalingam et al, 2012)
CTA specificity	0.98	
CEU sensitivity	0.96	
CEU specificity	0.85	
CDU sensitivity	0.74	
CDU specificity	0.94	
Costs (yearly, inflation-adjusted to 2020)		
CTA (Hospital)	\$806	Medicare Procedure Lookup, Physician Fee Schedule
CEU (Hospital)	\$636	
CDU (Hospital)	\$514	
Unnecessary Surgery	\$17,152	Retrospective cohort study of 13995 EVAR patients for Medicare costs (Columbo et al, 2019)
Surgery	\$22,165	
Baseline Healthcare Costs	Table by Age	National Bureau of Labor Statistics
Acute Kidney Injury	\$2,034.91	Retrospective cohort study, median costs for patients with AKI not requiring dialysis (Silver et al, 2017)
QALYs (Monthly)		
Baseline	0.064	QOL survey data from EVAR-1 RCT (Brown et al, 2012)
Acute Kidney Injury (5 days treatment)	-0.009	Prior EVAR vs. open CEA accounting for renal failure not on dialysis (Blackhouse et al, 2009)
Reintervention	-0.02	QOL survey data from EVAR-1 RCT (Brown et al, 2012)
Transition Probabilities (Monthly)		
No Cx -> Detected Cx (Surv)	0.021	Long-term outcomes of EVAR-1 RCT (Patel et al, 2018)
No Cx -> Detected Cx (Surg)	0.003	
No Cx -> Death	Life Table	National Vital Statistics Report
Detected Cx (Surv) -> Detected Cx (Surg)	0.226	Long-term outcomes of EVAR-1 RCT (Patel et al, 2018)
Surveillance -> No Cx	0.773	
Surveillance -> AAA-related Death	0.0002	Expert opinion
Surgery -> Surveillance	0.79	
Surgical Death from Necessary Surgery	0.001	Long-term outcomes of EVAR-1 RCT (Patel et al, 2018)
Surgical Death from Unnecessary Surgery	0.0001	
Untreated Surgical Cx -> AAA-related Death	0.0008	Retrospective cohort study of emergent intervention in non-compliant imaging patients (Jones et al, 2007)
Hazard Ratio for Undetected Cx	12	
Surveillance -> AKI	0.004	Incidence of AKI Post CT (Weisbord et al, 2008)

SCIENTIFIC SESSION ABSTRACTS continued

Figure 2. Cost-effectiveness diagram demonstrating the relative costs and QALYs associated with each strategy. The blue strategies maximize QALY and minimize costs, with CTA/CDU being cost-effective per the willingness to pay threshold.



Author Disclosures: V. Ho: Nothing to disclose; A. Nguyen: Nothing to disclose; J. Stern: Nothing to disclose; S. Asch: Nothing to disclose; D. Owens: Nothing to disclose; J. Salomon: Nothing to disclose; R. Dalman: Nothing to disclose; J. Lee: Nothing to disclose

29. TURNDOWN FOR RUPTURED ABDOMINAL AORTIC ANEURYSM REPAIR BASED ON SEX IN THE UNITED STATES

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Objective: Women experience worse outcomes following repair of ruptured abdominal aortic aneurysm (rAAA), but it is unknown whether they are more often turned down for repair as a result. Therefore, we evaluated the characteristics of patients who presented with rAAA and those who did not undergo operative intervention stratified by sex.

Methods: We evaluated all patients who presented with a rAAA in the National Inpatient Sample Database (NIS) from 2004-2015, and compared patients based on whether they subsequently underwent repair, stratified by sex. We used multivariate logistic regression to compare the likelihood of undergoing repair by sex, and to evaluate factors associated with turndown.

Results: A total of 62,399 patients were admitted with rAAA; 17,990 (29%) were women. Women were older (79 vs. 74, $p<0.001$), less likely to be white (85% vs. 87% $p<0.001$), had higher rates of CHF (7% vs 4% $p<0.0001$), and lower rates of renal failure (16%vs 18% $p<0.001$) and obesity (6%vs 8%, $p<0.001$). Women were also more likely to have Medicare (85% vs 73% $p<0.001$), and more likely to be treated at a rural (9%vs 7%, $p<0.001$), smaller (8% vs. 10% $p<0.001$) hospitals and less likely to be treated at an urban teaching (54% vs. 57% $p<0.001$). The turndown rate for women was 56%, compared to just 24% for men ($p<0.001$). Furthermore, mortality was also higher for women who did not undergo repair (75% vs 70%) $p<0.001$).

After adjustment for differences in demographics and comorbidities, women remained less likely to be treated for a rAAA (OR: 0.55 [0.50-0.59], $p<0.001$; Table 1). In multivariate analysis, sex was the factor most strongly associated with the odds of being turned down for repair.

Conclusions: Women were less likely to be treated for a rAAA even when adjusted for age, baseline demographics, and hospital characteristics. Women also had a higher mortality even when treated medically. Further investigation is needed to elucidate this discrepancy between sexes.

Odds of undergoing repair when presenting with RAAA		
Factor	Odds Ratio [95% CI]	P-Value
Female	0.55 [0.50-0.59]	<0.01
Age	0.94 [0.93-0.94]	<0.01
CHF	0.16 [0.13-0.19]	<0.01
Renal Failure	1.10 [0.98-1.23]	0.10
Diabetes	0.96 [0.85-1.09]	0.57
Hospital Location		
Urban	<i>Ref</i>	
Rural	0.47 [0.39-0.56]	<0.01
Urban Teaching	1.31 [1.18-1.45]	<0.01
Hospital Size		
Large	<i>Ref</i>	
Medium	0.74 [0.66-0.83]	<0.01
Small	0.62 [0.52-0.74]	<0.01

Author Disclosures: **K. Dansey:** Nothing to disclose; **T. O'Donnell:** Nothing to disclose; **P. Liang:** Nothing to disclose; **S. Zettervall:** Nothing to disclose; **M. Schaller:** Nothing to disclose; **L. Stangenberg:** Nothing to disclose; **M. Conte:** Nothing to disclose; **M. Schermerhorn:** Nothing to disclose

30. COMPARISON OF TOTAL TRANSFEMORAL APPROACH TO UPPER EXTREMITY ACCESS IN BRANCHED AND FENESTRATED PHYSICIAN MODIFIED ENDOGRAFTS SHOWS CLEAR ADVANTAGE

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Objective: Aortic aneurysms are normally treated by an endovascular approach. Due to the lack of devices and rising experience, there is a growing number of complex aneurysms undergoing repair by physician modified endografts (PMEGs). Our practice had been to target vessels through upper extremity access. We have since shifted to an all transfemoral approach. This study aims to show the operative benefits of transfemoral only approaches.

Methods: Patients who underwent PMEG at a tertiary center between 2015-2020 were included. Patients were stratified into two groups based on branched vessel access - transfemoral only versus axillary or composite (axillary and femoral). Forty-one patients had pararenal or type IV thoracoabdominal aneurysms (TAAA) and 15 patients had more complex TAAA. Intraoperative outcomes were operative time, radiation exposure, fluoroscopy time, contrast and blood loss. Secondary outcomes were 30-day mortality and major adverse events. Linear regression models were used to evaluate the association between access type and the main outcomes.

Results: Fifty-six patients were included with 48% in the transfemoral group and 52% in the axillary/composite group. Baseline characteristics were similar between the groups.

