45TH ANNUAL MEETING

Vascular & Endovascular Surgery Society

JANUARY 21-24, 2021

[VIRTUAL]

NATIONAL OFFICE
100 Cummings Center, Suite 124-A · Beverly, Massachusetts 01915 · Email: vess@administrare.com
Website: www.vesurgery.org

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VESS PAST MEETINGS & PRESIDENTS

Date	Location	President
1976	Chicago, IL	Organizational Meeting
1977	Dallas, TX	Steven M. Dosick, MD
1978	San Francisco, CA	Robert G. Scribner, MD
1979	Chicago, IL	William S. Gross, MD
1980	Chicago, IL	Charles A. Andersen, MD
1981	Dallas, TX	Larry H. Hollier, MD
1982	Boston, MA	G. Edward Bone, MD
1983	San Francisco, CA	Robert C. Batson, MD
1984	Atlanta, GA	Lee C. Bloemendal, MD
1985	Baltimore, MD	George J. Collins, Jr.
1986	New Orleans, LA	Jonathan B. Towne, MD
1987	Toronto, Canada	Thomas S. Riles, MD
1988	Chicago, IL	Paul T. McDonald, MD
1989	New York, NY	Anthony J. Comerota, MD
1990	Los Angeles, CA	John W. Hallett, Jr., MD
1991	Boston, MA	Paul M. Orecchia, MD
1992	Chicago, IL	David L. Rollins, MD
1993	Washington, DC	Frank T. Padberg, Jr., MD
1994	Seattle, WA	Peter G. Kalman, MD
1995	New Orleans, LA	William J. Quinones-Baldrich, MD
1996	Chicago, IL	Joseph L. Mills, MD
1997	Boston, MA	Gary Giangola, MD
1998	San Diego, CA	J. Gordon Wright, MD
1999	Washington, DC	Jeffrey R. Rubin, MD
2000	Toronto, Canada	Donald L. Akers, Jr., MD
2001	Baltimore, MD	Thomas F. Lindsay, MD
2002	Boston, MA	R. Clement Darling, III, MD
2003	Chicago, IL	Jeffrey L. Ballard, MD
2004	Anaheim, CA	Samuel R. Money, MD
2005	Chicago, IL	Lewis B. Schwartz, MD
2006	Philadelphia, PA	Robert A. Cambria, MD
2007	Baltimore, MD	William D. Jordan, Jr., MD
2008	San Diego, CA	W. Charles Sternbergh, III, MD
2009	Denver, CO	Tina R. Desai, MD
2010	Boston, MA	Karl A. Illig, MD
2011	Chicago, IL	Marc A. Passman, MD
2012	Baltimore, MD	Martin R. Back, MD
2013	Park City, UT	Ruth L. Bush, MD, MPH
2014	Steamboat Springs, CO	W. Darrin Clouse, MD
2015	Vail, CO	Vikram S. Kashyap, MD
2016	Park City, UT	Sean P. Roddy, MD
2017	Steamboat Springs, CO	Thomas S. Maldonado, MD
2018	Vail, CO	Peter R. Nelson, MD
2019	Snow Bird, UT	Jonathan Eliason, MD
2020	Steamboat Springs, CO	James H. Black, MD

CONTINUING MEDICAL EDUCATION INFORMATION

Accreditation Statement

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

Credit Designation Statement

Amedco, LLC designates this live activity for a maximum of *14.00 AMA PRA Category 1 Credits*$^{(TM)}$. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

Satisfactory Completion

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

Learning Objectives

This activity is designed for vascular surgeons and associated health care workers involved in the management of patients with vascular disease. Upon completion of this course, attendees should be able to:

- Understand the risks of stent graft oversizing during TEVAR
- Evaluate impact of tibial bypass conduit type on long term patency
- Quantify the charges of creating and maintaining hemodialysis access
- Review pharmacologic management of iliac vein stent placement
- Evaluate trends in reimbursement for femoropopliteal atherectomy and appropriateness of care
- Assess effects if symptom type and time of symptom onset on outcomes following carotid endarterectomy
- Review feasibility of virtual examinations for vascular surgery trainees
- Understand contemporary outcomes after infected aortic graft resection
- Evaluate outcomes of selective versus routine spinal drain use for fenestrated EVAR

2021 SCHEDULE-AT-A-GLANCE

Thursday, January 21, 2021

7:25 am – 12:30 pm **NEXT GENERATION STUDENT MENTOR PROGRAM**
Moderator: John Rectenwald, MD

7:25 am – 12:30 pm **VASCULAR FELLOW PROGRAM**
Moderator: Joanelle Lugo, MD

4:00 pm – 6:00 pm **SCIENTIFIC SESSION I**
Moderators: Matthew Corriere, MD & Bjoern Suckow, MD

4:00 pm – 4:15 pm 1
Stent Graft Oversizing is Associated with an Increased Risk of Long Term Left Ventricular Wall Thickening in Young Patients Following TEVAR
Marissa C. Kuo, Richard A. Meena, Christopher R. Ramos, Jaime Benarroch-Gampel, Bradley G. Leshnower, Yazan Duwayri, William D. Jordan, Jr., Ravi R. Rajani - Emory University School of Medicine, Atlanta, GA

4:15 pm – 4:30 pm 2
The Intraoperative Vascular Assist: Essential to Urgent Surgical Care
Cassandra Soto[1], Sally Tarabey[1], Charles Hamilton[1], Michael A. Ciaramella[1], Alexander Malanowski[1], Saum Rahimi[2], William Beckerman[2] - [1]Robert Wood Johnson Medical School, Rutgers University, New Brunswick, NJ; [2]Robert Wood Johnson University Hospital, New Brunswick, NJ

4:30 pm – 4:45 pm 3
Popliteal Vein External Banding for Treatment of Chronic Venous Insufficiency
Shayna Brathwaite, Ravi Rajani - Emory University, Atlanta, GA

4:45 pm – 5:00 pm 4
Impact of Tibial Bypass Conduit on Long-Term Patency and Survival in the Vascular Quality Initiative
Varun Dalmia, Matthew Carnevale, Patricia Friedmann, Jeffrey Indes, Evan Lipsitz, John Futchko, Issam Koleilat - Albert Einstein College of Medicine, Bronx, NY

5:00 pm – 4:10 pm 5 (RF)
Management and Outcomes after Upper Versus Lower Extremity Vascular Trauma
Lindsay Gallo, LeslieAnn S. Kao, Christopher R. Ramos, Ravi R. Rajani, Jaime Benarroch-Gampel - Emory University, Atlanta, GA

5:10 pm – 5:20 pm 6 (RF)
Quantifying the Charges of Creating and Maintaining Hemodialysis Access in an All-Payer Rate-Controlled Health System
Rebecca Sorber[1], Joseph K. Canner[1], Christopher J. Abularrage[1], Paula K. Shireman[2], Dorry L. Segev[1], James H. Black, III[1], Karen Woo[3], Caitlin W. Hicks[1] - [1]Johns Hopkins School of Medicine, Baltimore, MD; [2]University of Texas Health San Antonio Long School of Medicine & The South Texas Veterans Health Care System, San Antonio, TX; [3]UCLA School of Medicine, Los Angeles, CA

5:20 pm – 5:30 pm 7 (RF)
Redo Hemodialysis Access in Elderly Patients has Acceptable Outcomes with Similar Patency of Arteriovenous Fistulas as Compared to Grafts
M. Libby Weaver[1], Courtenay M. Holscher[2], Rebecca A. Sorber[2], Thomas Reifsnyder[3] - [1]University of Florida, Gainesville, FL; [2]The Johns Hopkins University School of Medicine, Baltimore, MD; [3]Johns Hopkins Bayview Medical Center, Baltimore, MD

5:30 pm – 5:45 pm 8
Adjunctive False Lumen Intervention for Aortic Dissection is Safe but Offers Unclear Benefit
Rae S. Rokosh[1], Neal Cayne[1], Jeffrey J. Siracuse[2], Virendra Patel3, Thomas Maldonado[1], Caron Rockman[1], Michael E. Barfield[1], Glenn Jacobowitz[1], Karan Garg[1] - [1]NYU Langone Health, New York, NY; [2]Boston Medical Center, Boston, MA; [3]Columbia University Irving Medical Center, New York, NY

5:45 pm – 6:00 pm 9
Trends in Pharmacologic Management after Iliac Venous Stent Placement
Daniel Veyg[1], Mustafa Alam[1], Julio Ramos[2], Songhon Hwang[2], Michael Marin[2], Peter Fairies[2], Windsor Tlng[2] - [1]NYIT College of Osteopathic Medicine, Glen Head, NY; [2]Icahn School of Medicine at Mount Sinai, New York, NY

2021 SCHEDULE-AT-A-GLANCE

6:00 – 6:30 pm **INDUSTRY-SPONSORED SYMPOSIUM**
Presented by: Convatec

6:30 pm – 6:45 pm **INDUSTRY-SPONSORED SYMPOSIUM**
Presented by: Boston Scientific

Friday, January 22, 2021

7:00 am – 9:15 am **SCIENTIFIC SESSION II**
Moderators: Shang Loh, MD & Max Wohlauer, MD

7:00 am – 7:15 am 10
Medicare Reimbursement Trends 2012 - 2017 for Femoral Popliteal Artherectomy and Stenting: High Reimbursement Amount Possibly Incentivizing Inappropriate Medical Provider Care?
Matthew Hafner[1], Bassel Bashjawish[2], Joel Crawford[3] - [1]Saint Barnabas Medical Center, Livingston, NJ; [2]SUNY Upstate, Syracuse, NY; [3]Sutter Medical Foundation, Roseville, CA

7:15 am – 7:30 am 11
Racial and Regional Disparities in the Utilization of Preventative Care Strategies Among Patients with Peripheral Artery Disease and Diabetes
Mark Anthony Eid[1], Kunal Mehta[1], Jonathan Aaron Barnes[1], Zachary Wanken[1], Barbara Gladders[2], Andrea M. Austin[3], Mark A. Creager[1], Marc P. Bonaca[4], Mark W. Feinberg[5], David H. Stone[1], Philip P. Goodney[1] - [1]Dartmouth-Hitchcock Medical Center, Lebanon, NH; [2]The Dartmouth Institute for Health Policy and Clinical Practice, Lebanon, NH; [3]The Dartmouth Institute for Health Policy and Clinical Practice, Hanover, NH; [4]University of Colorado Medical Center, Aurora, CO; [5]Brigham and Women's Hospital, Boston, MA

7:30 am – 7:45 am 12
High Mortality and Venous Thromboembolism Risk Following Major Penetrating Abdominal Venous Injuries
Maha H. Haqqani[1], Scott R. Levin[1], Jeffrey A. Kalish[1], Alik Farber[1], Tejal S. Brahmbhatt[1], Aaron P. Richman[1], Jeffrey J. Siracuse[1], Douglas W. Jones[2] - [1]Boston Medical Center, Boston University School of Medicine, Boston, MA; [2]University of Massachusetts Medical Center, Worcester, MA

7:45 am – 8:00 am 13
Effect of Symptom Type and Time from Symptom Onset on Outcomes Following Carotid Endarterectomy
Jinny Lu Beth[1], Chun Li[1], Livia de Guerre[1], Kirsten Dansey[1], Ruby Lo[2], Fahad Shuja[1], Marc Schermerhorn[1] - [1]Israel Deaconess Medical Center, Boston, MA; [2]Brown University, Providence, RI; [3]Mayo Clinic, Rochester, MN

8:00 am – 8:10 am 14 (RF)
Feasibility of Virtual Examinations for Vascular Surgery Trainees
Mark Zemela[1], Brigitte Smith[2], Rafael Malgor[3], Matthew R. Smeds[1] - [1]Saint Louis University, St. Louis, MO; [2]University of Utah, Salt Lake City, UT; [3]University of Colorado, Aurora, CO

8:10 am – 8:20 am 15 (RF)
Withdrawn

8:20 am – 8:30 am 16 (RF)
Benefits of Acute Normovolemic Hemodilution in Open Aortic Aneurysm Repair
Nathan Droz[1], Christopher Vo[1], Katherine Morrow[2], Behzad Farivar[1], Francis Caputo[1], Sean Lyden[1], Jia Lin[1], Christopher Smolock[1] - [1]Cleveland Clinic, Cleveland, OH; [2]Case Western Reserve University School of Medicine, Cleveland, OH

8:30 am – 8:45 am 17
Outcomes of Carotid Endarterectomy and Carotid Artery Stenting in Functionally Dependent and Independent Patients
Ahsan Zil-E-Ali[1], Victoria Kusztos[2], Faisal Aziz[1] - [1]Penn State College of Medicine, Hershey, PA; [2]Albert Einstein College of Medicine, New York, NY

2021 SCHEDULE-AT-A-GLANCE

8:45 am – 9:00 am

18
Initial Post-Operative Visit Absenteeism is Associated with Worse Amputation-Free Survival after Tibial Angioplasty
Anthony N. Grieff, Sapna Syal, William E. Beckerman, Justin Ady, ShihYau Huang - Rutgers Robert Wood Johnson, New Brunswick, NJ

9:00 am – 9:15 am

INDUSTRY-SPONSORED SYMPOSIUM
Presented by: Abbott Vascular

9:15 am – 10:00 am

INDUSTRY-SPONSORED SYMPOSIUM
Presented by: Janssen Pharmaceuticals

3:00 pm – 4:00 pm

ROUND TABLE SESSION
Case Reports and Video Presentations
Moderator: Karan Garg, MD

3:00 pm

(Case)
Retrograde Endovascular with Intimal Re-Entry Through Endarterectomy: The REWIRE Technique
Jordan R. Stern[1], Peter H. Connolly[2], Andrew J. Meltzer[3] – [1]Stanford University, Stanford, CA; [2]Weill Cornell Medicine, New York, NY; [3]Mayo Clinic, Phoenix, AZ

3:10 pm

(Video)
Interesting Complication after a Hybrid Aortic Arch Debranching and TEVAR for Type A Retrograde Dissection
Rolla Zarifa*[1], Sara Gaines*[1], Hyde Russell*[2], Cheong Jun Lee[3] – [1]University of Chicago, Chicago, IL; [2]Northshore University Health System, Chicago, IL; [3]Northshore University Health System, Evanston, IL

3:20 pm

(Case)
Percutaneous Pedal Artery Access for Distal Perfusion in the Setting of Limb Ischemia Following VA ECMO Cannulation – A Case Report
Yohanis O'Neill-Castro, Steven Cheung, Jason N. MacTaggart, Jason M. Johanning, Aleem Siddique, Iraklis I. Pipinos – University of Nebraska Medical Center, Omaha, NE

3:30 pm

(Video)
Axillary Vein to Superior Vena Cava Bypass for Dialysis Access Salvage
Ross G. McFall, Paul Haddad, Marvin Atkins, Eric Peden – Houston Methodist Hospital, Houston, TX

3:40 pm

(Case)
Subclavian Stump Syndrome Following Thoracic Endovascular Aortic Repair
Felecia N. Jinwala, Shahab Toursavadkohi – University of Maryland Medical Center, Baltimore, MD

4:00 pm – 6:00 pm

SCIENTIFIC SESSION III
Moderators: Sharon Kiang, MD & Caitlin Hicks, MD

4:00 pm – 4:15 pm

19
Underutilization of Palliative Care for Patients with Advanced Peripheral Arterial Disease
Mimmie Kwong, Eleanor E. Curtis, Matthew W. Mell - U.C. Davis, Sacramento, CA

4:15 pm – 4:30 pm

20
The Fundamentals of Vascular Surgery: When Do Vascular Trainees Achieve Basic Open Surgical Competency?
Malachi Sheahan[1], Alykhan Lalani[1], Jason Lee[2], Murray Shames[3], David Rigberg[4], Bryan Cass[1], Claudie Sheahan[1], Jean Bismuth[5] - [1]Louisiana State University Health Sciences Center, New Orleans, LA; [2]Stanford University, Stanford, CA; [3]University of South Florida, Tampa, FL; [4]University of California Los Angeles School of Medicine, Los Angeles, CA; [5]Houston Methodist Hospital, Houston, TX

4:30 pm – 4:345 pm

21
A Reappraisal of CT Angiography Derived Duplex Ultrasound Velocity Criteria with a Comparison to Digital Subtraction Angiography in Patients with Carotid Artery Stenosis
Christian Dohring, Joshua T. Geiger, Adam J. Doyle - University of Rochester Medical Center, Rochester, NY

2021 SCHEDULE-AT-A-GLANCE

4:45 pm – 5:00 pm

22
Outcomes of Arterial Grafts for the Reconstruction of Military Lower Extremity Arterial Injuries
Robert B. Laverty[1], Anne O'Shea[1], Thomas J. Walters[2], David S .Kauvar[1] - [1]Brooke Army Medical Center, JBSA Fort Sam Houston, TX; [2]US Army Institute of Surgical Research, JBSA Fort Sam Houston, TX

5:00 pm – 5:10 pm

23 (RF)
Patients with Chronic Limb Threatening Ischemia Prioritize Mobility over Pain, Support Systems, Wounds, or Mental Health
Bjoern Suckow[1], Sarah Bessen[1], Dorothy Hebb[1], Glyn Elwyn[2], David Stone[1], Jesse Columbo[1], Philip Goodney[1] - [1]Dartmouth-Hitchcock Lebanon, NH; [2]Dartmouth Institute for Health Policy & Clinical Practice, Lebanon, NH

5:10 pm – 5:20 pm

24 (RF)
The Impact of Comorbid Depression on Mortality and Amputation Risk in Patients with Chronic Limb Threatening Ischemia
Tara Zielke[1], Michael Wesolowski[2], Melissa D'Andrea[1], Bernadette Aulivola[3] - [1]Loyola Stritch School of Medicine, Maywood, IL; [2]Loyola University of Chicago Health Sciences, Maywood, IL; [3]Loyola University Medical Center, Maywood, IL

5:20 pm – 5:30 pm

25 (RF)
Risk Analysis Index: When is the Patient Too Frail to Undergo a Carotid Artery Endarterectomy?
Sally Boyd[1], Kedar S. Lavingia[1], Wayne Tse[1], Michael Amendola[2] - [1]Virginia Commonwealth University, Richmond, VA; [2]Central Virginia VA Health Care System, Richmond, VA

5:30 pm – 5:45 pm

26
Predictors of Adherence to Antihypertensive Therapy Among Patients Treated for Acute Type -B Aortic Dissections
Benjamin S. Brooke, Claire L. Griffin, Jason P. Glotzbach, Shardool Patel, Larry W. Kraiss - University of Utah, Salt Lake City, UT

5:45 pm – 6:00 pm

27
Contemporary Outcomes after Partial Resection of Infected Aortic Grafts
Matthew R. Janko[1], Karen Woo[2], Jayer Chung[3], Vikram S. Kashyap[1], Peter F. Lawrence[2], Jonathan Bath[4], Matthew R. Smeds[5] - [1]University Hospitals Cleveland Medical Center/Case Western Reserve University, Cleveland, OH; [2]University of California Los Angeles, Los Angeles, CA; [3]Baylor College of Medicine, Houston, TX; [4]MU Heath Care/University of Missouri, Columbia, MO; [5]SLUCare Physician Group/St. Louis University, St. Louis, MO

6:00 pm

VESS Member Business Meeting

Saturday, January 23, 2021

7:00 am – 8:30 am

SCIENTIFIC SESSION IV
Moderators: Matthew Smeds, MD & Nathan Liang, MD

7:00 am – 7:15 am

28
Twenty-Eight Year Experience with Ruptured and Symptomatic Type I-III Thoracoabdominal Aortic Aneurysms at a Large Tertiary Referral Center
Christopher Latz, Charles DeCarlo, Laura Boitano, Linda Wang, Zach Feldman, Anna Pendleton, Mark Conrad, Samuel Schwartz - General Hospital Boston MA

7:15 am – 7:30 am

29
Procedure Reimbursement, Inflation and the Declining Buying Power of the Vascular Surgeon (2011-2019)
Jack Haglin[1], Weslyn Bunn[1], Samuel Money[1], Victor Davila[2], William Stone[2], Ina Soh[2], Andrew Meltzer[2] - [1]Mayo Clinic Scottsdale, AZ; [2]Mayo Clinic, Phoenix, AZ

7:30 am – 7:45 am

30
Long-Term Functional Decline Following Vascular Surgery Among Vulnerable Adults
Madeline M. DeAngelo, Jordan B. Peacock, Teryn A. Holeman, Maria Maloney, Julie Beckstrom, Benjamin S. Brooke - University of Utah School of Medicine, Salt Lake City, UT

2021 SCHEDULE-AT-A-GLANCE

7:45 am – 8:00 am

31
Use of Intravascular Ultrasound During First-Time Femoropopliteal Peripheral Vascular Interventions Among Medicare Beneficiaries
Sarah E. Deery, Chen Dun, David P. Stonko, Christopher J. Abularrage, James H. Black, III, Martin A. Makary, Caitlin W. Hicks - Johns Hopkins Hospital, Baltimore, MD

8:00 am – 8:10 am

32 (RF)
Contemporary Rates of Inferior Vena Cava Filter Thrombosis and Risk Factors
Ryan King, Mathew Wooster, Ravi Veeraswamy, Elizabeth Genovese - Medical University of South Carolina, Charleston, SC

8:10 am – 8:20 am

33 (RF)
Analysis of Medicare Payments for Pre-Operative Imaging Prior to Carotid Endarterectomy
Nathan Itoga, Krishna Martinez-Singh, John Harris, Jason Lee, Laurence Baker, Manuel Garcia-Toca - Stanford University, Stanford, CA

8:20 am – 8:30 am

34 (RF)
Acute Thrombotic Event from COVID-19 Infection: Short-Term Follow-Up
Christopher M. Faries, Ajit Rao, Nicole Ilonzo, Songhon Hwang, Prakash Krishnan, Serdar Farhan, Windsor Ting, John Lantis, Michael L. Marin, Peter L. Faries – Icahn School of Medicine at Mount Sinai, New York, NY

8:30 am – 9:00 am

AWARD SESSION
Moderators: Matthew Corriera, MD & Christopher Smolock, MD

Update from 2020 Winner(s)

- Travel Award – Postponed Until 2021
- Resident Research Award – Christopher Audu
- Early Career Faculty Award – Sam Tyagi

2021 Award Winners

- VESS Travel Award
- VESS/Medtronic Resident Research Award
- VESS Early Career Faculty Research Award

9:00 am – 9:10 am

Introduction of the President
Jason Lee, MD

9:10 am – 9:55 am

PRESIDENTIAL ADDRESS
Matthew Corriere, MD

10:00 am – 10:45 am

PANEL ON IMPLICIT BIAS
Supported by: Medtronic

Panelists: Jean Starr, MD, Jeannie Ruddy, MD, Christine Shokrzadeh, MD & Vik Kashap, MD

3:45 pm – 4:00 pm

INDUSTRY-SPONSORED SYMPOSIUM
Presented by: Silk Road Medical

4:00 pm – 6:00 pm

SCIENTIFIC SESSION V
Moderators: Misty Humphries, MD & Manuel Garcia Toca, MD

4:00 pm – 4:15 pm

35
Long-Term Durability of Superficial Femoral Vein AV Fistula for Dialysis Access
Kristine C. Orion[1], Tanner Kim[2], Anthony Rizzo[1], Jonathan Cardella[2], Anthony Rizzo[3], Timur Sarac[1] - [1]Ohio State University Wexner Medical Center, Columbus, OH; [2]Yale University School of Medicine, New Haven, CT; [3]Cleveland Clinic, Columbus, OH

4:15 pm – 4:30 pm

36
Vascular Surgery Program Director Work Hours and Compensation Do Not Align with ACGME Proposed Requirements
Murray Shames[1], Kapland Owens[1], William Robinson[2], Amy Reed[3]; Jason Lee[4], William Jordan[5], Malachi Sheahan[6] - [1]University of South Florida, Tampa, FL; [2]East Carolina University, Greenville, NC; [3]University of Minnesota, Minneapolis, MN; [4]Stanford University, Stanford, CA; [5]Emory University School of Medicine, Atlanta, GA; [6]Louisiana State University Health Sciences Center, New Orleans, LA

2021 SCHEDULE-AT-A-GLANCE

4:30 pm – 4:45 pm

37
Laser In Situ Fenestration for Revascularization in Thoracic Endovascular Aortic Arch Repair: A Single Center Analysis
Elizabeth Evans, Ravikumar Veeraswamy, Sanford Zeigler, Mathew Wooster - Medical University of South Carolina, Charleston, SC

4:45 pm – 5:00 pm

38
Closure Device Use for Common Femoral Artery Antegrade Access is Higher Risk than Retrograde Access
Joel L. Ramirez[1], Eric J.T. Smith[1], Devin S. Zarkowsky[2], Jose Lopez[1], Caitlin W. Hicks[3], Peter A. Schneider[1], Michael S. Conte[1], James C. Iannuzzi[1] - [1]University of California, San Francisco, San Francisco, CA; [2]University of Colorado, Aurora, CO; [3]Johns Hopkins Hospital, Baltimore, MD

5:00 pm – 5:10 pm

39 (RF)
Risk Factors and Management of Steal Syndrome after Hemodialysis Access Creation
Shin-Rong Lee[1], Alan Dardik[1], Jeffrey Siracuse[2], Cassius Ochoa Chaar[1] - [1]Yale University School of Medicine, New Haven, CT; [2]Boston University School of Medicine, Boston, MA

5:10 pm – 5:20 pm

40 (RF)
Adjunctive Superior Mesenteric/Portal Venous Reconstruction in the Treatment of Borderline Resectable Pancreatic Adenocarcinoma
William Duong, Roy Fujitani, Steven Tohmasi, Cyrus Farzaneh, Nii-Kabu Kabutey, Shelley Maithel, Carlos Donayre, Zeljka Jutric, David Imagawa - University of California, Irvine, Orange, CA

5:20 pm – 5:30 pm

41 (RF)
The 2014 U.S. Preventive Services Task Force Abdominal Aortic Aneurysm Screening Guidelines Negligibly Impacted Repair Rates in Male Never Smokers and Female Smokers
Scott R. Levin[1], Alik Farber[1], Philip P. Goodney[2], Marc L. Schermerhorn[3], Mohammad H. Eslami[4], Katharine L. McGinigle[5], Julia Raifman[6], Jeffrey J. Siracuse[1] - [1]Boston University, Boston, MA; [2]Dartmouth-Hitchcock Medical Center, Lebanon, NH; [3]Beth Israel Deaconess Medical Center, Harvard Medical School, Boston, MA; [4]University of Pittsburgh Medical Center, Pittsburgh, PA; [5]University of North Carolina Medical Center, Chapel Hill, NC; [6]Boston University School of Public Health, Boston, MA

5:30 pm – 5:45 pm

42
A Single Center 8-Year Experience of Segmental Arterial Mediolysis Management
Arvind Srinivasan, Ayokunle Olowofela, Brian Lewis, Peter Rossi, Neel Mansukhani - Medical College of Wisconsin, Milwaukee, WI

5:45 pm – 6:00 pm

43
Unique Failure Modes and Complications of Iliac Branch Devices
Jordan R. Stern, Kenneth Tran, Ming Li, Jason T. Lee - Stanford University, Stanford, CA

Sunday, January 24, 2021

7:00 am – 9:00 am

SCIENTIFIC SESSION VI
Moderators: Jason Lee, MD & Mark Conrad, MD

7:00 am – 7:15 am

44
Selective vs. Routine Spinal Drain Use for Fenestrated/Branched Endovascular Aortic Repair (F-BEVAR)
Carla Scott, David Timaran, Fatemeh Malekpour, Marc Salhanick, Marilisa Soto Gonzalez, Mirza Baig, Carlos Timaran - University of Texas Southwestern Medical Center, Dallas, TX

7:15 am – 7:30 am

45
Development of a Convolutional Neural Network to Detect Infrarenal Abdominal Aortic Aneurysms
Justin Camar, Andrew Pop, Mathew Shedd, Brandon Dobrowsky, Cole Knox, Roger Tomihama, Sharon C. Kiang - Loma Linda University School of Medicine, Loma Linda, CA

2021 SCHEDULE-AT-A-GLANCE

7:30 am – 7:45 am	46 **Hybrid and Total Endovascular Approaches to Tandem Carotid Artery Have Similar Short- and Long-Term Outcomes** Charles Decarlo[1], Adam Tanious[1], Laura T. Boitano[1], Jahan Mohebali[1], David H. Stone[2], W. Darrin Clouse[3], Mark F. Conrad[1] - [1]Massachusetts General Hospital, Boston, MA; [2]Dartmouth-Hitchcock Medical Center, Lebanon, NH; [3]University of Virginia, Charlottesville, VA
7:45 am – 8:00 am	47 **Progression of Changes in Vascular Surgery Practices During the Novel Corona Virus SARS-CoV-2 Pandemic** Matthew R. Smeds[1], Faisal Aziz[2], Jonathan Bath[3] - [1]Saint Louis University, St. Louis, MO; [2]Pennsylvania State University, Hershey, PA; [3]University of Missouri, Columbia, MO
8:00 am – 8:10 am	48 (RF) **Surgeon Volume and Established Hospital Peri-Operative Mortality Rate Together Predict Superior Outcomes after Open AAA Repair** Joshua Geiger, Fergal Fleming, Michael Stoner, Adam Doyle - University of Rochester Medical Center, Rochester, NY
8:10 am – 8:20 am	49 (RF) **Ultrasound Screening of Abdominal Aortic Aneurysm by Junior Medical Officers in Australian Rural Hospital Setting: A Pilot Study** Vincent Wang Hon Chow, Mei Ping Melody Koo - St. Vincent's Hospital Melbourne, Victoria, Fitzroy, Victoria, Australia
8:20 am – 8:30 am	50 (RF) **Can Machine Learning Models Predict Failure of Maturation of Arteriovenous Fistula?** Siavash Bolourani, Amit Rao, Avinash Garlapati, Jeffrey Silpe, Firas Mussa, Gregg Landis, Yana Etkin - Donald and Barbara Zucker School of Medicine at Hofstra/Northwell, New Hyde Park, NY
8:30 am – 8:45 am	51 **Impact of Vessel Size on Midterm Outcomes after Percutaneous Transluminal Angioplasty for Isolated De Novo Superficial Femoral Artery Disease** Heepeel Chang[1], Caron B. Rockman[1], Glenn R. Jacobowitz[1], Neal S. Cayne[1], Virenda I. Patel[2], Karan Garg[1] - [1]New York University, New York, NY; [2]New York Presbyterian/Columbia University Medical Center, New York, NY
8:45 am – 9:00 am	52 **Aortic Neck Dilatation Following Endovascular Repair of Thoracic Aortic Aneurysm** Patricia Yau[1], Patricia Friedmann[2], Jeffrey Indes[1], Evan Lipsitz[1], Hasan Aldailami[1] - [1]Montefiore Medical Center, Bronx, NY; [2]Albert Einstein College of Medicine, Bronx, NY
9:00am	Adjourn

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Thursday, January 21, 2021

7:25 am **NEXT GENERATION STUDENT MENTOR PROGRAM**
Moderator: John Rectenwald, MD

7:25 am **VASCULAR FELLOW PROGRAM**
Moderator: Joanelle Lugo, MD

4:00 pm **SCIENTIFIC SESSION I**
Moderators: Matthew Corriere, MD & Bjoern Suckow, MD

4:00 pm 1
Stent Graft Oversizing is Associated with an Increased Risk of Long Term Left Ventricular Wall Thickening in Young Patients Following TEVAR
Marissa C. Kuo, Richard A. Meena, Christopher R. Ramos, Jaime Benarroch-Gampel, Bradley G. Leshnower, Yazan Duwayri, William D. Jordan, Jr., Ravi R. Rajani - Emory University School of Medicine, Atlanta, GA

INTRODUCTION AND OBJECTIVES: Left ventricular (LV) wall thickening occurs in patients following thoracic endovascular aortic repair (TEVAR). Clinical consequences of cardiovascular (CV) remodeling may be more significant younger patients with longer anticipated life spans. Risk factors for CV remodeling following TEVAR are unknown but may be related to graft size.

METHODS: A retrospective analysis was performed of a multicenter healthcare system including patients aged ≤ 60 who underwent TEVAR between 2011 and 2019 with at least one year follow-up computed tomography angiography imaging available. Standard perioperative variables, native aortic diameter, and stent graft specifications were collected. Graft oversizing was calculated by dividing proximal graft diameter by proximal aortic diameter on pre-operative imaging. Posterior LV wall thickness was measured at baseline and interval increases were normalized to time-to-follow-up. Primary outcome was annual rate of posterior LV wall thickening.

RESULTS: 101 patients met inclusion criteria with a mean (SD) follow-up time of 1270 (693) days. Overall mean (SD) rate of LV wall thickness change was 0.534 (0.750) mm per year. Mean (SD) absolute LV wall thickness at most recent follow-up was 10.97 (2.85) mm for men, 9.69 (2.03) mm for women. Multivariate analysis demonstrated that higher rates of LV wall thickening were associated with narrower graft diameters (p=0.0311). Greater absolute LV wall thickness at follow-up was associated with narrower grafts (p=0.0155) and greater graft oversizing (p=0.0376). Logistic regression demonstrated individuals who met criteria for LV hypertrophy were more likely to have narrower stent-grafts (p=0.00798) and graft oversizing (p=0.0315).

CONCLUSIONS: LV wall thickening occurred to a greater degree in individuals with narrower stent-grafts and higher rates of graft oversizing. This has significant implications for long-term cardiovascular health in younger patients may undergo TEVAR for atypical indications. Particular attention should be paid to long-term effects of stent-graft oversizing when selecting grafts in such populations.