Intraoperative outcomes revealed significant increase in the average operative time (418 vs. 246min, $p<0.001$), in radiation exposure (2755 vs. 1740 mGy, $p=0.03$), in fluoroscopy time (108 vs. 74min, $p=0.01$) and in blood loss (579 vs. 202cc, $P=0.002$) in the axillary/composite group compared to the transfemoral group. There was no significant difference in 30-day mortality or major adverse events including stroke. After adjusting for confounders, axillary access was associated with a 159min increase in operative time [95%CI: 102-216, $P<0.001$], a 30min increase in fluoroscopy time [95%CI: 1.4-59, $P=0.04$] and a 401cc increase in blood loss [95%CI: 150-651, $P=0.002$] (Table I).

Conclusion: This study shows a transfemoral approach to complex endovascular aortic repair as opposed to axillary/composite approach has decreased operative time, radiation exposure, and fluoroscopy time and no significant differences in 30-day mortality or major adverse events. When treating complex aneurysms, improving efficiency is important to minimize morbidity to patients and operators.

SCIENTIFIC SESSION ABSTRACTS continued

Table I: Linear Regression Unadjusted and Adjusted

	Transfemoral N=27 (48.2%)	Axillary/Composite N=29 (51.8%)	P-value	Adjusted Coefficient (95%CI)	P-value
Intraop Outcomes					
OR time (minutes), mean \pm SD	246 \pm 80	418 \pm 120	<0.001	159 (102-216)	<0.001
Contrast (cc), mean \pm SD	172 \pm 70	191 \pm 96	0.39	23 (-26-72)	0.30
Exposure (mGy), median(IQR)	1740 (1215-3702)	2755 (2005-5000)	0.03	990 (-713-2695)	0.24
Fluoroscopy time (minutes), mean \pm SD	74 \pm 37	109 \pm 61	0.01	30 (1.4-59)	0.04
Estimated Blood Loss (cc), mean \pm SD	202 \pm 170	579 \pm 582	0.002	401 (150-651)	0.002
Transfusion, N(%)	5 (18.5)	13 (44.8)	0.03	2.75 (0.77-9.82)	0.11
30-day outcomes					
Mortality, N(%)	1 (3.7)	2 (6.9)	0.6		
Major Adverse Events, N(%)	69 (22.2)	4 (13.8)	0.41		

Author Disclosures: **R. Patel:** Nothing to disclose; **A. Mathlouthi:** Nothing to disclose; **O. Al-Nouri:** Nothing to disclose; **J. Lane:** Nothing to disclose; **M. Malas:** Nothing to disclose; **A. Barleben:** Nothing to disclose

31. MONITORED ANESTHESIA CARE WITHOUT FOLEY PLACEMENT DECREASES HOSPITAL LENGTH OF STAY IN ELECTIVE ENDOVASCULAR ABDOMINAL AORTIC ANEURYSM REPAIR

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Objective: Hospital length of stay (LOS) plays a significant role in healthcare costs and efficiency. Endovascular aneurysm repair (EVAR) for abdominal aortic aneurysm (AAA) has the advantage of shorter LOS compared to open repairs. Based on National Surgical Quality Improvement Program (NSQIP) data, LOS after EVAR is 2.9 days with only 19% requiring more than 4 days of hospitalization. The purpose of this study is to assess whether LOS can be safely lowered with a protocol of monitored anesthesia care (MAC) without Foley catheter placement in EVAR.

Methods: A retrospective analysis of EVARs at a large tertiary hospital between January 2018 to December 2020 was conducted. We analyzed the subset of patients undergoing elective EVAR done under MAC and local analgesia without Foley insertion. Data was collected from the electronic medical record with focus on LOS, days to ambulation, post-operative urinary retention (POUR), and major complications. Statistical analysis was performed using Mann-Whitney U test.

Results: Of 107 patients who underwent EVAR, 93 were done electively and 46 were done electively and under MAC and local. 76.1% (n=35) were discharged on post-operative day (POD) 1 and 91.3% (n=42) ambulated on POD 1. Thirty-seven patients had no perioperative Foley placed and 9 patients had an intraoperative Foley removed in the operating room. Only 17.4% (n=8) patients had POUR; 5 patients required only one straight catheterization and 2 patients were discharged with a Foley. POUR was not related to case duration (114.5 minutes without POUR v. 129.1 minutes with POUR; p=0.368) or number of pieces implanted (2.87 pieces without POUR v. 2.5 with POUR; p=0.921). No patients required intubation. Average LOS was 2.0 days. Three patients had post-operative arrhythmias requiring ICU monitoring, one patient had a pseudoaneurysm requiring thrombin injection, and one patient had unplanned renal artery coverage requiring exploratory laparotomy for a hepatic artery to renal artery bypass.

Conclusions: This data suggests that EVAR LOS can be safely lowered using a standardized protocol of MAC and local analgesia without routine Foley placement. Further investigation is warranted to determine feasibility of performing elective EVAR in a non-hospital setting.

SCIENTIFIC SESSION ABSTRACTS continued

Author Disclosures: **S. Nammalwar:** Nothing to disclose; **D. Miles:** Nothing to disclose; **C. Arbabi:** Nothing to disclose; **R. Moridzadeh:** Nothing to disclose; **R. Abdul-Haqq:** Nothing to disclose; **R. Rao:** Nothing to disclose; **W. Wagner:** Nothing to disclose; **N. Gupta:** Nothing to disclose; **A. Azizzadeh:** Nothing to disclose; **A. Tulloch:** Nothing to disclose

32. ACCURACY SUBANALYSIS OF A DEEP LEARNING NEURAL NETWORK SPECIFIC FOR THE IDENTIFICATION OF INFRARENAL ABDOMINAL AORTIC ANEURYSMS

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Objective: To analyze the anatomic variables influencing the accuracy of a trained convolutional neural network (CNN) for infrarenal abdominal aortic aneurysms (AAA) identification on computed tomography angiogram (CTA) scans.

Methods: From 2015 to 2020, a HIPAA-compliant, IRB-approved, retrospective study analyzed abdominopelvic CTA scans from 200 patients with infrarenal AAA and 200 propensity- matched control patients. An AAA-specific trained CNN was developed by application of transfer learning to the VGG16 base model utilizing model training, validation, and testing techniques. Model accuracy and AUC were analyzed based on data sets (segmented, balanced or unbalanced), aneurysm size, extra-abdominal extension, dissections, and mural thrombus. Misjudgments were analyzed by review of heatmaps, via gradient weighted class activation, overlaid on CTA images.

Results: The trained custom CNN model reported high test group accuracies of 94.1%, 99.1%, and 99.6% and AUC of 0.99, 0.9998, and 0.9993 in segmented (n = 120), balanced (n = 3,704), and unbalanced image sets (n = 31,899), respectively. Despite an eight fold difference between balanced and unbalanced image sets, the CNN model demonstrated high test group sensitivities (99.9% vs. 98.9%) and specificities (94.8% vs 99.3%) in unbalanced and balanced image sets, respectively. For aneurysm size, the CNN model demonstrates decreasing misjudgements as aneurysm size increases: 47% (16/34) for aneurysms < 3.3 cm, 32% (11/34) for aneurysms 3.3-5 cm, and 20% (7/34) for aneurysms > 5 cm. Aneurysms containing measurable mural thrombus were over-represented within type II (false negative) misjudgements compared to type I (false positive) misjudgements (71% versus 15%, $p < 0.05$). Inclusion of extra-abdominal aneurysm extension (thoracic or iliac artery) or dissection flaps in these imaging sets did not decrease the model's overall accuracy.