4:15 pm 2
The Intraoperative Vascular Assist: Essential to Urgent Surgical Care
Cassandra Soto[1], Sally Tarabey[1], Charles Hamilton[1], Michael A. Ciaramella[1], Alexander Malanowski[1], Saum Rahimi[2], William Beckerman[2] - [1]Robert Wood Johnson Medical School, Rutgers University, New Brunswick, NJ; [2]Robert Wood Johnson University Hospital, New Brunswick, NJ

INTRODUCTION AND OBJECTIVES: The wide breadth of vascular surgery (VS) training emboldens vascular surgeons to assistant in nonvascular operations and rapidly respond to urgent and emergent needs for intervention. This study aims to evaluate VS secondary operative assistance and intraoperative consultations.

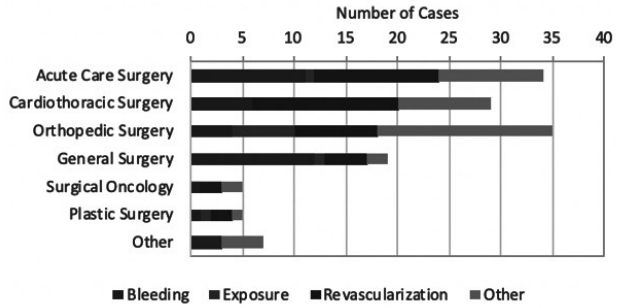
METHODS: Retrospective review of all patients requiring urgent or emergent operative intervention with a vascular surgeon as secondary surgeon between January 1st, 2011 and January 31st, 2020 at a single institution. Any cases with VS as primary service were excluded. Patient demographics, operative variables, and in hospital outcomes were evaluated.

RESULTS: One hundred thirty-four patients requiring urgent or emergent surgical interventions necessitating VS assistance were identified. The median age was 56.0 years (IQR: 30.8-68.0). Most patients were male (91, 67.9%), White (77, 57.5%), BMI >25 (84, 62.7%), and ASA ≥4 (83, 61.9%). Thirty-eight (28.4%) cases occurred after hours (≥18:00, <06:00) and 85 (63.4%) cases were emergent. Seventy-four (55.2%) cases involved intraoperative consultations, whereas, 60 (44.8%) provided advance notice of need for secondary assistance. The most common services requesting consultations were orthopedic surgery (35, 26.1%), acute care surgery (34, 25.3%), cardiothoracic surgery (29, 21.6%), and general surgery (19, 14.2%). Vascular interventions included revascularization (42, 31.3%), control of bleeding (38, 28.4%), and exposure (9, 6.7%). Additionally, there were 18 (13.4%) IVC filter placements immediately preoperatively. In hospital survival to discharge was 74.6%.

CONCLUSION: With the armamentarium of open, endovascular, and hybrid interventions, vascular surgeons are prepared to respond and intervene in nonvascular cases in the event of unexpected vascular compromise, iatrogenic injury, or challenging exposure. This study reinforces the role of VS in an institution's ability to promptly offer surgical intervention in patients with severe acuity.

Figure 1. Comparison of Cases by Consulting Service

A) Vascular Assist Category



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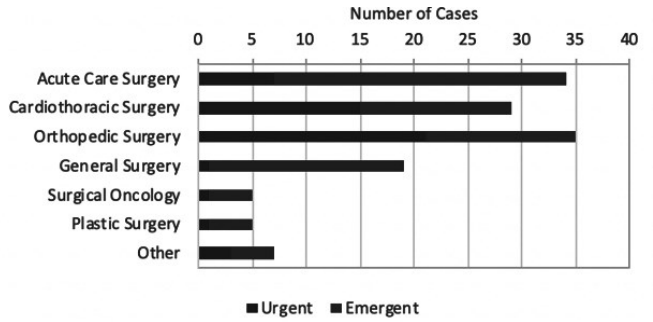
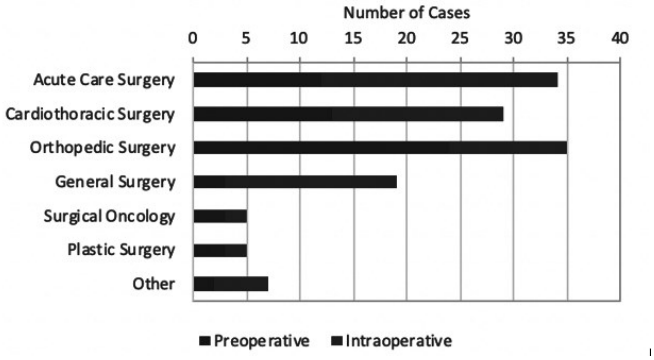
B) Case Acuity



C) Preoperative vs. Intraoperative Consult



4:30 pm 3

Popliteal Vein External Banding for Treatment of Chronic Venous Insufficiency

Shayna Brathwaite, Ravi Rajani - Emory University, Atlanta, GA

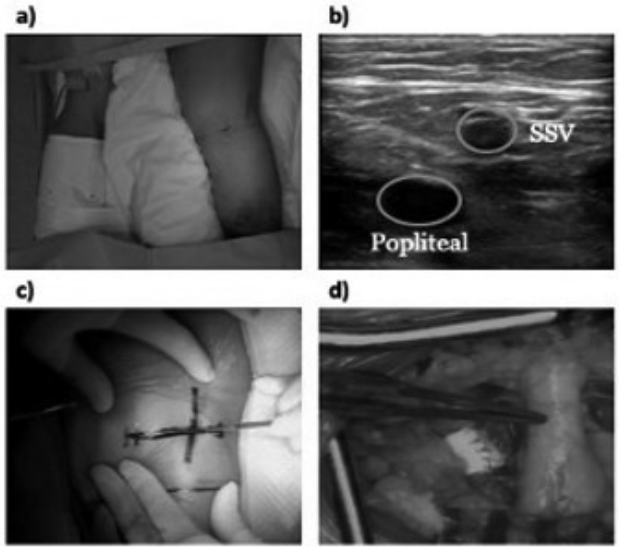
INTRODUCTION AND OBJECTIVES: Chronic venous insufficiency (CVI) remains a challenging global problem with significant impact on patient quality of life. Despite multiple different available surgical therapies, the outcomes following deep venous surgical reconstruction remain marginal. Popliteal vein external banding (PVEB) has been described, but prior reports have focused on specific patient subgroups. Our study aims to retrospectively review the outcomes for the largest U.S. series of consecutive patients undergoing PVEB.

METHODS: Patients with C4-C6 disease with underlying deep femoropopliteal venous reflux were treated with PVEB. Demographic, ultrasound, and procedural data and procedure specific outcomes were collected. Operative technique was the same for all patients (Figure 1). The primary outcome was improvement of symptoms or wound healing.

RESULTS: Twelve patients were identified. Seventy-five percent of patients had a history of DVT on the ipsilateral extremity and 66.7% (n=6) of those patients had previous iliac vein stenting for post-phlebitic syndrome. 58.3% of patients had active ulcerations (C6) at the time of PVEB. Patients were followed for a mean 8.62 months. Of the 8 patients that had active ulcers (C6), 75% were healed at 3-month follow-up. 91.6% of patients self-reported clinical improvement in their symptoms (i.e. reduction in edema/swelling and pain). There were three post-operative complications, all of which involved superficial wound dehiscence managed with basic bedside wound care.

CONCLUSIONS: Popliteal vein external banding represents a safe and effective treatment modality for patients with venous insufficiency secondary to deep venous reflux. It requires very little additional training and may be easily adopted at US centers interested in offering surgical therapy for deep venous reflux.

Figure 1. Operative Technique—Popliteal Vein External Banding a) Patient placed in the prone position on the operating room table. b) Pre-incision ultrasound performed to identify the small saphenous vein (SSV), the popliteal vein and the confluence, c) transverse incision is made in the popliteal fossa at the site of the SSV and popliteal vein confluence. d) Popliteal vein wrapped with PTFE patch measuring 2/3 x 1/3 the circumference of the popliteal vein.



4:45 pm 4

Impact of Tibial Bypass Conduit on Long-Term Patency and Survival in the Vascular Quality Initiative

Varun Dalmia, Matthew Carnevale, Patricia Friedmann, Jeffrey Indes, Evan Lipsitz, John Futchko, Issam Koleilat - Albert Einstein College of Medicine, Bronx, NY

INTRODUCTION AND OBJECTIVES: Optimal conduit selection for tibial artery bypass in limited clinical situations remains controversial. We sought to characterize long-term patency and mortality of patients undergoing tibial bypass across conduit types in the VQI.

METHODS: Patients who underwent elective first-time tibial bypass for occlusive disease involving rest pain or tissue loss were identified. Those with prior ipsilateral infrainguinal bypass or undergoing concomitant procedures were excluded. Outcomes of interest included survival and long-term (500 day) amputation-free primary patency (PATENCY), defined as freedom from revision, thrombectomy, occlusion, and ipsilateral amputation.

RESULTS: 3209 bypasses were identified. Compared to prosthetic and composite bypasses, vein grafts had the best survival (78.9%, p=0.035) and trended towards superior PATENCY (60.3%, p=0.34). Of the vein conduits, GSV bypasses had the best PATENCY (61.7%) and SSV the worst (50.0%). Of single-segment GSV types, in-situ configurations had the worst survival (74.5%, p=0.015) but appeared favored for PATENCY (65.0%, p=0.24). Single-segment GSV bypasses exhibited better PATENCY than multiple-segment (61.7% vs 51.9%, p=0.04). PTFE PATENCY was superior compared to biologic conduits (65.2% vs 44.4%, p=0.0024). PATENCY favored vein-cuff for prosthetic bypass

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over no vein-cuff (66.1% vs 54.9%, *p*=0.29). PATENCY was not significantly different between single-segment GSV and prosthetic grafts with vein-cuff (61.7% vs 66.1%). When evaluating the use of arm vein versus prosthetic with vein-cuff or composite grafts, there were no differences in survival (74.2% vs 75.3% vs 76.5%) or PATENCY (56.5% vs 66.1% vs 54.6%, *p*=0.49).

CONCLUSIONS: Surprisingly, there may be more equipoise among conduit types than previously thought, particularly if GSV is not used. Prosthetic may not be as disadvantaged in the long term, especially when compared to arm vein. Similarly, a vein-cuff or composite conduit may not impact the long-term outcome. Overall, these data suggest that conduit choice may not necessarily be the weakest link in tibial bypasses.

5:00 pm 5 (RF)

Management and Outcomes after Upper Versus Lower Extremity Vascular Trauma

Lindsay Gallo, LeslieAnn S. Kao, Christopher R. Ramos, Ravi R. Rajani, Jaime Benarroch-Gampel - Emory University, Atlanta, GA

INTRODUCTION: Significant literature exists regarding peripheral vascular injury management, the vast majority on lower extremities. As a result, management of arterial injuries in the upper extremities is often guided by literature specific to lower extremity vascular injuries. The purpose of this study is to use the largest single-center series reported in the literature to compare management and outcomes of upper and lower extremity injuries.

METHODS: Patients who underwent operative repair of traumatic vascular injuries of the extremities were identified from the trauma registry of a level I trauma center. A retrospective chart review (2011 -2018) was conducted. Demographic, mechanism of injuries, operative technique and outcomes were compared between patients with upper versus lower extremity vascular injuries.

RESULTS: 535 patients were included with 234 (43.8%) patients undergoing repair of upper extremity vascular injuries. Patients with upper extremity vascular injuries were more likely to be female (16.7% vs 9%,P=.007), have a pre-hospital tourniquet (21.8% vs 12%,P=.002), have associated nerve injuries (40.2% vs 4.7%,P<.0001) or present with bleeding (76.1% vs 64.1%,P=.002) but were less commonly associated with concomitant fractures (25.6% vs 39.9%,P=.0006). There was no difference in age, race or mechanism of injury. In regards of operative management, upper extremity injuries were more likely to be managed with vessel ligation (38% vs 17.6%,P<.0001) or primary anastomosis (12.4% vs 5.6%,P=.009) but less likely associated with concomitant fasciotomies (13.3% vs 56.5%,P<.0001). Postoperative, upper extremity injuries were associated with nerve deficits (21.7% vs 10%,P=.0002) while lower extremity injuries had a higher 30-day limb loss rates (5.7% vs 1.3%,P=.008). There were no differences in mortality or graft-patency rates.

CONCLUSIONS: Upper extremity vascular injuries are associated with a lower limb-loss rate but increased prevalence of neurological deficits compared to lower extremities. A high level of suspicion is paramount to intraoperatively identify associated nerve injuries to improve postoperative functional outcomes.

5:10 pm 6 (RF)

Quantifying the Charges of Creating and Maintaining Hemodialysis Access in an All-Payer Rate-Controlled Health System

Rebecca Sorber[1], Joseph K. Canner[1], Christopher J. Abularrage[1], Paula K. Shireman[2], Dorry L. Segev[1], James H. Black, III[1], Karen Woo[3], Caitlin W. Hicks[1] - [1]Johns Hopkins School of Medicine, Baltimore, MD; [2]University of Texas Health San Antonio Long School of Medicine & The South Texas Veterans Health Care System, San Antonio, TX; [3]UCLA School of Medicine, Los Angeles, CA

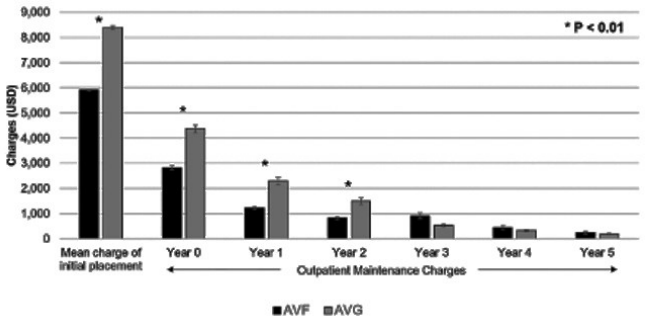
INTRODUCTION AND OBJECTIVES: The creation and maintenance of durable hemodialysis access is critical in reducing patient morbidity and controlling costs within health systems. We examined the charges associated with hemodialysis access placement and its maintenance within a rate-controlled health system.

METHODS: The Maryland Health Services Cost Review Commission administrative claims database was used to identify patients undergoing access placement from 2012-2019. Patients were identified using access placement CPT codes, and charges (equivalent to payments in Maryland) were accrued for the initial encounter and all subsequent outpatient access-related encounters. Wilcoxon and t-tests were used to compare reinterventions and access-related charges (USD) between arteriovenous fistulae (AVF) and arteriovenous grafts (AVG). Multivariable modeling was used to quantify the association of access type with charge variation.

RESULTS: Overall, 10,913 patients underwent access placement (68.6% AVF vs. 31.4% AVG). AVF was associated with a longer primary patency (mean 168 vs. 55 days) and lower number of cumulative reinterventions (1.47 vs. 2.13) compared to AVG (both p<0.0001). AVF was associated with lower overall charges in the year of placement ($11,419 vs. $16,326, p<0.001), a difference that remained significant over the subsequent 3 years. The lower charges associated with AVF were present both in the charges associated with initial placement and subsequent maintenance (Figure). On multivariable analysis adjusting for baseline differences between groups, AVF was associated with a $3,288 reduction in total access-related charges versus AVG (95%CI -$3549, -3027).

CONCLUSIONS: AVF require fewer interventions and are associated with lower charges at placement and over the first three years of maintenance compared to AVG. The use of AVF for hemodialysis access represents an opportunity for healthcare savings in select patient populations.

Figure 1. Longitudinal Charges for AVF vs. AVG



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5:20 pm

7 (RF)

Redo Hemodialysis Access in Elderly Patients has Acceptable Outcomes with Similar Patency of Arteriovenous Fistulas as Compared to Grafts

M. Libby Weaver[1], Courtenay M. Holscher[2], Rebecca A. Sorber[2], Thomas Reifsnyder[3] - [1]University of Florida, Gainesville, FL; [2]The Johns Hopkins University School of Medicine, Baltimore, MD; [3]Johns Hopkins Bayview Medical Center, Baltimore, MD

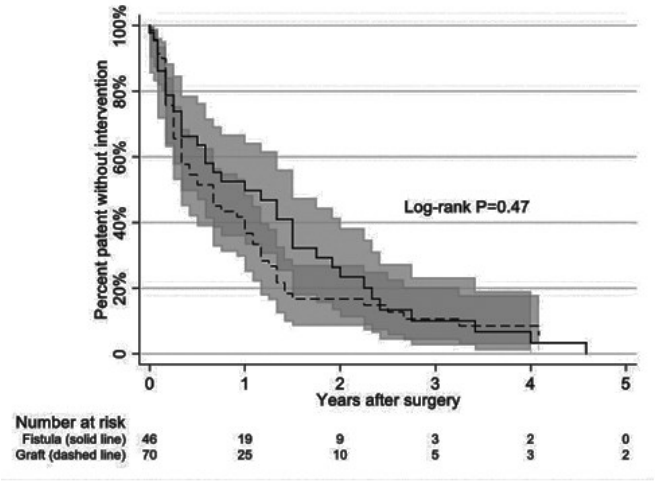
INTRODUCTION AND OBJECTIVES: Selecting optimal hemodialysis access in elderly patients remains challenging, particularly in those requiring new options after failed initial access. We sought to describe the outcomes of redo hemodialysis access in elderly patients.

METHODS: All patients aged ≥65 undergoing hemodialysis access placement from 2014-2019 were retrospectively identified in the electronic medical record. Characteristics and outcomes of those with initial versus redo access were compared. Patency was depicted utilizing Kaplan-Meier methods, with censoring at loss to follow-up or death, and unadjusted Cox regression.

RESULTS: Overall, 211 patients undergoing 257 procedures were included in the study with a median age of 73. There were 116 (45.1%) redo, and 141 initial, access procedures. There were no differences between the two groups with the exception of central venous stenosis which was more common in the redo cohort (27.2% vs 6.4%, p<0.001). 91.5% of initial, vs 60.3% of redo, procedures were arteriovenous fistulas (p<0.001). Distribution of fistula type differed between the two groups with first time and redo procedures of 25.5% vs 6.9% radiocephalic, 28.4% vs 7.8% brachiocephalic, and 35.5% vs 37.1% brachiobasilic respectively (p<0.001). At 12 and 24 months, 63.6% and 40.8% of first-time accesses remained patent vs 51% and 25.3% of redo accesses (HR 1.37 (95% CI 1.05-1.80), p=0.02). However, there was no difference in primary patency between redo grafts and fistulas (48.7% fistulas vs 55.0% grafts at 12 months, p=0.47).

CONCLUSIONS: These results demonstrate acceptable outcomes of redo access in elderly patients. There is no evidence from this study that prosthetic grafts are preferential, suggesting elderly patients with meaningful life expectancy who require redo access should be offered autogenous options when possible.

Figure 1. Primary Patency of Redo Access with Censoring at Death or Loss to Follow-Up



5:30 pm

8

Adjunctive False Lumen Intervention for Aortic Dissection is Safe but Offers Unclear Benefit

Rae S. Rokosh[1], Neal Cayne[1], Jeffrey J. Siracuse[2], Virendra Patel3, Thomas Maldonado[1], Caron Rockman[1], Michael E. Barfield[1], Glenn Jacobowitz[1], Karan Garg[1] - [1]NYU Langone Health, New York, NY; [2]Boston Medical Center, Boston, MA; [3]Columbia University Irving Medical Center, New York, NY

INTRODUCTION AND OBJECTIVES: Adjunctive false lumen embolization (FLE) with thoracic endovascular aortic repair (TEVAR) in patients with chronic aortic dissection is thought to induce FL thrombosis and favorable aortic remodeling. However, evidence is limited and the potential benefit of FLE remains unproven.

METHODS: Patients 18+ who underwent TEVAR for chronic aortic dissection with known FLE status in the SVS VQI database 1/2010-2/2020 were included. Ruptured patients and emergent procedures were excluded. Primary outcomes were in-hospital post-operative complications and all-cause mortality. Secondary outcomes included follow-up maximum aortic diameter change, re-intervention rates, and mortality.

RESULTS: 884 patients were included: 46 had TEVAR/FLE and 838 had TEVAR alone. There was no significant difference between groups in terms of age, gender, comorbidities, maximum pre-operative aortic diameter, presentation symptomatology, or intervention indication. FLE was associated with significantly longer procedural times (178min vs. 146min, p=0.0002), increased contrast use (134mL vs. 113mL, p=0.02), and prolonged fluoroscopy time (34min vs. 21min, p<0.0001), but not associated with a significant difference in post-operative complications (17.4% vs. 13.8%, p=0.51), length of stay (6.5 vs. 5.7 days, p=0.18), or in-hospital all-cause mortality (0% vs. 1.3%, p=1). In mid-term follow-up (median 15.5months), all-cause mortality trended lower, but was not significant (2.2% vs. 7.8%); Kaplan-Meier analysis demonstrated no difference in overall survival between groups (p=0.23). Post-operative complications had the strongest independent association with all-cause mortality (HR 2.65, 95% CI 1.56-4.5, p<0.001). In patients with available follow-up imaging and re-intervention status, mean aortic diameter change (n=337, -0.71cm vs. -0.69cm, p=0.64) and re-intervention rates (n=487, 10% vs. 11.4%, p=1) were similar.

CONCLUSIONS: Adjunctive FLE can be performed safely in chronic thoracic aortic dissections without significantly higher perioperative morbidity or mortality. However, given lack of reduction in re-intervention rates, induction of significant favorable aortic remodeling, or definitive survival benefit compared to TEVAR alone, FLE utility remains unclear.

5:45 pm

9

Trends in Pharmacologic Management after Iliac Venous Stent Placement

Daniel Veyg[1], Mustafa Alam[1], Julio Ramos[2], Songhon Hwang[2], Michael Marin[2], Peter Fairies[2], Windsor TIng[2] - [1]NYIT College of Osteopathic Medicine, Glen Head, NY; [2]Icahn School of Medicine at Mount Sinai, New York, NY

INTRODUCTION AND OBJECTIVES: The optimal pharmacologic regimen after vein stent placement for chronic proximal venous outflow obstruction (PVOO) varies significantly amongst vascular surgeons. This study was conducted to highlight this concern, and support the need for a uniform treatment algorithm for pharmacological management following venous stent placement.

METHODS: We searched the PubMed database for trials that placed venous stents in the iliac region from 2009 to 2019. Studies were included if they had at least 10 patients and if a specific postoperative anticoagulation and/or anti-platelet protocol was included in the study. We then excluded studies that had a greater

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than 60% post-thrombotic cohort. We reviewed the type of post stent medication used, the length of time for which it was used, the basic demographics of the trial cohort, and the frequency of post-thrombotic patients.

RESULTS: Nine studies met inclusion criteria and included a total of 1,394 patients who underwent venous stenting for chronic PVOO. Mean age of patients was 55 years with a female to male ratio of 2:1. The most common post vein stent pharmacological therapy was low molecular weight heparin (LMWH) immediately following the stenting procedure, followed by continuation of LMWH or transition to a second agent, usually warfarin. The length of time that patients remained on these medications varied. For most cases, the average length of was 6 months. Stent patency at 1 year follow-up across the studies ranged from 68-98%, with no apparent correlation with medication used. In all studies, stent patency was most strongly correlated with patient compliance and pre-existing comorbidities.

CONCLUSIONS: This study underscored the absence of prospective data on pharmacologic therapy after vein stenting for PVOO. As vein stent placement becomes an increasingly common treatment option in chronic PVOO, a prospective trial on optimal therapy following vein stent placement seems appropriate and timely.

6:00 pm **INDUSTRY-SPONSORED SYMPOSIUM**
Presented by: Convatec

6:30 pm **INDUSTRY-SPONSORED SYMPOSIUM**
Presented by: Boston Scientific

Friday, January 22, 2021

7:00 am **SCIENTIFIC SESSION II**
Moderators: Shang Loh, MD & Max Wohlauer, MD

7:00 am 10
Medicare Reimbursement Trends 2012 - 2017 for Femoral Popliteal Artherectomy and Stenting: High Reimbursement Amount Possibly Incentivizing Inappropriate Medical Provider Care?
Matthew Hafner[1], Bassel Bashjawish[2], Joel Crawford[3] - [1]Saint Barnabas Medical Center, Livingston, NJ; [2]SUNY Upstate, Syracuse, NY; [3]Sutter Medical Foundation, Roseville, CA

BACKGROUND: Research into revascularization practices has shown a wide variety of specialists offering endovascular approaches to treat limb ischemia. The Medicare Provider Utilization and Payment (MPUP) database catalogues procedures provided on Medicare patients. The estimated reimbursement of Femoral-Popliteal atherectomy and stent placement (FPATS) is the highest for any vascular procedure performed in the lower extremity according to the Medicare Reimbursement Coding Sheet, with reported reimbursement as high as $15,000+. This level of reimbursement could incentivize overuse. This paper is an analysis of the data showing the distribution of providers and change of use overtime for FPATS.

METHODS: The MPUP database was queried for FPATS using CPT 37227 between 2012 and 2017. The data was then imported into a spreadsheet program for statistical analysis. Cases were analyzed both by year and over the 5-year time span to assess the changes in the trends of providers and utilization.

RESULTS: Over the 6-year period (2012-2017) the total number of FPATS have increased steadily every year, for a total of 54607 FPATS over 6 years. The number of total providers increased from 183 to 405. The top provider types that billed for FPATS were Cardiologists (39.8%) with Vascular Surgeons as second most frequent (38.6%). The average intervention per patient in the study period was 1.24, with one provider performing 2.2 per patient on average. During the study period the total US Medicare reimbursement of FPATS was $480,000,000.

CONCLUSIONS: We showed there is an increase in FPATS over the study period and while minimal change in procedures performed per specialty there is great variability among providers. With considerable variability in utilization among providers' questions regarding appropriate use develop. The relative marketability and high reimbursement for FPATS makes this a concerning area for overuse. Further investigation in the appropriate use of FPATS is necessary.

7:15 am 11
Racial and Regional Disparities in the Utilization of Preventative Care Strategies Among Patients with Peripheral Artery Disease and Diabetes
Mark Anthony Eid[1], Kunal Mehta[1], Jonathan Aaron Barnes[1], Zachary Wanken[1], Barbara Gladders[2], Andrea M. Austin[3], Mark A. Creager[1], Marc P. Bonaca[4], Mark W. Feinberg[5], David H. Stone[1], Philip P. Goodney[1] - [1]Dartmouth-Hitchcock Medical Center, Lebanon, NH; [2]The Dartmouth Institute for Health Policy and Clinical Practice, Lebanon, NH; [3]The Dartmouth Institute for Health Policy and Clinical Practice, Hanover, NH; [4]University of Colorado Medical Center, Aurora, CO; [5]Brigham and Women's Hospital, Boston, MA

INTRODUCTION: Preventative care practices, such as vascular imaging studies, serum hemoglobin A1c (HbA1c) testing, and diabetic foot exams, are universally recommended for patients with peripheral artery disease (PAD) and diabetes. The utilization of these practices across regions and racial groups, however, is not well characterized.

METHODS: Using data from the Centers for Medicare and Medicaid Services from 2003-2016, we identified a cohort of patients concurrently diagnosed with both PAD and diabetes (N= 10,505,853). We studied when patients obtained these three preventive measures (HbA1c, vascular testing, and diabetic foot exams). We stratified our results by race (White, Black, Hispanic) and geographic regions of the US.

RESULTS: The prevalence of PAD and diabetes across the entire cohort was 23.6 per 1000 Medicare patients (range: 11 in Montana, 37 in New Jersey). Within the first six months after a diagnosis of PAD and diabetes, patients were most likely to complete a HbA1c (49.5% White, 48.5% Black, 51.9% Hispanic) and least likely to undergo a diabetic foot exam (30.5% White, 32.3% Black, 26.9% Hispanic). At the state level, the lowest rates of adherence were seen in Southern states while the highest rates were typically clustered in the Northeast (Figure 1, Panel A). By 2.5 years after initial diagnoses, adherence to individual preventative testing improved, but only 25% of patients recorded billing evidence of having received all three tests (Figure 1, Panel B).

CONCLUSIONS: Across the US and all major racial groups, adherence to preventative care practices among patients with PAD and diabetes varies, and requires nearly two years to attain higher rates of compliance. Future efforts should target more expedient care coordination among patients and regions at highest risk.

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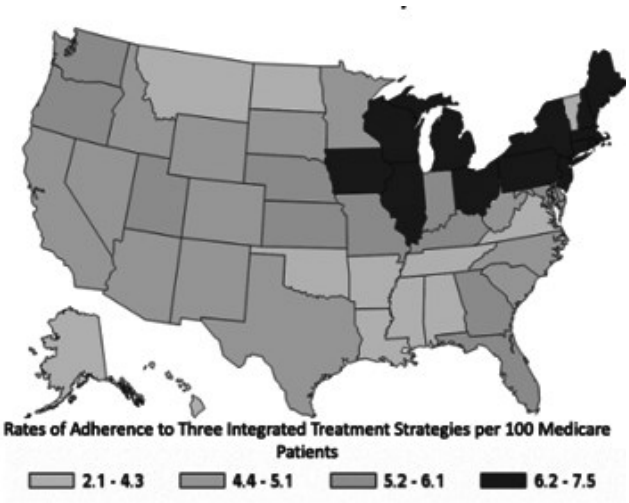
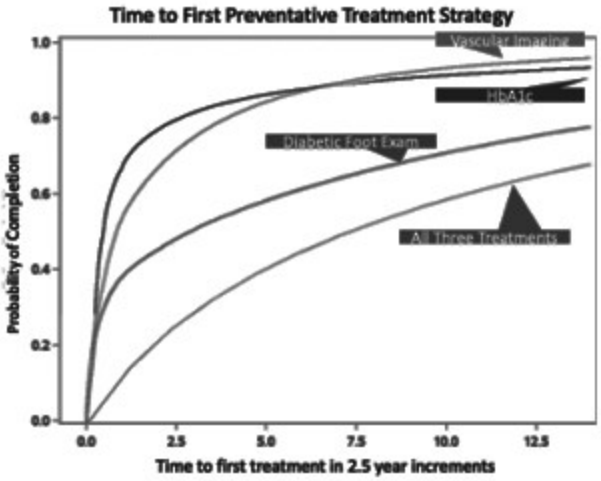
Figure 1A. Differences in Adherence of Three Preventative Care Strategies within 6-Months of Diagnosis of PAD and Diabetes by State



Panel A

Figure 1B. Time to First Preventative Care Strategy for HbA1c, Diabetic Foot Exam and Vascular Imaging



Panel B

7:30 am

12

High Mortality and Venous Thromboembolism Risk Following Major Penetrating Abdominal Venous Injuries

Maha H. Haqqani[1], Scott R. Levin[1], Jeffrey A. Kalish[1], Alik Farber[1], Tejal S. Brahmbhatt[1], Aaron P. Richman[1], Jeffrey J. Siracuse[1], Douglas W. Jones[2] - [1]Boston Medical Center, Boston University School of Medicine, Boston, MA; [2]University of Massachusetts Medical Center, Worcester, MA

INTRODUCTION AND OBJECTIVES: Penetrating injuries to the inferior vena cava (IVC) and/or iliac veins are a source of hemorrhage but may also predispose patients to venous thromboembolism (VTE). We sought to determine the relationship between iliocaval injury, VTE and mortality.

METHODS: The National Trauma Data Bank was queried for penetrating abdominal trauma from 2015-2017. Univariate analyses compared baseline characteristics and outcomes based on presence of iliocaval injury. Multivariable analyses determined the effect of iliocaval injury on VTE and mortality.

RESULTS: Of 9,974 patients with penetrating abdominal trauma, 329 had iliocaval injury (3.3%). Iliocaval injury patients were more likely to have a firearm mechanism (83% vs. 43%, $P<0.001$), concurrent head ($P=0.036$), spinal cord ($P<0.001$), and pelvic injuries ($P<0.001$), and higher total injury severity score (median 20 vs. 8.0, $P<0.001$). They were more likely to undergo 24-hour hemorrhage control surgery (69% vs. 17%, $P<0.001$), but less likely to receive VTE chemoprophylaxis during admission (64% vs. 68%, $P=0.04$). Of patients undergoing iliocaval surgery, 64% underwent repair, 26% ligation, and 10% unknown. Iliocaval injury patients had higher rates of VTE (12% vs. 2%), 24-hour (23% vs. 2.0%) and in-hospital mortality (33% vs. 3.4%) ($P<0.001$ for all). VTE rates were similar following repair (14%) and ligation (17%). They also had higher rates of cardiac complications (10.3% vs. 1.4%), acute kidney injury (8.2% vs. 1.3%), extremity compartment syndrome (4.0 vs. 0.2%), and unplanned return to OR (7.9% vs. 2.5%) ($P<0.001$ for all). In multivariable analyses, iliocaval injury was independently associated with risk of VTE (OR 2.3, [95% CI, 1.5-4.1], $P<0.001$), and in-hospital mortality (OR 9.6, [95% CI, 4.0-22.9], $P<0.001$).

CONCLUSIONS: Iliocaval injuries occur in <5% of penetrating abdominal trauma but are associated with more severe injury patterns and high mortality rates. Regardless of repair type, survivors should be considered high risk for developing VTE.