Conclusions: Preliminary subanalysis of an AAA-specific CNN model can accurately screen and identify infrarenal AAA on CTA despite varying pathology and quantitative data sets. The highest anatomic misjudgments were with small aneurysms (< 3.3 cm) or the presence of mural thrombus. Accuracy of the CNN model is maintained despite the inclusion of extra- abdominal pathology and imbalanced data sets.

Author Disclosures: **S. Kiang:** Nothing to disclose; **J. Camara:** Nothing to disclose; **A. Abou- Zamzam:** Nothing to disclose; **R. Tomihama:** Nothing to disclose

33. DISPOSABLE LIGHTWEIGHT SHIELD ATTACHED TO LEADED OR NON-LEADED GLASSES DECREASES OPERATOR EYE AND BRAIN RADIATION DOSE DURING FLUOROSCOPICALLY GUIDED INTERVENTIONS

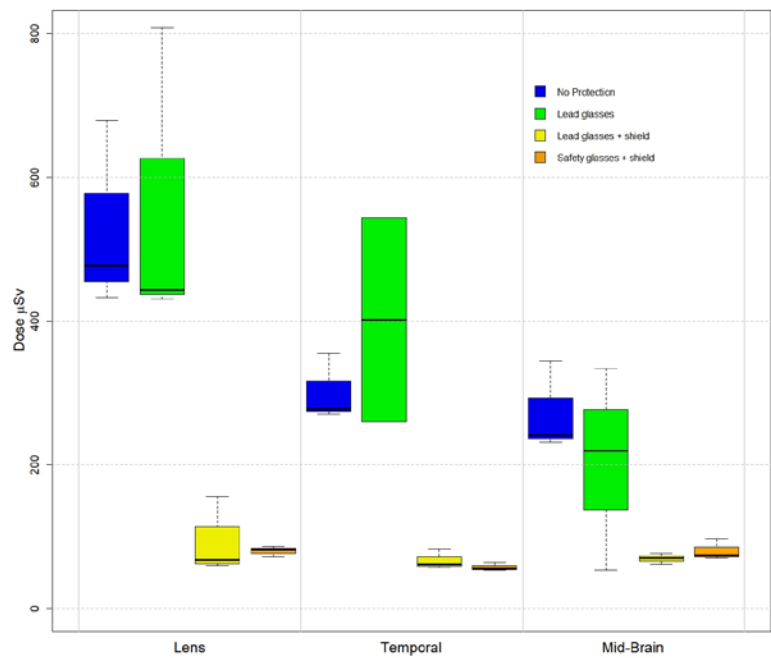
Melissa L. Kirkwood, MD, Carlos Timaran, MD, Michael Siah, MD, Michael Shih, MD, Shirling Tsai, MD, Bala Ramanan, MD, Shadman Baig, MD, Greg Modrall, MD, Jeffrey Guild, PHD. *University of Texas Southwestern Medical Center, Dallas, TX, USA.*

Objective: Long-term radiation exposure from FGIs can cause cataracts and brain tumors to the operator. We have demonstrated that leaded eyewear does not decrease operator eye dose unless lead shielding is added to the inferior portion. Therefore, we developed a disposable, lightweight, lead equivalent shield that can be attached to the operator's eyewear, conforming around the face and adhering to the surgical mask. This study evaluates the efficacy of our new prototype in lowering operator brain and eye dose when added to both leaded and non-leaded eyewear.

Methods: The attenuating efficacy of leaded eyewear alone, leaded eyewear + prototype and non-leaded eyewear + prototype were compared to no eyewear protection in both a simulated setting and clinical practice. In the simulation, optically stimulated, luminescent nanoDot detectors (Landauer, Glenwood, IL) were placed inside the ocular, temporal lobe, and midbrain spaces of a head phantom (ATOM model701:CIRS, Norfolk, VA), and at the surface of the left eye within and outside the eyewear. The phantom was positioned to represent a primary operator. Fluorography was performed on a plastic scatter phantom at 80kVp for an exposure of 3Gy RAK. In the clinical setting, nanoDots were placed below the operator's eye both inside and outside the prototype during FGIs. Means and standard errors were calculated using a pooled linear mixed model with repeated measurements.

Results: Wearing standard leaded eyewear alone did not decrease operator ocular or brain dose. In the phantom experiment: the prototype + leaded glasses, reduced dose to the lens, temporal lobe and midbrain by 83%(p<.001), 78%(p<.001) 75%(p<.001) respectively. The prototype + non-leaded glasses reduced dose to the lens, temporal lobe and midbrain by 85%(p<.001), 81%(p<.001), 71%(p<.001) Figure 1. In the clinical setting, 15 FGIs were included, mean RAK was 213 mGy. The mean operator eye dose outside the prototype was 249.3 μ Sv compared to 39.4 μ Sv inside resulting in an average dose reduction of 89% (p<.001).

Conclusions: Attaching the prototype to both leaded and non-leaded glasses significantly decreased eye and brain radiation dose to the operator. This face shield attachment provides meaningful radiation protection and should be considered as either a replacement or adjunct to routine leaded eyewear.



Author Disclosures: **M. Kirkwood:** Nothing to disclose; **C. Timaran:** Nothing to disclose; **M. Siah:** Nothing to disclose; **M. Shih:** Nothing to disclose; **S. Tsai:** Nothing to disclose; **B. Ramanan:** Nothing to disclose; **S. Baig:** Nothing to disclose; **G. Modrall:** Nothing to disclose; **J. Guild:** Nothing to disclose

34. OPEN ABDOMINAL AORTIC SURGERY IN THE ENDOVASCULAR ERA - WILL WE HAVE ENOUGH VOLUME FOR VASCULAR TRAINEES?

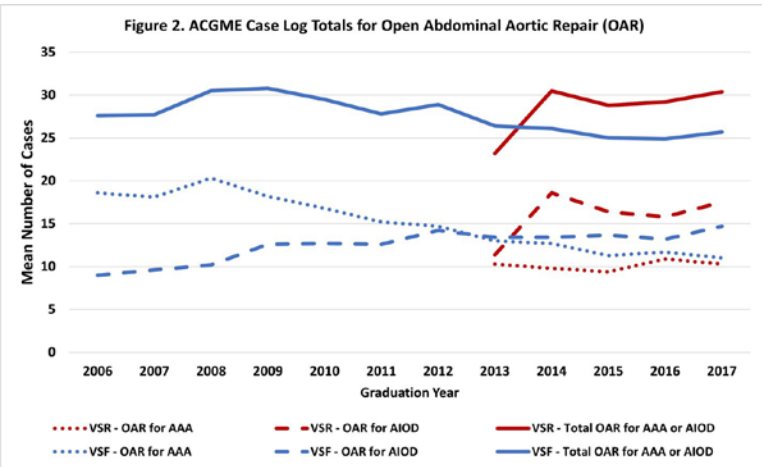
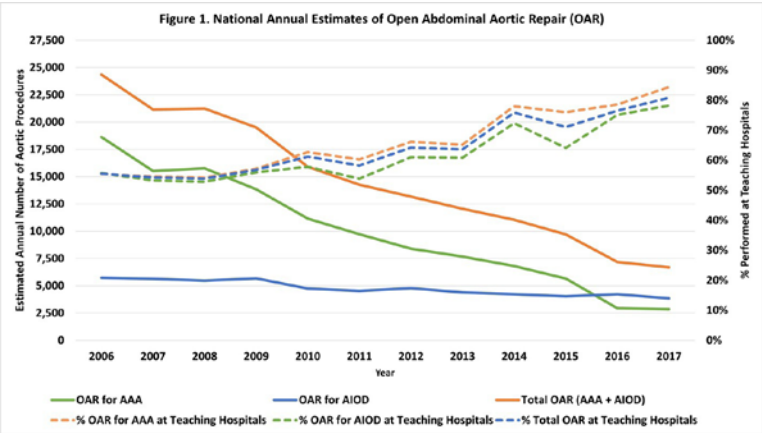
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Objectives: Prior analysis predicted a shortfall in open abdominal aortic repair (OAR) experience for vascular trainees resulting from endovascular aortic repair (EVAR). We explored how EVAR has transformed contemporary open aortic surgical education.

Methods: We examined ACGME case volumes of open abdominal aortic aneurysm (AAA) repair and reconstruction for aorto-iliac occlusive disease (AIOD) via aorto-iliac/femoral bypass (AFB) from vascular surgery residents (VSR) and fellows (VSF) graduating 2006-2017 and compared them to national estimates of total OAR (open AAA repair + AFB) in the AHRQ National Inpatient Sample (NIS). Changes over time were assessed using Chi-square test, Student's t-test, and linear regression.

Results: Over 12 years the national annual total OAR and open AAA repair estimates exponentially decreased: total OAR by 72.5% (2006: estimate (standard deviation) 24,355 (1185) vs. 2017: 6,690 (274); $p < 0.001$) and open AAA repair by 84.7% (2006: 18,619 (924) vs. 2017: 2,850 (168); $p < 0.001$); AFB estimates decreased linearly by 33.0% ($p < 0.001$). The percentage of total OAR, open AAA repair, and AFB performed at teaching hospitals significantly increased from ~55 to 80% (all $p < 0.001$) (Figure 1). There was a 40.9% decrease in open AAA repairs logged by graduating VSF (mean 18.6 vs. 11) but only a 6.9% decrease in total OAR cases (mean 27.6 vs. 25.7) due to increasing AFB volumes (mean 9.0 vs. 14.7). VSR graduates consistently logged an average of ~10 open AAA repairs and there was a 31.0% increase in total OAR (mean 23.2 vs. 30.4), again secondary to rising AFB volumes (mean 11.4 vs 17.5) (Figure 2). Although there was an absolute decrease in open aortic experience for VSF, the rate of decline for total OAR case volumes was not significantly different after VSR programs were established ($p = 0.40$).

Conclusions: As incidence decreases nationally, OAR is shifting towards teaching hospitals. While open AAA procedures for trainees are declining due to EVAR, open aortic reconstruction for AIOD is rising and plays an important role in ensuring that vascular trainees continue to have satisfactory OAR experience sufficient for meeting minimum graduation requirements. Strategies to maintain and maximize the education and experience from these cases should be top priority for vascular surgery program directors.



Author Disclosures: E. George: Nothing to disclose; S. Arya: Nothing to disclose; A. Anand: Nothing to disclose; V. Ho: Nothing to disclose; J. Stern: Nothing to disclose; V. Chandra: Nothing to disclose; J. Lee: Nothing to disclose

35. VASCULAR1: DEVELOPMENT OF A VIRTUAL REALITY TRAINING MODULE FOR ULTRASOUND GUIDED VASCULAR ACCESS

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Objective: Achieving direct vascular access is a procedure performed 150 million times annually in the United States. Ultrasound guided vascular access (UGVA) has been proven to minimize puncture-related complications and increase patient satisfaction. UGVA training remains limited because of high cost and poor accessibility. We built Vascular1, a virtual reality (VR)-based module, to train essential hand-eye coordination skills for safe and effective UGVA on an affordable platform. We seek to test the efficacy of Vascular1 through a pilot study.

Methods: Vascular1 was developed using Unity's Game Engine with Steam's VR plugin and includes both skills labs as well as virtual patient rooms for attempting femoral artery UGVA. The \$299 USD Oculus Quest was used to test the module, which simulates dynamic ultrasound probe and needle handling with handheld controllers. Medical students, surgical residents, and one vascular surgery faculty member were recruited to participate in a trial of Vascular1 with pre- and post-session questionnaires evaluating their experiences.

Results: Nine participants successfully completed the pilot module. Five of eight trainees reported receiving no previous training in UGVA. Before the trial, participants indicated an average confidence of 2.1 (1-5 Likert Scale, 1=not confident, 5=confident) compared to 3.5 after the trial ($P=0.001$, Wilcoxon Signed-Rank test). Only two trainees reported more than 15 minutes of previous VR experience and all participants unanimously rated Vascular1 as "very comfortable." Participants found the module valuable for visualizing anatomy and ultrasound probe adjustments, and suggestions include improved needle handling and increased haptic feedback.

Conclusions: This trial establishes the potential of Vascular1 as a scalable training platform for UGVA that we will continue to test. All trainees noted increased confidence in their ability to perform UGVA and comfort with VR.



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36. PATIENT-REPORTED PHYSICAL FUNCTION PREDICTS POSTOPERATIVE RECOVERY AFTER VASCULAR SURGERY

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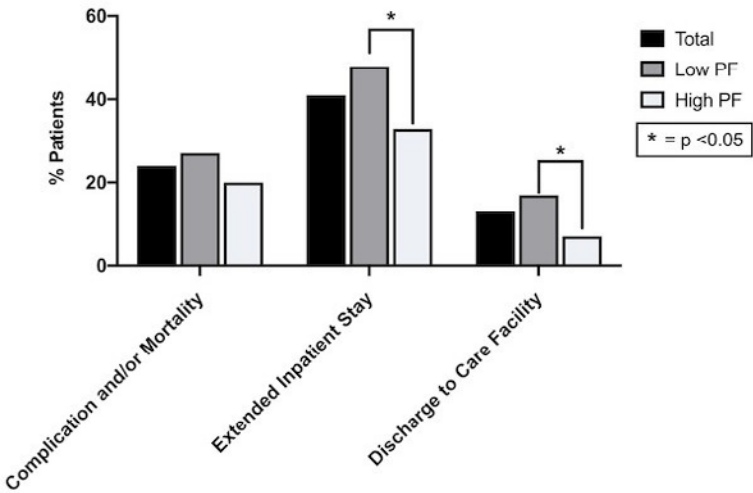
Objective: Preoperative risk assessment in vascular surgery often relies on the clinical subjectivity of providers and assessment tools with poor discrimination. Patient-reported outcome measures (PROMs) may provide better discrimination of patient's health status and ability to recover after surgery. We designed this study to determine whether PROMs assessed for physical function (PROM-PF) prior to vascular surgery could be used to predict patient risk for perioperative complications and delayed recovery.