7:45 am

13

Effect of Symptom Type and Time from Symptom Onset on Outcomes Following Carotid Endarterectomy

Jinny Lu Beth[1], Chun Li[1], Livia de Guerre[1], Kirsten Dansey[1], Ruby Lo[2], Fahad Shuja[1], Marc Schermerhorn[1] - [1]Israel Deaconess Medical Center, Boston, MA; [2]Brown University, Providence, RI; [3]Mayo Clinic, Rochester, MN

OBJECTIVE: Current clinical practice defines patients with carotid territory symptoms >180 days prior to surgery as asymptomatic, however perioperative event rates may not be similar to patients who have never had symptoms. This study aims to determine the effect of symptom type and time since symptom on stroke/death following CEA.

METHODS: We utilized the VQI to identify patients undergoing elective CEA from 2003-2019. These patients were divided into recently symptomatic (180 days), and asymptomatic cohorts. Recently symptomatic and formerly symptomatic patients were further subdivided by symptom-type: stroke, TIA, and amaurosis. Our primary outcomes were 30-day and 1-year stroke/death.

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RESULTS: We identified 72,398 patients after exclusions: 16,997 (23.5%) were recently symptomatic, 2596 (3.6%) were formerly symptomatic, and 52,805 (72.9%) were asymptomatic. Overall, recently symptomatic patients had highest risk of 30-day stroke/death compared to formerly symptomatic, who had intermediate risk, and asymptomatic patients who were at lowest risk (3.3% vs 2.4% vs 1.5%, p<.01). In patients presenting with stroke, recently symptomatic patients had higher risk than formerly symptomatic patients, and both were higher than asymptomatic patients with 30-day stroke/death rates of 3.7% vs 2.6% vs 1.5%, p<.01. In patients presenting with TIA, recently symptomatic had higher 30-day stroke/death rates (3.7% vs 1.5%, p<.01) than asymptomatic. Formerly symptomatic trended toward higher 30-day stroke/death rates than asymptomatic (2.5% vs 1.5%, p=.07). In patients presenting with amaurosis, recently symptomatic had higher 30-day stroke/death rates (2.1% vs 1.5%, p=.01) than asymptomatic. There was no difference between formerly symptomatic presenting with amaurosis and asymptomatic. In patients presenting with stroke, recently symptomatic (OR 2.5 [95% CI 2.15-2.84]) and formerly symptomatic (OR 1.7 [95% CI 1.25-2.34]) had higher odds of 30-day stroke/death compared with asymptomatic. Recently symptomatic also had higher odds of stroke/death (OR 1.4 [95% 1.02-2.01]) than formerly symptomatic. At 1-year, risk of stroke/death was significantly higher in both recently symptomatic patients presenting with stroke (HR 2.02 [1.87-2.18], p<.01) and formerly symptomatic patients (HR 1.66 [1.41-1.96], p<.01) compared with asymptomatic (Fig 1). At 1- year, risk of stroke/death was significantly higher in recently symptomatic patients presenting with TIA (HR 1.51 [1.35-1.68], p<.01) and trended toward higher in formerly symptomatic patients (HR 1.35 [0.99-1.83], p=.054) compared with asymptomatic (Fig 2).

CONCLUSIONS: Patients presenting with stroke >180 days prior to elective CEA are at intermediate risk of stroke/death compared to recently symptomatic and asymptomatic patients. This should be factored into decision-making regarding treatment.

Figure 1. Freedom from Stroke/Death in Stroke Patients Compared Across Asymptomatic, Formerly Symptomatic, and Recently Symptomatic Groups.

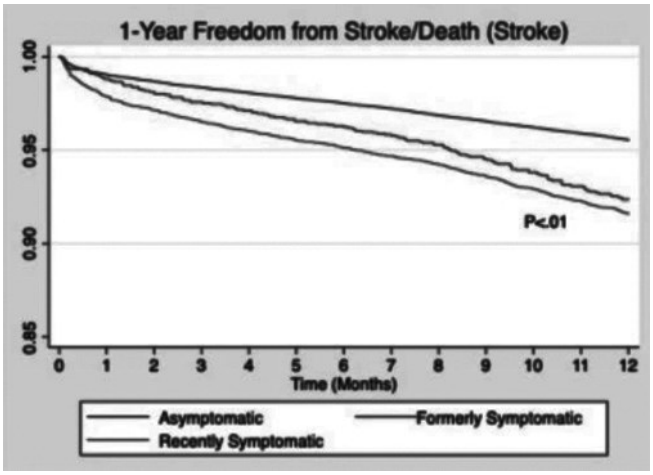
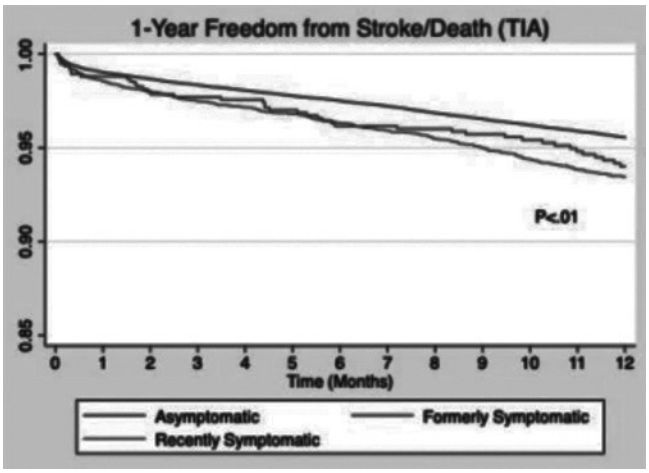


Figure 2. Freedom from Stroke/Death in TIA Patients Compared Across Asymptomatic, Formerly Symptomatic, and Recently Symptomatic Groups



8:00 am

14 (RF)

Feasibility of Virtual Examinations for Vascular Surgery Trainees

Mark Zemela[1], Brigitte Smith[2], Rafael Malgor[3], Matthew R. Smeds[1] - [1]Saint Louis University, St. Louis, MO; [2]University of Utah, Salt Lake City, UT; [3]University of Colorado, Aurora, CO

INTRODUCTION: The COVID-19 pandemic resulted in the cancelling of in-person testing across the country. We sought to understand the feasibility of conducting virtual oral examinations as well as opinions of vascular surgery program directors regarding the use of virtual platforms to conduct both mock and the "real" virtual certifying examinations (CE).

METHODS: Forty-four senior vascular trainees from 17 institutions took part in a virtual mock oral examination conducted by 38 practicing vascular surgeons via zoom. Each examination lasted 30 minutes with four clinical scenarios. An anonymous survey pertaining to conduct of the examination and opinions on feasibility of using virtual examinations for the vascular surgery CE was sent to all examiners and examinees. A similar survey was sent to all vascular surgery program directors (PD).

RESULTS: Overall pass rate was 82% with no correlation with training paradigm. 32/44 (73%) of trainees, 29/38 (76%) of examiners and 49/103 (48%) PD completed the surveys. All groups thought the experience was (would be) beneficial (Table). While the majority of trainees and examiners believed they were able to communicate and express (or evaluate) knowledge and confidence as easily virtually as in person, PD were less likely to agree confidence could be assessed virtually. The majority of respondents thought the certifying examination of the Vascular Surgery Board could be offered virtually, although no groups thought virtual exams were superior to in person examinations. While cost benefit was perceived in virtual examinations, security of examination was a concern.

CONCLUSIONS: Performing virtual mock oral examinations for vascular trainees is feasible. Both vascular surgery trainees as well as program directors feel that virtual certifying examinations should be considered by the Vascular Surgery Board.

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Table 1.

	Examinees (n=32)	Examiners (n=29)	PD (n=49)	p-value
Virtual Mock Oral Examination Was (would be) Beneficial for Trainees	31 (97%)	28 (97%)	48 (98%)	NS
Examinee Traits Expressed Virtually as well as in Real Life				
Knowledge Base	30 (94%)	29 (100%)	44 (90%)	NS
Confidence	26 (82%)	25 (86%)	29 (59%)	0.015
Audio Quality was (would be) Adequate	29 (91%)	28 (97%)	28 (57%)	NS
Video Quality was (would be) Adequate	31 (97%)	29 (100%)	38 (78%)	NS
Virtual Oral Exams are Superior to In Person Exams	4 (13%)	2 (7%)	0 (0%)	NS
Certifying Examination of VSB Could be Done Virtually	22 (69%)	23 (79%)	27 (55%)	NS
Virtual Certifying Examinations Would Not be as Secure as In Person Examinations	13 (41%)	12 (41%)	21 (43%)	NS
Examinees Would be More Able to Cheat on Virtual Certifying Examinations as In Person Examinations	9 (28%)	11 (38%)	13 (27%)	NS
The Cost of a Virtual Certifying Examination Would Be Cheaper than In Person Examination	31 (97%)	26 (90%)	37 (76%)	0.021

8:10 am — 15 (RF)
Withdrawn

8:20 am — 16 (RF)
Benefits of Acute Normovolemic Hemodilution in Open Aortic Aneurysm Repair
Nathan Droz[1], Christopher Vo[1], Katherine Morrow[2], Behzad Farivar[1], Francis Caputo[1], Sean Lyden[1], Jia Lin[1], Christopher Smolock[1] - [1]Cleveland Clinic, Cleveland, OH; [2]Case Western Reserve University School of Medicine, Cleveland, OH

OBJECTIVE: Acute normovolemic hemodilution (ANH) is an operative blood conservation technique involving the removal and storage of patient blood after induction of anesthesia, while maintaining normovolemia with crystalloid and/or colloid replacement. Developed and used predominately in cardiac surgery, ANH has been applied to the vascular surgery population but data regarding impact on transfusion requirements in this population is limited. The objective of this study is to compare transfusion requirements and coagulopathy in patients undergoing open abdominal aortic aneurysm repair (oAAA) employing ANH to those receiving only product replacement as clinically indicated.

METHODS: This is a retrospective review of patients undergoing elective oAAA at a quaternary aortic referral center from 2017-2019. Those eligible for ANH, no active cardiac ischemia, no valvular disease, normal LV/RV function, CKD <3, HCT > 38%, normal coagulation profile, no active cardiac ischemia, were included in the study. Patient demographics and characteristics were collected as were operative variables including extent of aneurysm, clamp site, visceral/renal ischemia time, operative time, and transfusion requirements. Post-operative morbidity, mortality, and length of stay were analyzed. Patients with and without ANH were matched and compared. Continuous measures were analyzed with Wilcoxan rank sum tests and t-tests.

RESULTS: Over the study period, 209 oAAA were performed, 76 patients met inclusion criteria; 27 patients underwent ANH while 49 did not. Using t-tests we found less PRBC intraoperative transfusion (0.37±0.63, $p<0.05$ vs 1.2±1.8, $p<0.05$), less at 24 hours (0.52±0.70 vs.1.6±1.8, $p<0.05$), 48 hours (0.52±0.70 vs. 1.6±1.9, $p < 0.05$) and throughout the admission (0.67±0.88 vs.1.7±2.0, $p<0.05$). FFP transfusion at 24 hours (1.1±1.5, $p<0.05$ vs 2.1±2.7, $p<0.05$), 48 hours (1.1±1.5, $p<0.05$ vs 2.1±2.7, $p<0.05$), and total admission (1.1±1.5, $p<0.05$ vs 2.2±2.6, $p<0.05$) were significantly less in ANH. There was no difference in intraoperative platelet or cryoprecipitate transfusions. At 48-hours, ANH had significantly higher platelet counts (142±35.8, $p<0.05$ vs 124±37.6, $p<0.05$), lower PTT, and lower INR. There was no difference in MI, RTOR, or mortality (1 death overall). ANH patients had shorter LOS (7.0±2.7 vs 8.8±4.8, $p<0.05$). Due to non-normality of continuous data, Wilcoxan rank sum tests were used. ANH required fewer intraoperative PRBC (0 [0,1] vs 1[0,2] $p<0.05$) and less PRBC at 24 and 48 hours. ANH had lower PTT (28.3 [25.9,29.9] vs 20.2 [28.5,31.6] $p<0.05$), INR (1 [1,1.1] vs 1.1 [1,1.2] $p<0.05$), and platelets (136 [114,165] vs 117 [98,149] $p<0.05$) at 48 hours.

CONCLUSIONS: ANH during oAAA results in less intraoperative and post-operative PRBC with improved coagulation parameters.

8:30 am — 17
Outcomes of Carotid Endarterectomy and Carotid Artery Stenting in Functionally Dependent and Independent Patients
Ahsan Zil-E-Ali[1], Victoria Kusztos[2], Faisal Aziz[1] - [1]Penn State College of Medicine, Hershey, PA; [2]Albert Einstein College of Medicine, New York, NY

OBJECTIVES: The purpose of this study was to stratify patients undergoing either carotid endarterectomy (CEA) or carotid artery stenting (CAS) based on pre-procedural functional status (FS) and quantify the predictive ability of FS as a potential predictor of adverse postoperative outcomes.

METHODS: We reviewed patients undergoing CEA and CAS between 2011 and 2018 using the National Surgical Quality Improvement Program (NSQIP). Primary outcomes were mortality and stroke within 30 days post-operation. Outcomes were adjusted with a multivariate logistic regression risk prediction model.

RESULTS: Among patients undergoing CEA, 25325 (97.24%) were Independent (FS-I) and 718 were Dependent (FS-D) (2.76%). In the CAS population, 1074 (95.89%) were FS-I and 46 (4.11%) were FS-D. In an adjusted logistic model, we found that FS-D patients undergoing CEA had three times higher odds of mortality than the FS-I patients (AOR: 3.06, CI: 1.90, 4.92, $p<0.001$). Among patients undergoing CAS, a similar higher odds of mortality was seen in FS-D patients compared to FS-I patients (AOR: 3.42, CI: 0.86, 13.67, $p=0.082$). Odds of developing a stroke following either intervention were insignificant in both groups. Among FS-D patients, those undergoing CAS were three times more likely to develop a stroke, compared to those undergoing CEA (AOR: 2.35, CI: 0.32,1.97, $p=0.046$).

CONCLUSIONS: Preoperative functional dependence is associated with increased risk of mortality in patients undergoing CEA. CEA should be used cautiously, and alternative treatment should be considered for FS-D patients.

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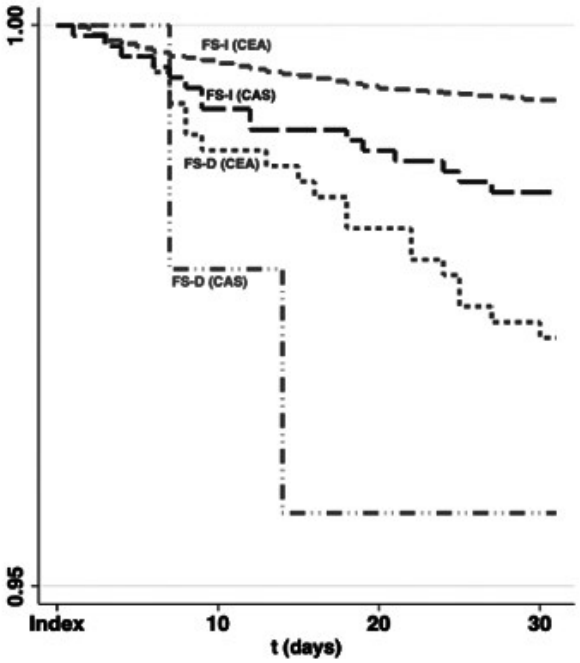
Table 1. Logistic Regression Model to Compute the Outcomes of FS -D and FS-I Patients Undergoing CEA and CAS

	Carotid Endarterectomy (FS-D vs. FS-I)			
	UOR (95% CI)	p-value	AOR (95% CI)	p-value
30 Days Mortality	4.28(2.69-6.81)	<0.001	3.06 (1.90-4.92)	<0.001
30 Days Stroke	1.28(0.78-2.10)	0.335	1.14(0.69-1.88)	0.609
Length of Intraoperative Time	1.32(1.14-1.53)	<0.001	1.36(1.17-1.58)	<0.001
Unplanned Reoperation	1.85(1.32-2.60)	<0.001	1.68(1.19-2.37)	0.003
Pneumonia	9.53(2.94-30.97)	<0.001	5.43(1.62-18.11)	0.006
Length of Stay in Hospital	3.49(3.01-4.06)	<0.001	3.05(2.62-3.56)	<0.001
Still in Hospital >30 Days	3.17(1.06-9.48)	0.039	2.08(0.68-6.36)	0.197
	Carotid Artery Stenting (FS-D vs. FS-I)			
30 Days Mortality	3.60(0.92-14.09)	0.065	3.42(0.86-13.67)	0.082
30 Days Stroke	2.67 (0.85-8.38)	0.093	2.53(0.80-8.01)	0.113
Length of Intraoperative Time	1.51(0.74-3.05)	0.256	1.46 (0.72-2.97)	0.291
Unplanned Reoperation	1.21(0.23-6.42)	0.822	1.33(0.25-7.08)	0.741
Pneumonia	23.39(2.38-229.47)	0.007	20.81 (1.66-261.54)	0.019
Length of Stay in Hospital	2.30(1.28-4.14)	0.005	2.18(1.21-3.93)	0.01
Still in Hospital >30 Days	4.57 (0.22-96.58)	0.329	5.81(0.17-194.35)	0.326
	FS-D Carotid Artery Stenting vs. FS-D Carotid Endarterectomy			
30 Days Mortality	1.91(0.50-7.37)	0.345	2.35(0.59-9.38)	0.227
30 Days Stroke	3.43(1.04-11.30)	0.043	3.46(0.32-1.97)	0.046
Length of Intraoperative Time	0.30(0.14-0.58)	0.001	0.25(0.12-0.52)	<0.001
Unplanned Reoperation	0.62(0.12-3.24)	0.568	0.69(0.13-3.68)	0.664
Pneumonia	6.40(0.92-44.41)	0.06	11.29 (1.32-96.74)	0.027
Length of Stay in Hospital	0.74(0.41-1.34)	0.324	0.78(0.43-1.41)	0.407
Still in Hospital >30 Days	2.09(0.11-41.00)	0.629	1.32(0.06-26.98)	0.856

Figure 1. Postoperative 30 Days Survival Estimates



FS-D (CEA)	25322	25243	25185	25154
FS-I (CEA)	1074	1066	1062	1058
FS-D (CAS)	718	710	705	699
FS-I (CAS)	46	45	44	44

8:45 am 18

Initial Post-Operative Visit Absenteeism is Associated with Worse Amputation-Free Survival after Tibial Angioplasty

Anthony N. Grieff, Sapna Syal, William E. Beckerman, Justin Ady, ShihYau Huang - Rutgers Robert Wood Johnson, New Brunswick, NJ

INTRODUCTION AND OBJECTIVES: Several studies have identified loss to follow-up (LTF) as a risk factor for worse outcomes in several vascular procedures. Specifically, tibial revascularization is often performed in the setting of critical limb ischemia and tissue loss thus requiring close patient monitoring in the early post-operative period for worsening gangrene and/or ischemia. Therefore, we evaluated the role of LTF and its risk factors against outcomes in patients undergoing tibial endovascular procedures.