Methods: We identified all patients who completed a PROM-PF survey prior to undergoing an elective vascular procedure captured in the SVS-VQI registry (CEA, AAA, EVAR, TEVAR, PVI, INFRA, and SUPRA) at a single academic institution between January 2016 and June 2020. PROM-PF assessment was obtained electronically in clinic using the validated PROMIS short form (v1.2) instrument, and patient demographics and comorbidities were collected as part of the SVS-VQI registry. After stratifying patients based on high vs. low preoperative PROM-PF, multivariable regression models were used to assess the risk-adjusted odds ratios for perioperative complications, extended hospital length of stay (LOS), and discharge to a care facility.

Results: A total of 240 patients (mean age 68 years, 69% male, 88% Caucasian) completed a PROM-PF assessment 30 days before a vascular surgery intervention, of which 54% had low-PF. Patients with high-PF were more likely than those with low-PF to undergo an open vascular intervention (36% high-PF vs. 15% low-PF; $p < 0.001$). Rates of perioperative complications and/or mortality were similar between groups, although patients with low-PF were more likely to have an extended hospital LOS and/or be discharged to a care facility (Figure). These results were confirmed in risk-adjusted models showing that patients with low-PF scores were significantly more likely to have an extended LOS (adjusted OR 1.77, 95%CI 1.02- 3.09) and be discharged to a care facility (adjusted OR 2.67, 95%CI 1.04-6.88).

Conclusions: Low preoperative PROM-PF was associated with a higher risk of extended inpatient LOS and discharge to a care facility. PROMs can provide valuable information about a patient's health status before surgery to help inform clinical decision-making and anticipate postoperative recovery.

Figure: Association Between Patient-Reported Physical Function (PF) and Postoperative Recovery Outcomes



Author Disclosures: **T. Holeman:** Nothing to disclose; **J. Groberg:** Nothing to disclose; **J. Beckstrom:** Nothing to disclose; **B. Brooke:** Nothing to disclose

SCIENTIFIC SESSION ABSTRACTS continued

37. MODELING SOCIAL MEDIA ACTIVITY AND ACADEMIC INFLUENCE IN VASCULAR SURGERY Ina Y. Soh, MD, MS1, Stephen J. Tarsa, PhD2, William W. Sheaffer, MD1, Austin T. Pierce, MD1, Patricia G. Lu, MD1, Victor J. Davila, MD1, Andrew J. Meltzer, MD, MBA1, William M. Stone, MD1. *1Mayo Clinic, Phoenix, AZ, USA, 2Harvard University, Cambridge, MA, USA.*

Objective: Social media has changed the scope and nature of scholarship. Via Twitter, surgeons have an accessible platform for communicating with and influencing a large community without academic editorial or peer review. Traditional academic advancement based on publication prowess is being challenged by the development of altmetrics quantifying the impact of social media activity. We compare vascular surgeons' use of these two platforms.

Methods: Academic productivity metrics (h-index, citations & publications, academic rank) and social media activity (Twitter profile, no. of Twitter followers) were collected for 923 surgeons affiliated with training programs listed publicly on the Society for Vascular Surgery (SVS) website. A linear prediction model was used to capture the expected number of followers based on publication count after correcting for years since medical school graduation. Surgeons were clustered into two groups: stronger social media presence (SM) with more followers than expected, and stronger academic literature presence (AL) with fewer followers than expected. Multivariate analysis was done for each group.

Results: Of 923 surgeons, there were 266 (28.8%) Twitter profiles (median:199 followers, 85thile:1028 followers), 191 (20.7%) females, 221 (23.9%) full professors, with median h-index 9, and average years since medical school graduation 23.8. Clustering users (SM: 107, 40.2%, AL: 159, 59.8%) improved goodness-of-fit for multivariate modeling, $R^2=0.310$ to 0.594 (Fig 1). Represented more in the SM group were females (40.2% [CI 14.7-19.5] vs 21.4% [15.0-27.8]; $p<0.05$) and a younger generation of surgeons (avg years since medical school graduation 17.1 [CI 14.7-19.5] vs. 23.8 [CI 21.4-26.2]; $p<0.05$). There were more full professors in the AL group (32.7% [25.4-40.0] vs. 16.8% [9.7-23.9]; $p<0.05$), but no significant difference in median h-index between groups (11.0 vs. 13.0; $p=0.16$) (Table I).

Conclusions: Social media and academic literature are not mutually exclusive platforms, offering complimentary pathways of knowledge diffusion. Surgeons most active on social media are earlier in their careers and equally academically productive. The implications are important for individuals, societies, and institutions that strive for prominence and inclusivity.

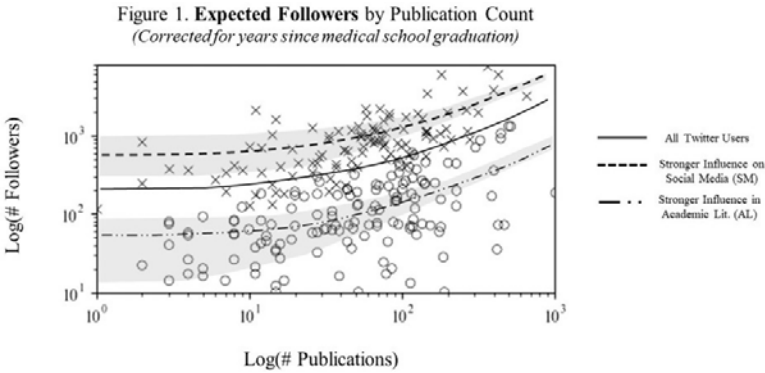


Table 1. Social Media Cluster Versus Traditional Academic Cluster

	Popula- tion	Stronger Influence in Social Media (SM)	Stronger Influence in Academic Literature (AL)
n	923	107 (11.6%)	159 (17.2%)
Mean Years Since M.D. Graduation	23.81	17.1 (p<0.05, CI 14.7- 19.5)	23.82 (p<0.05, CI 21.4-26.2)
% Female	20.7%	40.2% (p<0.05, CI 30.9%- 49.5%)	21.4% (p<0.05, CI 15.0%- 27.8%)
% Full Professor	23.9%	16.8% (p<0.05, CI 9.7%- 23.9%)	32.7% (p<0.05, CI 25.4%- 40.0%)
Median h-index	9	11 (n.s, p=0.16)	13 (n.s, p=0.16)

Author Disclosures: **I. Soh:** Nothing to disclose; **S. Tarsa:** Nothing to disclose; **W. Sheaffer:** Nothing to disclose; **A. Pierce:** Nothing to disclose; **P. Lu:** Nothing to disclose; **V. Davila:** Nothing to disclose; **A. Meltzer:** Nothing to disclose; **W. Stone:** Nothing to disclose



CONSTITUTION & BYLAWS

CONSTITUTION & BYLAWS

ARTICLE I – NAME

The name of this corporation is the Western Vascular Society (hereinafter the “Society”).

ARTICLE II – PURPOSES

The purpose of the Society shall be: (1) to promote study and discussion of the art and science of vascular surgery; (2) to promote exchange of information among the membership; (3) to hold annual meetings; (4) to do and engage in any and all lawful activities that may be incidental or related to the foregoing and to have and exercise all powers and authority now or hereafter conferred upon not-for-profit corporations under the laws of the State of California.

Notwithstanding the foregoing, (1) no part of the Corporation’s net earnings or assets shall inure to the benefit of any member, director, officer, or other person, except that the Corporation shall be authorized and empowered to pay reasonable compensation for services rendered and to make other payments and distributions in furtherance of the purposes set forth above, and (b) the Corporation shall not carry on any activity not permitted to be carried on by an organization exempt from federal income tax under section 501 (c) (6) of the Internal Revenue Code of 1954, as amended (the “Code”) or the corresponding provision of any further United States revenue statute.

ARTICLE III – MEMBERSHIP

1. The membership of this Society shall be limited to surgeons who practice primarily vascular surgery, who are in good standing in their community as judged by members of the Society. Candidates for membership shall be certified by the American Board of Surgery added Certification in Vascular Surgery or the Royal Canadian College of Surgeons Certificate of Special Competence in Vascular Surgery. In exceptional cases, the Membership Committee may elect to accept equivalent periods of training for formal certification.

2. Members shall be drawn from the Western states, provinces and the Pacific Rim. This will be defined as follows: Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oklahoma,

CONSTITUTION & BYLAWS continued

Oregon, Utah, Washington, Wyoming, Alberta, British Columbia and the Pacific Rim.

Exception to this rule is in the case of any active duty military personnel who are welcome to membership regardless of their geographic location.

3. There shall be five types of members: active, senior, honorary, associate, and adjunct.

4. Active membership shall consist of the following members of the Organization plus subsequent individuals elected to membership by the Society. The total number of active members shall be limited to 160.

4a. Prospective members should have completed a minimum of one (1) years of practice after vascular surgery training before applying for membership.

4b. The prospective member should meet one or more of the following three (3) criteria in order to be considered for membership:

Excellence in Clinical Care – this can be reflected by letters from colleagues and collaborators, regional reputation, years in practice, peer-recognition awards (Chief of Staff, senior surgeon in group, HMO recognition award), service on peer-review organizations, case lists and outcomes, community involvement or participation in clinical trials.

Contributions to Vascular Science – this can be reflected by peer-review publications, non-profit or federal grant support, invited lectures, professorships, faculty appointments, invited publications, participation in clinical trials, device development, active participation in local/ regional vascular societies or serving on hospital committees.

Contributions to Vascular Education – this can be reflected by teaching responsibilities at a vascular or general surgery training program, hospital grand rounds, seminars, proctorship of new vascular procedures or other lectureships.

5. Senior members shall consist of active members who have reached the age of sixty-five (65) or who for reasons of health or other just cause, the Council recommends for classification in this category. Senior members shall not be bound by requirements for attendance at meetings; however, working senior members shall continue to pay annual dues until such time as they have notified the Secretary-Treasurer that they have left active practice.

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6. Honorary members of the Society shall consist of individuals who have made outstanding contributions in the field of vascular science. Honorary members shall not be bound by the requirements for attendance at meetings, shall have no voting privileges nor shall they be required to pay dues.

7. Associate members of the Society shall consist of those individuals who were previously active members but have moved out of the geographic limits of the Western Vascular Society. Associate members shall not be bound by the requirements for attendance at meetings nor shall they be required to pay dues.

8. Adjunct membership will be granted to those individuals who are not vascular surgeons but have made and continue to make meaningful contributions to the science and practice in the field of vascular disease. This category will include non-M.D.s who are working in the field of research. It will also include physicians who actively practice and publish in the field of non-surgical treatment of vascular diseases. Adjunct members shall not have voting privileges, be able to hold office, participate on standing committees, or be required to pay dues.

9. Prospective members should attend an annual meeting of the Western Vascular Society prior to submitting application for membership. The prospective member is encouraged to attend the annual meeting.

ARTICLE IV – SELECTION OF MEMBERS

Qualification for membership in the Society will be judged primarily upon evidence of a prospective member's scholarly contributions to the vascular surgery literature.

1. Active Members:

a. Application forms for membership shall be available only by request of a sponsoring member and shall be provided by the Secretary-Treasurer.

b. Application forms presenting the curriculum vitae of the candidates and signed by them and the sponsor shall be in the hands of the Secretary-Treasurer at least two (2) months before the Executive Session at which it is desired that the candidate be considered for election. Applications must be supported by a letter from the sponsor. Additional letters of recommendation from other members are desirable.

CONSTITUTION & BYLAWS continued

- c. The Secretary-Treasurer shall send to the Chairman of the Membership Committee these applications with all pertinent data, including supporting letters, at least two (2) months before the annual meeting. The Membership Committee shall review the professional qualifications of the candidates.
- d. The list of candidates with data concerning them shall be circulated by the Secretary-Treasurer to all members of the Society at least one (1) month before the annual meeting.
- e. The Membership Committee shall meet prior to the annual meeting to review the applications and to make recommendation for membership. The Chairman of the Membership Committee shall meet with the Council for purposes of presenting recommendations of the Membership Committee for review by Council before presenting recommendations to the membership at large at the time of the annual meeting.
- f. The names of Candidates recommended by the Council for election shall be submitted by the Secretary-Treasurer to the membership in the annual report at the Executive Session of the Society.
- g. Election to membership shall be by secret ballot, by a three-fourths affirmative vote of the membership present and voting at the annual Executive Session.
- h. A candidate who fails election at one meeting may be presented for re-consideration of membership at a subsequent meeting by repeating the above process.

2. Honorary members:

- a. Any active or senior member may nominate an individual for membership. The name and brief description of the accomplishments of the nominee must be submitted to the Secretary-Treasurer at least six (6) months prior to the annual meeting for circulation to an Honorary Membership Committee, which consists of the three (3) past presidents on the Council.
- b. The Honorary Membership Committee shall make its recommendations to the Council.
- c. Following its deliberation, the Council may recommend that the candidate's name be submitted by the Secretary-Treasurer to the membership in the annual report presented at the Executive Session of the Society.

CONSTITUTION & BYLAWS continued

- d. Election to membership shall be by secret ballot, by a three-fourths affirmative vote of the membership present and voting at the annual Executive Session.
3. Associate members:
 - a. Any member in good standing, who leaves the geographic area of the Western Vascular Society, may request transfer in status to associate membership. If a member fails to request such a transfer he/she will automatically be dropped from the membership roster.
4. Adjunct members:
 - a. The process of election shall be the same as for active members.

ARTICLE V – BOARD OF DIRECTORS (“COUNCIL”)

1. The Board of Directors of the Society shall be called the Council.
2. The Council shall be composed of the President, the President-Elect, the Secretary-Treasurer, the Recorder, and the three (3) most recent available past presidents.
3. The Council shall be the governing body of the Society and shall have full power to manage and act on all affairs of the society except as follows:
 - a. It may not without the approval of the Society membership at an annual executive session alter the initiation fees or annual dues, or levy any assessments against the membership, except that it may, in individual cases, waive annual dues or assessments.
 - b. It may not amend the Articles of Incorporation or Bylaws.
 - c. It may neither elect new members nor alter the status of existing members, other than to apply the provisions of Article XI.
4. The President of the Society shall serve as Chairman of the Council and the Secretary-Treasurer of the Society as its Secretary.
5. Meetings of the Council shall be held at the call of the President of the Society, and each member of the Council must be notified in writing of the time and place of each such meeting.
6. The annual meeting of the Council shall precede the Executive Session of the Society membership.