METHODS: A retrospective single-institution chart review of patients who underwent therapeutic endovascular tibial revascularization between 2014-2018 was performed. Patient follow-up at multiple points up to thirty-six months post-operatively were tracked. Primary endpoints were death or major amputation.

RESULTS: Eighty-nine patients met inclusion criteria. The overall rate of absenteeism at less than four weeks, one-to-six months, and greater than six months post-operatively were 39%, 20% and 37% respectively. There were no major demographic differences between

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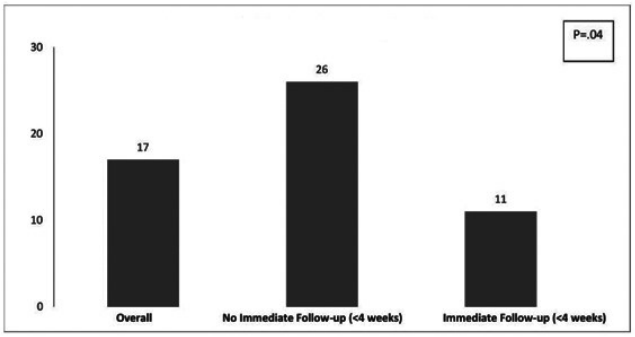
patients. Patients without tissue loss (≤ Rutherford 4) tended to be less compliant with follow-up. Notably, absenteeism from the first immediate post-operative visit was a significant risk factor for further absenteeism at one-to-six months (51% vs 26%; p=.01) and at greater than six-month follow-up (48% vs 31%; p=.05). Missing the first post-operative visit was also associated with a higher rate of major amputation (26% vs 11%, p=.04).

CONCLUSIONS: Absenteeism from the first post-operative visit is associated with worse amputation-free survival and a significant risk factor for further absenteeism from post-operative care. Given these results, ensuring close immediate post-operative follow up is essential to improving outcomes in high-risk patients undergoing tibial revascularization.

Figure 1. 36-Month Major Amputation Rates



9:00 am **INDUSTRY-SPONSORED SYMPOSIUM**
Presented by: Abbott Vascular

9:15 am **INDUSTRY-SPONSORED SYMPOSIUM**
Presented by: Janssen Pharmaceuticals

3:00 pm **ROUND TABLE SESSION**
Case Reports & Video Presentations
Moderator: Karan Garg, MD

3:00 pm (Case)
Retrograde Endovascular with Intimal Re-Entry Through Endarterectomy: The REWIRE Technique
Jordan R. Stern[1], Peter H. Connolly[2], Andrew J. Meltzer[3] – [1]Stanford University, Stanford, CA; [2]Weill Cornell Medicine, New York, NY; [3]Mayo Clinic, Phoenix, AZ

3:10 pm (Video)
Interesting Complication after a Hybrid Aortic Arch Debranching and TEVAR for Type A Retrograde Dissection
Rolla Zarifa*[1], Sara Gaines*[1], Hyde Russell*[2], Cheong Jun Lee[3] – [1]University of Chicago, Chicago, IL; [2]Northshore University Health System, Chicago, IL; [3]Northshore University Health System, Evanston, IL

3:20 pm (Case)
Percutaneous Pedal Artery Access for Distal Perfusion in the Setting of Limb Ischemia Following VA ECMO Cannulation – A Case Report
Yohanis O'Neill-Castro, Steven Cheung, Jason N. MacTaggart, Jason M. Johanning, Aleem Siddique, Iraklis I. Pipinos – University of Nebraska Medical Center, Omaha, NE

3:30 pm (Video)
Axillary Vein to Superior Vena Cava Bypass for Dialysis Access Salvage
Ross G. McFall, Paul Haddad, Marvin Atkins, Eric Peden – Houston Methodist Hospital, Houston, TX

3:40 pm (Case)
Subclavian Stump Syndrome Following Thoracic Endovascular Aortic Repair
Felecia N. Jinwala, Shahab Toursavadkohi – University of Maryland Medical Center, Baltimore, MD

4:00 pm **SCIENTIFIC SESSION III**
Moderators: Sharon Kiang, MD & Caitlin Hicks, MD

4:00 pm 19
Underutilization of Palliative Care for Patients with Advanced Peripheral Arterial Disease
Mimmie Kwong, Eleanor E. Curtis, Matthew W. Mell - U.C. Davis, Sacramento, CA

INTRODUCTION AND OBJECTIVES: Advanced peripheral arterial disease (PAD) is associated with an annual mortality between 20-40%. Amputees are at particularly high risk for death and may benefit from palliative care programs to improve quality of life and align treatments with goals of care. As palliative care studies for vascular patients are scarce, we sought to examine palliative care utilization using below knee amputation (BKA) as a surrogate for advanced PAD.

METHODS: All patients who underwent BKA over a 5-year period at a single large referral center were identified. Their demographics, pre-operative conditions, intraoperative factors, and perioperative outcomes were recorded. The primary outcome studied was palliative care consultation at the time of amputation. The secondary outcomes included one-year mortality and palliative care consultation prior to death.

RESULTS: 111 patients (76 men, 35 women) underwent BKA during the study period. Three patients (2.7%) received palliative care consultations at the time of their amputations. Of these, one had been obtained remotely for an oncologic condition and the others for surgical decision-making. Follow-up was available for 73 patients. One-year mortality was 21.9% (n=16) at a mean of 102 ± 86 days post-amputation. Among patients who died within 1 year of their amputation, 37.5% (n=6) received palliative care consultations prior to death. The median interval between amputation and palliative consultation was 26 (IQR 14-81) days. The median interval between palliative consultation and death was 9 (IQR 4-39) days.

CONCLUSIONS: Palliative care services were rarely provided to patients with advanced PAD. Consultations, when obtained, occurred closer to death than to amputation, suggesting a missed opportunity to receive the benefits of early evaluation. Future studies should aim to identify the cohort of vascular patients who would most benefit from early palliative consultation and determine if palliative evaluation alters health care utilization patterns and outcomes for vascular patients.

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4:15 pm

20

The Fundamentals of Vascular Surgery: When Do Vascular Trainees Achieve Basic Open Surgical Competency?

Malachi Sheahan[1], Alykhan Lalani[1], Jason Lee[2], Murray Shames[3], David Rigberg[4], Bryan Cass[1], Claudie Sheahan[1], Jean Bismuth[5] - [1]Louisiana State University Health Sciences Center, New Orleans, LA; [2]Stanford University, Stanford, CA; [3]University of South Florida, Tampa, FL; [4]University of California Los Angeles School of Medicine, Los Angeles, CA; [5]Houston Methodist Hospital, Houston, TX

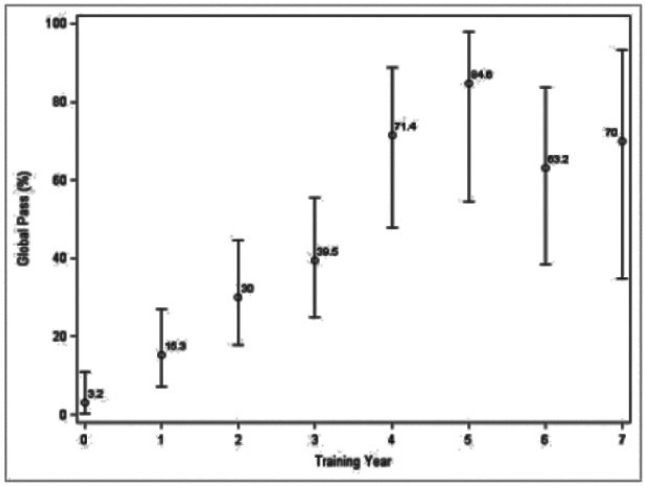
OBJECTIVE: While standardized methods are employed to assess the medical knowledge of vascular trainees, there is little information regarding their technical proficiency. Using validated skills modules, this study provides a national assessment of the open operative competency of vascular trainees.

METHODS: The Fundamentals of Vascular Surgery is a validated skills exam which tests basic proficiency in common vascular tasks. The assessment consists of three modules- end to side anastomosis, patch angioplasty, and clockwise radial suturing. A continuous skills score (0-35) and a global rating (1-4) are issued by validated assessors. Minimum global scores of 3 (competent) on all modules are required to pass. Covariate data recorded at the time of evaluation included training year, sex, months spent on vascular, number of open cases, and confidence in performing an anastomosis. Univariate analyses regarding the association between skills scores and trainee covariates was assessed via Kruskall Wallis tests and Spearman Rank-Order correlation. Multiple logistic regression with stepwise variable selection determined factors significantly associated with an overall passing score.

RESULTS: Between 2012 and 2019, 313 trainees completed the exam. They consisted of integrated vascular residents (59.4%), medical students (20.1%), general surgery residents (11.2%), and vascular fellows (9.3%). Months on vascular surgery ranged from 0 to 38 with a median of 5 months. The sample was 62.3% male. Months on vascular (P<.001), number of open cases (P<.001), and confidence in performing anastomosis (P<.001) were all significantly associated with improved skill scores. Females had slightly better performance than males (P=.002), but this advantage was lost when controlling for trainee year. Overall passing score was significantly different by level of training, with a greater than 50% passing rate only achieved by PGY 4 (p<.0001, Figure 1). Stepwise model selection determined that the number of open cases and self-reported confidence in performing anastomosis were associated with passing. The odds of passing were 15 times greater for trainees with more than 50 open cases, compared to 50 or less [OR (95% CI): 15.88 (6.12,41.19)], and more than doubled for a single unit increase in self-reported confidence [OR (95% CI): 2.2 (1.57,3.08)]. In the integrated resident sub-group, case volume [OR (95% CI): 16.85 (5.1,55.63)] and confidence [OR (95% CI): 2.4 (1.55,3.72)] predicted a passing score independent of trainee year.

CONCLUSIONS: Competence in performing basic vascular tasks is not reliably achieved in the first three years of integrated vascular training. Interventions such as increasing operative experience early in residency may shift this learning curve.

Figure 1.



4:30 pm

21

A Reappraisal of CT Angiography Derived Duplex Ultrasound Velocity Criteria with a Comparison to Digital Subtraction Angiography in Patients with Carotid Artery Stenosis

Christian Dohring, Joshua T. Geiger, Adam J. Doyle - University of Rochester Medical Center, Rochester, NY

INTRODUCTION AND OBJECTIVES: Traditionally, carotid duplex ultrasound (CDUS) velocity criteria have been derived from angiography. Recent studies support a shift toward computed tomography angiography (CTA) derived velocity criteria, however, they lack a comparison to angiography. The purposes of this study are to correlate CTA to digital subtraction angiography (DSA) and to update our previous CTA-derived velocity criteria for 50% and 80% stenosis.

METHODS: All patients between 2010 and 2019 who underwent CDUS and a neck CTA within 6 months were identified for a retrospective review. Vessel diameter and corresponding CDUS data were recorded. Additional DSA measurements were recorded for a subset of patients. Data from this cohort were added to a previously reported deidentified data set from patients between 2000 and 2009. Receiver operating characteristic (ROC) curves were generated to determine optimal velocity thresholds. Spearman rank correlation was used to correlate measurements obtained by CTA to those obtained by DSA.

RESULTS: A total of 1139 vessels from 636 patients were analyzed. ROC analysis to identify >50% stenosis resulted in optimized thresholds of 143 cm/sec, 46.2 cm/sec, and 2.15 for peak systolic velocity (PSV), end diastolic velocity (EDV), and PSV to common carotid artery PSV ratio (PSVR), respectively. ROC analysis to identify >80% stenosis resulted in optimized thresholds of 319 cm/sec, 87.2 cm/sec, and 3.49 for PSV, EDV, and PSVR, respectively. The degree of carotid artery stenosis for a subset of 124 vessels on CTA correlated well with that of DSA ($\rho = 0.89$, $p < 0.0001$).

CONCLUSIONS: These data demonstrate a high correlation between measurements obtained on CTA and DSA while forming a reliable CTA-derived CDUS velocity criteria.

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Table 1. CTA-Derived Ultrasound Velocity Criteria for ≥50% and ≥80% Carotid Artery Stenosis

	Ideal Velocity Criteria	Sensitivity (%)	Specificity (%)	PPV (%)	NPV (%)	Accuracy (%)
Velocity Criteria for ≥ 50% Stenosis						
PSV	≥ 143 cm/sec	90.3	88.2	87.6	90.8	89.2
EDV	≥ 46.2 cm/sec	79.3	90.1	88.0	82.5	84.9
PSVR	≥ 2.15	83.9	92.2	90.9	86.1	88.2
Velocity Criteria for ≥ 80% Stenosis						
PSV	≥ 319 cm/sec	89.4	86.5	53.6	97.9	86.9
EDV	≥ 87.2 cm/sec	86.4	86.6	52.9	97.3	86.6
PSVR	≥ 3.49	92.9	80.1	44.9	98.5	82.0

Velocity criteria for detecting ≥50% and ≥ 80% stenosis for peak systolic velocity (PSV), end diastolic velocity (EDV), and PSV to common carotid PSV ratio (PSVR). For each, the velocity is listed in centimeters per second with corresponding sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), and overall accuracy.

4:45 pm 22

Outcomes of Arterial Grafts for the Reconstruction of Military Lower Extremity Arterial Injuries

Robert B. Laverty[1], Anne O'Shea[1], Thomas J. Walters[2], David S .Kauvar[1] - [1]Brooke Army Medical Center, JBSA Fort Sam Houston, TX; [2]US Army Institute of Surgical Research, JBSA Fort Sam Houston, TX

INTRODUCTION: Lower extremity (LE) arterial injuries are common in military casualties and limb salvage is a primary goal. Bypass grafts are the most common reconstructions; however, their specific outcomes are largely unreported. We sought to describe the outcomes of LE arterial grafts among combat casualties and their association with limb loss.

METHODS: Retrospective cohort study of 2004-2012 Iraq/ Afghanistan casualties with LE arterial injury undergoing bypass graft from a database containing follow-up until amputation, death, or military discharge. Primary outcome was composite graft complications (GC-thrombosis, stenosis, pseudoaneurysm, blowout, and/or arteriovenous fistula).

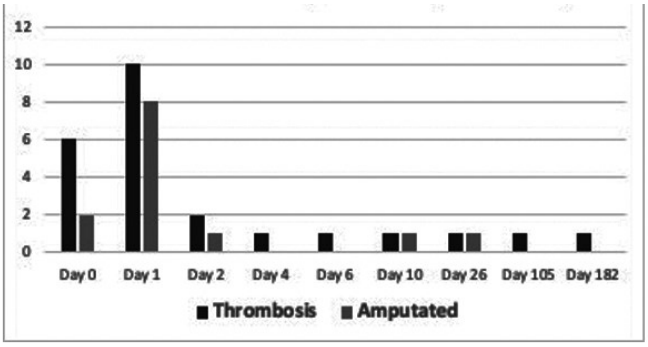
RESULTS: 220 grafts were included (99 femoral, 73 popliteal, 48 tibial). 56 (26%) had at least one GC; thrombosis was most common in femoral, stenosis most common in popliteal and tibial. GC was not associated with graft level or eventual amputation (limb salvage 76% overall), but was associated with multiple-level arterial injuries (P=.07), and synthetic conduit (P=.03, Table). Four of eight synthetic grafts had amputations, all <72h, and two of eight thrombosed (both amputated). Overall 24 (11%) of grafts thrombosed, 16 within 48h and 13 in limbs undergoing amputation (P=.001 for association of thrombosis with amputation, Figure).