CONSTITUTION & BYLAWS continued

7. A majority of the voting members of the Council shall constitute a quorum for the transaction of business. Voting can take place electronically via email or poll.
8. The act of a majority of the members of the Council present at a duly called meeting at which a quorum is present shall be the act of the Council, unless the act of a greater number of required by applicable statute, the Articles of Incorporation or these Bylaws.
9. Any action which is required by law or the Articles of Incorporation or these Bylaws to be taken at a meeting of the Council, or any other action which may be taken at a meeting of the Council, may be taken without a meeting if a consent in writing, setting forth the action taken, shall be signed by all the members of the Council entitled to vote with respect to the subject matter thereof. Any consent signed by all the members of the Council shall have the same force and effect as a unanimous vote of a duly called and constituted meeting of the Council.

ARTICLE VI – OFFICERS

1. The Officers of the Society shall be a President, a President-Elect, a Secretary-Treasurer, and a Recorder, all to be elected as provided in these Bylaws. Said officers shall serve ex-officio as voting members of the Council.
2. All Officers of the Society shall be elected for terms of one (1) year each. Secretary-Treasurer and Recorder both serve three (3) year terms. The President may not serve more than one (1) term.
3. Officers of the Society shall be nominated by the Nominating Committee that shall present the slate to the membership at the Executive Session of the annual meeting. Additional nominations may be made from the floor of the Executive Session each year. The election shall take place at the Executive Session and election shall be by a majority of the votes cast.
4. The President shall preside at meetings of the Society and the Council, preserve order, regulate debates, announce results of elections, appoint committees not otherwise provided for, sign Certificates of Membership, and perform the duties of the President's office.
5. The President-Elect, in the absence or incapacity of the President, shall perform the duties of the President's office.

CONSTITUTION & BYLAWS continued

6. In the absence of both the President and the President-Elect, the Chair shall be taken by a Chairman Pro Tem, elected by such members of the Council as are present.

7. The Secretary-Treasurer shall ensure proper storage of the minutes of the meetings of the Society and Council, attest all official acts requiring certification; notify officers and members of their election; conduct correspondence; take charge of all papers not otherwise provided for. At least thirty (30) days but not more than forty (40) days prior to each annual or special meeting he shall ensure issue to all members of the Society a program of the forthcoming meeting. He/she shall compile a written report to be read at the annual Executive Session of the Society, in which shall be included a list of candidates proposed for membership, as approved by Council. He/she shall ensure receipt of all moneys and funds belonging to the Society; ensure payment of all bills; ensure rendering of bills for dues and assessments as soon as possible after the annual meeting; and report to the Council at each annual meeting the names of all members in arrears as to dues. He shall prepare a written report of the finances of the Society to be presented at the Council Meeting and at the Executive Meeting.

8. The Historian shall serve a five-year term and will be appointed by the President. It shall be the duty of the Historian to assemble and preserve the Archives of the Society for storage and reference. The archives shall consist of the roster of the members of the society since its inception and such photographs as are available. It shall be his/her duty to secure and file a photograph of each new member. At the request of the President, the Historian may be asked to provide an appropriate historical comment at either the executive session or the regular meeting. The records of the Western Vascular Society are preserved at the society headquarters and at the UCLA Medical Center by the archivist of the Louise Darling Library.

9. The Recorder shall ensure receipt of all papers and reports of discussions on papers presented before the Society. The Recorder, together with the Program Committee, shall ensure submission of manuscripts to the Journal of Vascular Surgery for publication.

CONSTITUTION & BYLAWS continued

ARTICLE VII – COMMITTEES

1. Standing committees of the Society shall consist of a Membership Committee, a Nominating Committee, a Program Committee, and a Local Arrangements Committee for the annual meeting.
2. The Membership Committee shall consist of three (3) members who shall be appointed by the President to serve overlapping terms of three (3) years each. The Secretary-Treasurer shall be an ex officio member of the membership committee. The senior member in service on this Committee shall be the Chairman. Nominations to the Membership Committee shall be made by the Nominating Committee which shall present the slate to the membership at its annual business meeting. Election shall be by a majority of votes cast at the Executive Session. The functions of the Committee shall be to pass upon the professional and ethical qualifications of the applicants and to advise the membership of these recommendations.
3. The Nominating Committee shall consist of the three (3) most recent available past Presidents. The Committee shall be appointed by the President one (1) month before the annual meeting. Its function shall be to make up a slate of officers to be presented at the annual business meeting to the membership.
4. The Program Committee shall consist of four (4) members who shall be appointed by the President to serve overlapping terms of four (4) years each. The senior member in term of service on this Committee shall be the Chairman. The President, Secretary-Treasurer and Recorder shall be ex officio members of the Program Committee. The function of the Program Committee shall be to solicit presentations from members and other individuals and to make up the program for the annual meeting. The appointed members of the Program Committee shall serve as an advisory committee to act, with the Recorder, to ensure editorial review of the submitted manuscripts.
5. The Chairman of the Local Arrangements Committee for the annual meeting shall be appointed by the President and the members of the Committee shall be appointed by the Chairman. These individuals will consist of members resident in the general locality in which the annual meeting is to be held, together with the President, the Secretary-Treasurer, acting ex officio. The function of this Committee shall be the making of the general arrangements for the annual meeting.

CONSTITUTION & BYLAWS continued

6. The Council may from time to time establish such other Committees as it deems advisable. Each such Committee shall consist of such persons and shall have such duties and the Council upon establishment of the Committee from time to time may designate powers as thereafter. Unless otherwise provided by the Council, the President shall appoint the members of each such Committee.

7. Any vacancy occurring among the members of any elected Committee of the Society shall be filled by appointment by the President. The Appointee will serve until the next annual meeting of the Society membership.

ARTICLE VIII – MEETINGS

1. The annual meeting of the Society shall be held at a time and place to be determined by the Council at least one year in advance.

2. The Council shall meet on the day prior to the annual meeting, at a time and place designated by the President. The Chairmen of the Membership Committee, the Nominating Committee and the Local Arrangements Committee shall meet with the Council in an advisory capacity.

3. Twenty (20) voting members present in person shall constitute a quorum at a meeting of the membership.

4. The vote of a majority of the votes entitled to be cast by the members present at a duly called meeting at which a quorum is present shall be necessary for the adoption of any matter voted upon by the members, unless a greater proportion is required by the applicable statute, the Articles of Incorporation, or the Bylaws.

5. Members may not cast their votes by proxy. Voting can be done via electronic means.

6. The Executive Session of the Society, attendance at which shall be limited to active, senior and honorary members, shall be held at a time and place to be set by the President. The business of the Society shall be conducted at that time.

7. The scientific session of the annual meeting shall consist of original presentations of papers and the discussion of these papers. An active or senior member must be a participant, co-author or sponsor of each presentation selected.

CONSTITUTION & BYLAWS continued

8. Special meetings of the Society may be called at any time by the President. The President must call a special meeting whenever he is requested to do so in writing by ten (10) members of the Society in good standing.

9. Notice of any Executive Session of any annual or special meeting of the Society shall be given to each member of the Society not less than thirty (30) nor more than forty (40) days prior to the Executive Session by written or printed notice delivered personally or by mail, by or at the direction of the Council, the President or the Secretary -Treasurer. Such notice shall state the place, day and hour of the Executive Session and in the case of a special meeting shall also state the purpose or purposes for which the Executive Session is called.