CONCLUSIONS: GC are common among LE bypass grafts in combat casualties but are not associated with limb loss. Thrombosis is predominantly early and is associated with amputation. Closer attention to ensuring early patency may improve limb salvage.

Table 1.

	No Graft Complication (n=164)	Graft Complication (n=56)	P
Iraq Theater, n (%)	115 (70)	36 (64)	0.26
Mechanism, n (%)			0.48
Blast	105 (64)	36 (64)	
Penetrating	51 (31)	18 (32)	
Blunt	5 (3)	2 (4)	
Crush	3 (2)	0 (0)	
Cause, n (%)			0.39
IED	76 (46)	23 (41)	
Artillery/Mortar/RPG	25 (15)	13 (23)	
Explosive NOS	6 (4)	0 (0)	
Bullet/GSW/Firearm	49 (30)	18 (32)	
Vehicle Crash	7 (4)	1 (2)	
Fasciotomy, n (%)	26 (16)	9 (16)	0.97
Role 2, n (%)	87 (53)	28 (50)	0.69
MESS > 7, n (%)	25 (15)	10 (18)	0.76
Tourniquet, n (%)	89 (54)	36 (64)	0.19
Fracture, n (%)	97 (59)	28 (50)	0.23
Nerve Injury, n (%)	92 (56)	28 (50)	0.43
Combined venous, n (%)	76 (46)	23 (41)	0.49
Multiple arterial, n (%)	17 (10)	11 (20)	0.07
Arterial shunt, n (%)	47 (29)	18 (32)	0.62
Graft level, n (%)			0.87
Femoral	73 (44)	26 (46)	
Popliteal	56 (34)	17 (30)	
Tibial	35 (21)	13 (23)	
Hemostatic adjunct, n (%)	24 (15)	12 (21)	0.23
Synthetic graft, n (%)	3 (2)	5 (9)	0.01
MESS, med (IQR)	6 (5-7)	6 (5-7)	0.92
Revasc time, min, med (IQR)	390 (266-514)	365 (198-532)	0.96
ISS, med (IQR)	15 (11-19)	16 (11-21)	0.32
TK time, min, med (IQR)	57 (38-76)	55 (38-72)	0.99

Figure 1. Thrombosis and Amputation by Event Day



5:00 pm 23 (RF)

Patients with Chronic Limb Threatening Ischemia Prioritize Mobility over Pain, Support Systems, Wounds, or Mental Health

Bjoern Suckow[1], Sarah Bessen[1], Dorothy Hebb[1], Glyn Elwyn[2], David Stone[1], Jesse Columbo[1], Philip Goodney[1] - [1]Dartmouth-Hitchcock Lebanon, NH; [2]Dartmouth Institute for Health Policy & Clinical Practice, Lebanon, NH

OBJECTIVE: Chronic limb threatening ischemia (CLTI) patients suffer diminished quality of life (QOL). However, no patient-reported outcome measures exist to specifically assess the key domains that determine QOL in CLTI: pain, mobility, mental health, support systems, and wounds. Our objective was to measure patient preference regarding which domains are viewed as more important in their CLTI treatment course and analyze clinical characteristics that are associated with domain preference.

METHODS: We prospectively enrolled 100 patients with CLTI (Rutherford classification 4-6) in the inpatient and ambulatory setting of one tertiary-care facility. All completed a demographic questionnaire, a generic QOL survey (EQ-5D), and a depression

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screening survey (PHQ-9). Subjects were randomized 1:1 to rank five QOL domains by either card sort technique (visually aligning the domains) or classical ranking (enumerating the domains). A comprehensive chart review elicited demographics, comorbidities, WIfI score, and treatment history. Mean ranks were compared between domains. Univariate and multivariate regression analysis compared patients with different ranking preferences.

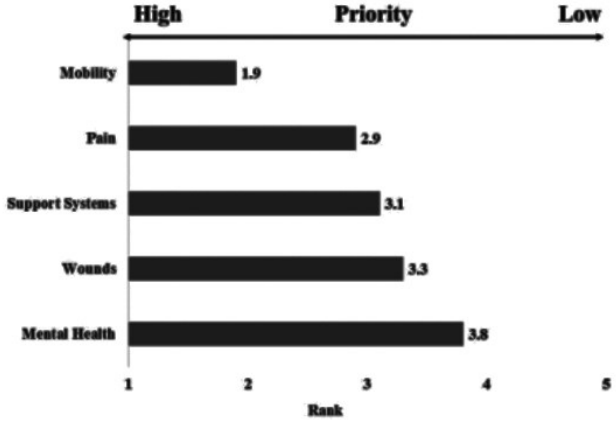
RESULTS: Characteristics of the 100 participants were: mean age 68.1 yrs (SD 10.7), 67% male, 54% married, 79% former/current smokers, 66% with diabetes, 48% with coronary disease, and 19% with chronic kidney disease. Mean toe pressure was 37 mmHg. 15% of patients had a prior toe/transmetatarsal amputation while 9% had a prior major amputation. Patients and ranking outcomes were similar between the two randomized ranking methods. A majority of participants ranked mobility as the top (49%) or second priority (26%), while patients predominantly ranked mental health as fourth (31%) or last priority (37%) (Table 1). Mean ranks for all five domains are compared in Figure 1. There were no differences in comorbidities, demographics, or clinical variables between patients who ranked mobility highest compared to those who didn't. Mean EQ-5D Index Scores were similar between those who ranked mobility highest and those who didn't (08. vs. 081, p=0.16). Mean PHQ-9 scores were similar between participants who ranked mental health lowest versus those who didn't (5.9 vs. 6.8, p=0.49).

CONCLUSIONS: This prospective randomized study found CLTI patients rank mobility as their highest priority 49% and second highest priority 26% of the time. Mobility is therefore the predominant domain valued by CLTI patients, followed by pain, support systems, and wound care while mental health is least emphasized. Clinical patient characteristics, generic QOL and depression screening surveys are unable to predict which QOL domain CLTI patients prioritize. Shared decision-making about CLTI treatment should emphasize preservation of or return to mobility.

Table 1. Frequency of Rank Order for Quality of Life Domains in CLTI Patients

(n=100)	Rank 1	Rank 2	Rank 3	Rank 4	Rank 5
Mobility, n(%)	49 (49%)	26 (26%)	12 (12%)	10 (10%)	3 (3%)
Pain, n(%)	16 (16%)	20 (20%)	31 (31%)	20 (20%)	13 (13%)
Mental Health, n(%)	8 (8%)	11 (11%)	13 (13%)	31 (31%)	37 (37%)
Support Systems, n(%)	17 (17%)	26 (26%)	14 (14%)	21 (21%)	22 (22%)
Wounds, n(%)	10 (10%)	17 (17%)	30 (30%)	18 (18%)	25 (25%)

Figure 1. Mean Rank for Each Domain



5:10 pm 24 (RF)

The Impact of Comorbid Depression on Mortality and Amputation Risk in Patients with Chronic Limb Threatening Ischemia

Tara Zielke[1], Michael Wesolowski[2], Melissa D'Andrea[1], Bernadette Aulivola[3] - [1]Loyola Stritch School of Medicine, Maywood, IL; [2]Loyola University of Chicago Health Sciences, Maywood, IL; [3]Loyola University Medical Center, Maywood, IL

INTRODUCTION AND OBJECTIVES: Peripheral artery disease (PAD) incidence is increasing worldwide and is associated with significant morbidity. Depression is associated with worse outcomes in PAD. The impact of depression in patients with chronic limb threatening ischemia (CLTI) is not well described, nor is the impact of medical treatment for depression in this population. We sought to investigate the prevalence of depression in CLTI patients, its impact on major amputation and all-cause mortality, and whether antidepressant treatment is associated with improvement in these outcomes.

METHODS: A retrospective cohort of 2,987 patients with CLTI (2007 -2018) was analyzed at a single academic medical center. Depression was identified using ICD-9 and ICD-10 codes 6 months before or after PAD diagnosis. Multivariable logistic regression models estimated the adjusted effects of comorbid depression and antidepressant treatment on major amputation and all-cause mortality.

RESULTS: A total of 2,987 patients with CLTI were identified with a mean age of 68.6 ± 12.9 years and 57% male. Comorbid depression was identified in 7.1% of the cohort. Overall major amputation rate and mortality was 14.8% and 23.6% respectively. Unadjusted OR for comorbid depression on amputation and all-cause mortality were 1.94 (1.39, 2.70) and 1.59 (1.18, 2.15). For mortality, the interaction between comorbid depression diagnosis within 6 months and antidepressants was significant (p = 0.01), including after adjustment (p = 0.02). Adjusted OR for comorbid depression and no antidepressant was 2.64 (1.31, 5.32) compared to comorbid depression with antidepressant 1.06 (0.72, 1.55). Comorbid depression on mortality varies significantly by whether or not the patient is on an antidepressant.

CONCLUSIONS: Comorbid depression portends a poorer prognosis for patients with CLTI in amputation and mortality outcomes. Medical treatment of depression is associated with improvement in outcomes, emphasizing the importance of appropriate medical management of this comorbidity.

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5:20 pm

25 (RF)

Risk Analysis Index: When is the Patient Too Frail to Undergo a Carotid Artery Endarterectomy?

Sally Boyd[1], Kedar S. Lavingia[1], Wayne Tse[1], Michael Amendola[2] - [1]Virginia Commonwealth University, Richmond, VA; [2]Central Virginia VA Health Care System, Richmond, VA

INTRODUCTION: Rapid objective preoperative assessment of patients undergoing carotid endarterectomy (CEA) remains difficult and variable. The Risk Analysis Index (RAI) is a validated assessment of frailty that potentially predicts clinical outcomes. We applied RAI to a veteran population undergoing CEA for asymptomatic cerebrovascular disease.

METHODS: The VASQIP database was queried from 2002 to 2015 for ICD codes indicating asymptomatic patients. RAI was then calculated based on VASQIP variable extraction. Patients were placed in three groups: non-frail (RAI< 30), frail (RAI 30-34) and very frail (RAI $\geq$ 35). Binary logistic regression was used to evaluate predictors of stroke, death, and complications.

RESULTS: 41,593 asymptomatic patients underwent CEA. 40,923 (98.4%) patients were male with average age of 68 ± 8.5 years. The cohorts contained 83.1% (n=34,554), 12.2% (n=5074), and 4.7% (n=1965) for non-frail, frail and very frail respectively. Frailty was associated with increased rates of post-operative stroke, death, and any complication (p<0.05) (Table 1).

Table 1. Postoperative Outcomes Following Carotid Endarterectomy in Asymptomatic Patients

Outcome	RAI < 30 (n=34,554)	RAI 30-34 (n=5074)	RAI ≥35 (n=1965)	Total (n=41,593)	p- value
Stroke	482 (1.4%)	92 (1.8%)	45 (2.3%)	619 (1.5%)	P=0.001
Any complication	1647 (4.8%)	404 (8.0%)	241 (12.3%)	2292 (5.5%)	P<0.001
Death	208 (0.6%)	41 (0.8%)	48 (2.4%)	297 (0.7%)	P<0.001
Complications (mean ± SD)	0.07 ± 0.35	0.12 ± 0.45	0.19 ± 0.61	0.08 ± 0.38	P<0.001
LOS (days) (mean ± SD)	3.15 ± 8.5	4.98 ± 13.6	8.79 ± 37.7	3.64 ± 12.3	P<0.001

Total hospital length of stay was significantly increased from non-frail to frail to very frail (3.15 vs. 4.98 vs. 9.79 days) (p<0.05). Frailty was associated with death within very frail patients (OR 2.881, 95% CI 2.005-4.139, p<0.05). Increasing frailty also predicted having one or more complications as frailty scores increased (Table 2).

Table 2. Odds Ratios for Outcomes Following CEA in VASQIP by RAI. Odds ratios determined by forward binary logistic regression. RAI, risk analysis index; OR, odds ratio; CI, confidence interval; Ref, reference

Outcome	RAI <30	RAI 30-34 OR (95% CI)	p- value	RAI ≥35 OR (95% CI)	p- value
Stroke	Ref	1.305 (1.042-1.635)	P=0.020	1.657 (1.216-2.257)	P=0.001
Complication	Ref	1.338 (1.162 – 1.541)	p<0.001	1.720 (1.385 – 2.136)	P<0.001
Death	Ref	1.056 (0.735-1.517)	P=0.768	2.881 (2.005-4.139)	P<0.001

CONCLUSIONS: Increasing frailty was associated with worse outcomes in asymptomatic patients undergoing CEA. The higher RAI cohorts were associated with higher rates of postoperative stroke, complications and death. We recommend the use of this frailty index as a screening tool to guide risk discussions with asymptomatic patients undergoing CEA.

5:30 pm

26

Predictors of Adherence to Antihypertensive Therapy Among Patients Treated for Acute Type-B Aortic Dissections

Benjamin S. Brooke, Claire L. Griffin, Jason P. Glotzbach, Shardool Patel, Larry W. Kraiss - University of Utah, Salt Lake City, UT

INTRODUCTION AND OBJECTIVES: Antihypertensives remains the mainstay of treatment for patients who present with acute Type-B aortic dissections (TBAD), although it's unclear whether patients maintain adherence to their regimens following hospital discharge. This study was designed to evaluate predictors of medication adherence among patients treated for acute TBAD.

METHODS: We used the Truven-MarketScan database to identify US patients who presented with an acute TBAD between 2008-2017. Patients with continuous health insurance (Commercial or Medicare Part-C) for at least 12-months after TBAD diagnosis were stratified by whether they underwent open surgical repair (OPEN), thoracic endovascular aortic repair (TEVAR), or only medication management (MED). Prescriptions for antihypertensives were captured and adherence was defined as >80% fill-rate over the follow-up period. Logistic regression models were used to identify predictors of medication adherence.

RESULTS: A total of 6,702 patients were identified that underwent treatment for TBAD (3% TEVAR, 9% OPEN, & 74% MED), whereas 14% received no intervention. The overall antihypertensive adherence rate was 82%, and varied based on TBAD therapy (79% TEVAR, 85% OPEN, & 82% MED). The majority of patients across all treatment groups were prescribed ≥2 antihypertensive agents, with beta-blockers and diuretics being the most common classes. The odds of adherence to antihypertensives were significantly lower for females ages <45 years, non-adherent on pre-existing therapy, and when medications were obtained in less than 90-day supplies (Table).

CONCLUSIONS: Nearly a fifth of patients were nonadherent with antihypertensive therapy prescribed following acute TBADs, which was more likely among younger females not adherent before their event. Adherence was improved among patients who received >90-day supply of medications by mail. Improving antihypertensive adherence following TBAD can help prevent further complications.

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Table 1. Multivariate Analysis of Risk Factors for Adherence to Antihypertensive Medication Therapy

Variable	Odds Ratio	95% Confidence Interval	P-value
Female Sex	0.92	0.85 - 0.99	0.027
Age group			
>65 years	Ref	Ref	
55-64 years	1.01	1.01 – 0.92	0.818
45-54 years	0.90	0.90 – 0.81	0.067
35-44 years	0.74	0.74 – 0.63	<0.001
18-34 years	0.71	0.71 – 0.54	0.013
Pharmacy Type			
Other	Ref	Ref	
Mail	1.04	0.97 – 1.11	0.323
Retail	0.69	0.65 – 0.73	<0.001
# Days' Supply of Rx			
<45-day supply	Ref	Ref	
46-90-day supply	1.71	1.62 – 1.79	<0.001
>90-day supply	2.07	1.61 – 2.68	<0.001
Non-adherence Pre-TBAD	0.79	0.71 – 0.88	<0.001
# of Antihypertensive Classes Rx			
1 Drug Class Prescribed	Ref	Ref	
2 Drug Classes Prescribed	0.99	0.89 – 1.09	0.814
3 Drug Classes Prescribed	0.93	0.84 – 1.04	0.194
4 Drug Classes Prescribed	0.92	0.80 – 1.05	0.217
>5 Drug Classes Prescribed	0.82	0.60 – 1.05	0.128
Charlson Comorbidity Index			
Score 0-1	Ref	Ref	
Score 2-3	1.04	0.96 – 1.12	0.381
Score 4-5	0.98	0.87 – 1.12	0.802
Score ≥ 6	0.83	0.67 – 1.01	0.063
Urban Population	0.99	0.90 – 1.11	0.963

Abbreviations: TBAD, Type-B Aortic Dissection; Rx: medications prescribed

5:45 pm 27

Contemporary Outcomes after Partial Resection of Infected Aortic Grafts

Matthew R. Janko[1], Karen Woo[2], Jayer Chung[3], Vikram S. Kashyap[1], Peter F. Lawrence[2], Jonathan Bath[4], Matthew R. Smeds[5] - [1]University Hospitals Cleveland Medical Center/ Case Western Reserve University, Cleveland, OH; [2]University of California Los Angeles, Los Angeles, CA; [3]Baylor College of Medicine, Houston, TX; [4]MU Heath Care/University of Missouri, Columbia, MO; [5]SLUCare Physician Group/St. Louis University, St. Louis, MO

INTRODUCTION AND OBJECTIVES: Aortic graft infection remains a considerable clinical challenge, and it is unclear which variables are associated with adverse outcomes among patients undergoing partial resection.