10. The Council may, by majority vote, revoke the membership of any active member who shall have been absent from three (3) consecutive meetings of the Society without providing the Secretary-Treasurer with an acceptable written explanation of such absence. An active member shall receive a warning letter from the Secretary-Treasurer following two (2) consecutive unexcused absences from the annual meetings, and the Secretary-Treasurer shall, within thirty (30) days after revocation of any active membership pursuant to this section, send written notice of such action to the individual whose active membership has been so revoked. In addition, in order to emphasize the importance of scholarly participation, it shall be the requirement for each member to be a named author of at least one abstract during a four-year term or to be a named discussant of a paper selected for presentation. An active member shall receive a warning letter from the Secretary-Treasurer following three (3) consecutive years in which the member has failed to participate as described above. The Secretary-Treasurer shall, within thirty-(30) days after revocation of active membership pursuant to this section, send written notice of such action to the individual whose active membership has been so revoked. Any person whose active membership has been revoked by the Council pursuant to this section may, within six (6) months after such revocation, send to the Secretary-Treasurer a written request that the Council at its next meeting reconsider its decision. Such a request must be accompanied by a written statement for the reasons for the consistent absence or lack of participation from annual meetings of the Society. If the Council, upon reconsideration, determines by a majority vote that reinstatement is appropriate, the individual shall be

CONSTITUTION & BYLAWS continued

reinstated as an active member upon payment in full of any outstanding dues or other financial obligations to the Society, including any such obligations which may have arisen during the period in which the revocation was in effect.

11. The societies current President and Recorder will moderate the first Scientific Session of the Annual Meeting. The incoming President-Elect and current Recorder will moderate the final Scientific Session of the Annual Meeting. All other moderators for all other sessions will consist of and be chosen by the Program Committee.

ARTICLE IX – INVITED GUESTS

1. A member of the Society may invite one or more guest(s) to attend the Annual Meeting of the Society. Should a member wish to tender an invitation, formal request must be made to the Secretary-Treasurer to send a written invitation to the individual identified by the member. No guest will be admitted to the scientific sessions and/or social events without a formal or email invitation and active registration for the annual meeting.
2. The names of all guests attending the Annual Meeting shall be entered under a separate heading in the attendance list.
3. All invited guests shall be given the privilege of the floor by the President but shall not be present at the Executive Session.

ARTICLE X – FEES AND DUES

1. Initiation fees, dues and assessments shall be levied by the Council and approved by the membership at the annual Executive Session.
2. Any member of the Society in arrears as to dues for one (1) year shall be notified of that fact by the Secretary- Treasurer, by email and registered letter, which shall contain a copy of this Section 2. If the dues are not paid before the next annual Council meeting, or some reasonable explanation of the delinquency is not forthcoming, the name of the delinquent member shall be presented at the Council meeting and on a majority vote of the Council the name may be stricken from the membership list. The Council may reinstate the delinquent member upon payment of the dues in arrears.

CONSTITUTION & BYLAWS continued

ARTICLE XI – RESIGNATIONS AND DISCIPLINE

1. Resignation of members not in arrears as to dues may be accepted at any annual meeting of the Society by a majority vote of the members present.
2. Charges of unprofessional or unethical conduct may be brought against any member of the Society by a written complaint signed by three (3) members of the Society and delivered to the Secretary-Treasurer. The Council shall establish the rules governing disciplinary proceedings based upon such charges from time to time.

ARTICLE XII – PAPERS AND REPORTS

1. All papers and reports read before the Society shall be submitted to the Journal of Vascular Surgery prior to the time of their presentation at the Annual Meeting. The Recorder shall be responsible for ensuring the submission of these manuscripts.
2. No paper shall be submitted for publication as having been read before the Society unless it has been read before the Society. Remove this section.
3. Final submission of a manuscript to the JVS must be done within 2 months of the presentation at the annual meeting. The exception would be if the revisions suggested at the meeting required more time, in which case the request can be made for an extension. The penalty for no or late submission is ineligible abstract submission to the WVS for 1 year.

ARTICLE XIII – PROCEDURE

The proceedings of the Society shall be conducted under Roberts Rules of Order Newly Revised.

ARTICLE XIV – CERTIFICATE OF MEMBERSHIP

Every elected member of the Society shall be entitled to a Certificate of Membership signed by the President and the Secretary-Treasurer and bearing the seal of the Society.

CONSTITUTION & BYLAWS continued

ARTICLE XV – SEAL

This Society shall make, have, and use a seal bearing the name of the Society, the words “Corporate Seal, California,” and such other device and description, as the Society shall deem proper.

ARTICLE XVI – NOTICE AND WAIVER OF NOTICE

1. Whenever, under applicable law, these Bylaws, or resolution of the Council, notice is required to be given to any member, Council member or Officer, such notice may be given in writing, by e-mail or standard mail, addressed to such member, Council member or Officer, at his or her address/electronic address as it appears on the records of the Society. Such mailed notice shall be deemed to be given when deposited in the United States Mail in a sealed envelope so addressed, with postage therein prepaid.

2. Whenever, under applicable law, these Bylaws, or resolution of the Council, any notice is required to be given, a waiver thereof in writing, signed by the person or persons entitled to such notice. Whether before or after the time stated therein, shall be deemed equivalent to the giving of such notice. In addition, the attendance of a member or Council member at any meeting shall constitute a waiver of notice of such meeting, except where an individual attend the meeting for the express purpose of objecting to the transaction of any business because the meeting is not lawfully called or convened.

ARTICLE XVII – INDEMNIFICATION

1. To the full extent in accordance with the procedure prescribed by the General Not-For-Profit Corporation Act, the Society shall indemnify any and all members of the Council (which members shall hereinafter in this Article be referred to as “Directors”) and any and all officers, employees, agents and representatives of the Society for certain expenses and other amounts paid in connection with legal proceedings in which any such person become involved by reason of their serving in any such capacity for the Society.

2. Upon specific authorization by the Council, the Society may purchase and maintain insurance on behalf of any or all Directors, Officers,

CONSTITUTION & BYLAWS continued

employees, agents or representatives of the Society against any liability asserted against any such person and incurred in any such capacity, or arising out of the status of serving in any such capacity, whether or not the Society would have the power to indemnify them against such liability under the provisions of Section 1 of this Article.

ARTICLE XVIII – AMENDMENT

These Bylaws may be amended by a three-fourths vote of the members present and voting at a properly called and convened Executive Session at an Annual or Special Meeting of the Society, provided that the proposed Amendment has been submitted to the Secretary-Treasurer by at least three (3) voting members of the Society at least three (3) months prior to the Executive Session of the Society. The Secretary-Treasurer shall mail the proposed Amendment at least thirty (30) days prior to the Executive Session, accompanied by notice that such Amendment will be acted upon at that Executive Session.

ARTICLE XIX – RULES AND REGULATIONS

The Society may enact from time to time rules and regulations that will govern the actions of the Society. Such Rules and Regulations shall be enacted, amended or deleted by a majority (>50%) vote of those attending the annual business meeting. Proposed rules and regulations require notification of the membership no less than 30 days prior to the annual meeting. Amendments to a proposed Rule and Regulation made at the time of the business meeting may be voted upon at the same business meeting and do not require an additional 30-day notification of members. All Rules and Regulations must be in conformity with the bylaws of the Society.

Amended September 2019

NOTES

CONTACT INFORMATION



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NOTES

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PLATINUM SPONSORS

Abbott Vascular
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