METHODS: A retrospective, multi-institutional study of patients who underwent partial resection of infected aortic grafts from 2002-2014 was performed using a standard database. Baseline demographics, comorbidities, operative, and postoperative variables were recorded. The primary outcome was mortality. Descriptive statistics, Kaplan-Meier survival analysis, and Cox regression analysis were performed.

RESULTS: 116 patients at 23 medical centers in 6 countries underwent partial resection of an infected aortic graft. 70% were men with median age 70 years. 97% had a history of open aortic bypass graft, with infection diagnosis at a median 4.3 years post-implant. All patients underwent partial resection followed by either extra-anatomic vascular reconstruction (43%), in situ reconstruction (53%), or no vascular reconstruction (4%). Median overall survival was 3.7 years. Higher postoperative mortality approached significance in those who underwent resection of an an abdominal infection, compared against those with limb-only infection (HR 1.7, P=0.08). There was no appreciable survival difference between those undergoing in situ reconstruction or extra-anatomic bypass (P=0.6). Age (0.04) and time to infection (P=0.01) were associated with reinfection.

CONCLUSIONS: This is the largest study to date on the topic of partial resection of infected aortic grafts, and finds favorable long-term outcomes with encouraging overall survival after partial resection of infected aortic grafts.

Figure 1. N=116 Patients with Subtotal Aortic Graft Infection Resection

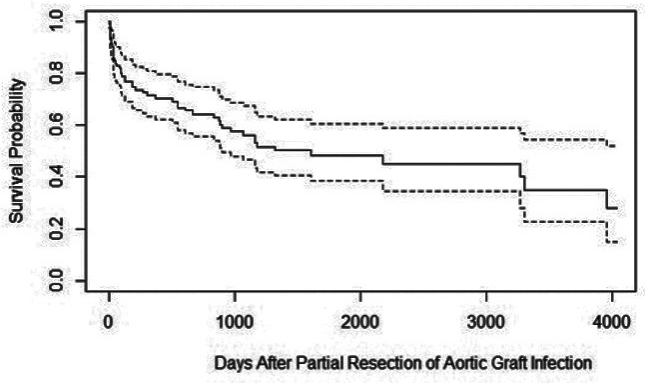
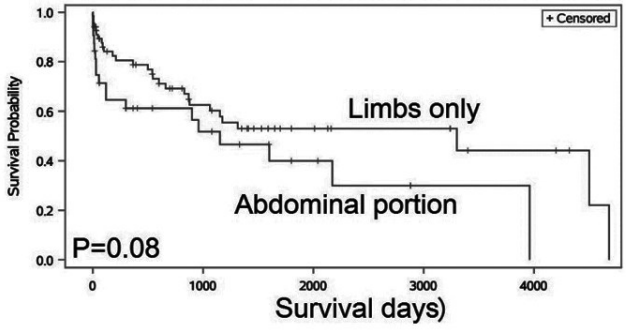


Figure 2. Survival after Partial Resection of Infected Aortic Graft



6:00 pm VESS MEMBER BUSINESS MEETING

2021 ANNUAL MEETING ABSTRACTS

Saturday, January 23, 2021

7:00 am **SCIENTIFIC SESSION IV**
Moderators: Matthew Smeds, MD & Nathan Liang, MD

7:00 am 28
Twenty-Eight Year Experience with Ruptured and Symptomatic Type I-III Thoracoabdominal Aortic Aneurysms at a Large Tertiary Referral Center
Christopher Latz, Charles DeCarlo, Laura Boitano, Linda Wang, Zach Feldman, Anna Pendleton, Mark Conrad, Samuel Schwartz - General Hospital Boston MA

OBJECTIVE: Given the relative rarity of ruptured and symptomatic type I-III thoracoabdominal aortic aneurysms (TAAA), there is little data regarding of the outcomes of those who survive to repair. The goal of this study was to determine short and long-term outcomes after open repair of type I-III TAAA surgery for ruptured and symptomatic TAAA and compare the results to elective TAAA repairs.

METHODS: All open type I-III TAAA repairs performed from 1987-2015 were evaluated using an institutional database. Charts were retrospectively evaluated for perioperative outcomes: major adverse event (MAE), in-hospital death, spinal cord ischemia (SCI) and long-term survival. Univariate analysis was performed using the Fisher's exact test for categorical variables and ANOVA for continuous variables. Logistic regression was used for in-hospital endpoints; survival analysis was performed with Cox proportional hazards modeling and Kaplan-Meier techniques.

RESULTS: Five hundred-sixteen patients had an open type I-III TAAA repair during the study period. 59 (11.4%) were performed for rupture and 51 (9.9) were performed for symptomatic aneurysm. Ruptured and symptomatic groups were more likely to be older, female and have larger presenting aortic diameters. The majority of ruptured and symptomatic cases were transferred from an outside facility (59.3% and 54.9%, respectively). Intraoperatively, the elective cohort was more likely to receive left-heart bypass as an operative adjunct; ruptures were less likely to receive a renal bypass and operative time was highest for the elective cohort. Perioperative mortality was 18.6% for ruptured, 2.0% for symptomatic, and 7.4% for elective indications. Ruptures were most likely to require new hemodialysis after repair (20.3% versus 10.3% for elective, p=0.02). On adjusted analysis, ruptures were more likely to suffer from perioperative death (AOR: 4.5, 95% CI: 1.7-11.4) and major adverse events (AOR: 2.8, 95% CI: 1.4-5.4). Rupture and symptomatic aneurysm were not independently associated with spinal cord ischemia, however pre-operative hemodynamic instability was predictive (AOR: 8.7, 95% CI:1.7-44.2). Both rupture and symptomatic cases were associated with decreased survival on Kaplan-Meier analysis with 5-year survival for ruptures at 35%, symptomatic at 47.7% and elective at 63.7%, p<0.001. Adjusted hazards of death were 1.2 (95% CI: 0.9-1.8) in the symptomatic cohort and 2.3 (95% CI: 1.5-3.7) in the ruptured cohort.

CONCLUSIONS: Open Ruptured and symptomatic type I-III TAAA repairs can be performed with acceptable morbidity and mortality. Most symptomatic and rupture repairs were performed after transfer from another institution. Post-operative spinal cord ischemia is most strongly related to the pre-operative hemodynamic status of the patient.

7:15 am 29
Procedure Reimbursement, Inflation and the Declining Buying Power of the Vascular Surgeon (2011-2019)
Jack Haglin[1], Weslyn Bunn[1], Samuel Money[1], Victor Davila[2], William Stone[2], Ina Soh[2], Andrew Meltzer[2] - [1]Mayo Clinic Scottsdale, AZ; [2]Mayo Clinic, Phoenix, AZ

OBJECTIVE: The purpose of this study was to evaluate the trend in Medicare reimbursement for common vascular procedures over the last decade. To enrich the context of this analysis, vascular procedure reimbursement is directly compared to inflation-adjusted changes in other surgical specialties.

METHODS: The Centers for Medicare & Medicaid Services (CMS) Physician/Supplier Procedure Summary file was utilized to identify the 20 procedures most commonly performed by vascular surgeons from 2011-2019. A similar analysis was performed for orthopedic, general, and neurological surgeons. The CMS Physician-Fee Schedule Look- Up Tool was queried for each procedure, and reimbursement data was extracted. All monetary data was adjusted for inflation to 2019 dollars (USD) utilizing the consumer price index. Average year-over-year and total percentage change in reimbursement were calculated based on adjusted data for included procedures. Comparisons to other specialty data were made with ANOVA.

RESULTS: From 2011-2019, the average, unadjusted change in reimbursement for vascular procedures was -1.2%. Accounting for inflation, the average procedural reimbursement declined by 13.6%. The greatest decline was observed in endovenous ablation (-30.9%). Open arteriovenous fistula revision was the only vascular procedure with an increase in inflation-adjusted reimbursement (+12.5%) [TABLE 1]. Year-over-year, inflation-adjusted reimbursement for common vascular procedures decreased by 1.7% per year. Venous procedures experienced the largest decrease in average adjusted reimbursement (-22.6%), followed by endovascular (- 14.2%) and open procedures (-9.9%). These changes were significantly different across procedural subgroups (p=.0434). During the same period, the average adjusted change in reimbursement for the 20 most common procedures in orthopedic surgery, general surgery, and neurosurgery was -7.1% vs. -13.6% for vascular surgery (p=.004). [Figure]

CONCLUSIONS: Medicare reimbursement for common surgical procedures has declined over the last decade. While absolute reimbursement has remained relatively stable for several procedures, accounting for a decade of inflation demonstrates the true diminution of buying power for equivalent work. The most alarming observation is that vascular surgeons have faced a disproportionate decrease in inflation-adjusted reimbursement in comparison to other surgical specialists. Awareness of these trends is a crucial first step towards improved advocacy and efforts to ensure the "value" of vascular surgery does not continue to erode.

Figure. Average Change in Inflation-Adjusted Medicare Reimbursement Across Surgical Specialties 2011-2019

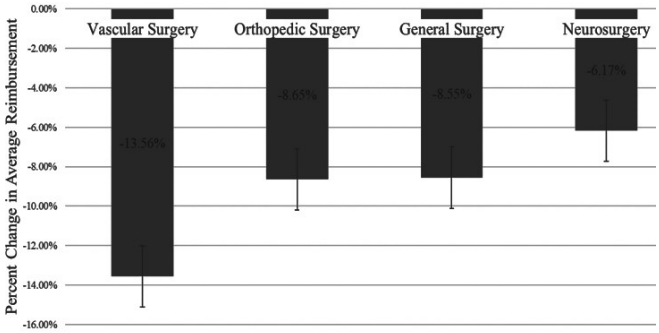


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Table 1. Adjusted Reimbursement Trends. All values adjusted for inflation.

Procedure	2011 Reimbursement (in 2011 USD)	2011 Reimbursement (in 2019 USD)	2019 Reimbursement (in 2019 USD)	% Change in Buying Power (% Change Adjusted)
Endovenous ablation therapy of incompetent vein, extremity	$371.23	$424.31	$293.38	-30.9%
Thromboendarterectomy, carotid, vertebral, subclavian	$1134.09	$1296.24	$1183.05	-8.7%
Insertion of tunneled centrally inserted central venous catheter, w/o port	$292.30	$334.09	$275.47	-17.5%
Arteriovenous anastomosis, open; direct, any site	$720.27	$823.26	$695.67	-15.5%
Revascularization, endovascular, open or percutaneous, iliac artery, with transluminal stent placement(s)	$533.92	$610.26	$520.77	-14.7%
Revascularization, endovascular, open or percutaneous, femoral, popliteal artery(s), with transluminal angioplasty	$482.92	$551.97	$467.26	-15.3%
Revascularization, endovascular, open or percutaneous, tibial, peroneal artery, with transluminal angioplasty	$589.94	$674.29	$570.71	-15.4%
Revascularization, endovascular, open or percutaneous, femoral, popliteal artery(s), with atherectomy	$650.31	$743.30	$635.76	-14.5%
Revision, open, arteriovenous fistula; without thrombectomy	$615.84	$703.90	$791.70	12.5%
Ligation or banding of angioaccess arteriovenous fistula	$398.42	$455.39	$392.49	-13.8%
Creation of arteriovenous fistula, nonautogenous graft	$697.54	$797.28	$698.76	-12.4%
Revascularization, endovascular, open or percutaneous, femoral, popliteal artery(s), with transluminal stent placement(s), includes angioplasty within the same vessel	$538.79	$615.83	$547.84	-11.0%
Revascularization, endovascular, open or percutaneous, tibial, peroneal artery, with atherectomy, includes angi-oplasty within the same vessel	$761.47	$870.35	$742.53	-14.7%
Endovascular repair of infrarenal aorta and/or iliac artery(ies) by deployment of an aorto-bi-iliac endograft; for non-rupture	$1518.52	$1735.65	$1601.28	-7.7%
Revascularization, endovascular, open or percutaneous, femoral, popliteal artery(s), with transluminal stent placement(s) and atherectomy, includes angioplasty	$785.47	$897.78	$764.21	-14.9%
Thromboendarterectomy, including patch graft, if performed; common femoral	$890.31	$1017.61	$855.29	-16.0%
Stab phlebectomy of varicose veins, 1 extremity; 10-20 stab incisions	$480.21	$548.87	$470.29	-14.3%
Excision of infected graft, extremity	$611.69	$699.15	$591.38	-15.4%
Revascularization, endovascular, open or percutaneous, iliac artery, unilateral, initial vessel; with transluminal angioplasty	$438.41	$501.10	$421.47	-15.9%
Insertion of tunneled centrally inserted central venous access device, with subcutaneous port	$365.71	$418.00	$354.88	-15.1%
Average				**-13.6%**

2021 ANNUAL MEETING ABSTRACTS

7:30 am

30

Long-Term Functional Decline Following Vascular Surgery Among Vulnerable Adults

Madeline M. DeAngelo, Jordan B. Peacock, Teryn A. Holeman, Maria Maloney, Julie Beckstrom, Benjamin S. Brooke - University of Utah School of Medicine, Salt Lake City, UT

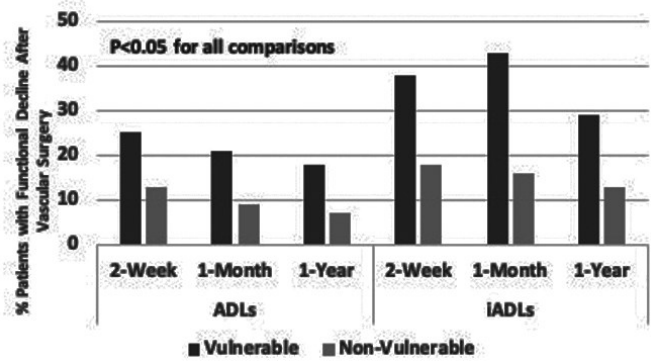
INTRODUCTION AND OBJECTIVES: Identifying high-risk patients that may experience functional decline following vascular surgery poses a challenge to healthcare providers. The Vulnerable Elders Survey (VES-13) is a patient-reported tool designed to identify risk for health deterioration based on age, self-rated health, physical function, and functional disabilities. This study was designed to determine whether VES-13 could predict long-term functional decline among patients undergoing vascular surgery procedures.

METHODS: Patients consented for elective vascular surgery procedures between May 2018 and March 2019 at an academic hospital were administered VES-13, and those scoring ≥3-points were classified as vulnerable. Each patient's functional status was assessed using the Katz Activities of Daily Living (ADL) and the Lawton-Brody Instrumental Activities of Daily Living (iADL) indices prior to surgery followed by 2-week, 1-month, and 1-year postoperative time points. Logistic regression models were used to identify independent predictors of functional decline.

RESULTS: 126 patients (59% male) were assessed before and after minor (56%) and major (44%) vascular procedures, with 55 (43%) meeting criteria for vulnerability. Vulnerable patients were older, had lower baseline functional status, and were more likely than non-vulnerable patients to experience further declines in ADLs and iADLs at all time-points (Figure). These findings were confirmed after adjusting for patient age and procedure type in regression models where vulnerability was associated with an increased likelihood of decline in ADLs (OR:3.3; 95%CI:1.0-10.6;P<0.05) and iADLs (OR:2.6; 95%CI:1.0-6.6;P=0.05) at 1-year following surgery.

CONCLUSIONS: VES-13 identifies vulnerable patients who are at risk of functional decline following vascular surgery. This survey is a quick and effective screening tool, allowing surgeons to prepare older patients and their caretakers for postoperative functional limitations.

Figure 1.



7:45 am

31

Use of Intravascular Ultrasound During First-Time Femoropopliteal Peripheral Vascular Interventions Among Medicare Beneficiaries

Sarah E. Deery, Chen Dun, David P. Stonko, Christopher J. Abularrage, James H. Black, III, Martin A. Makary, Caitlin W. Hicks - Johns Hopkins Hospital, Baltimore, MD

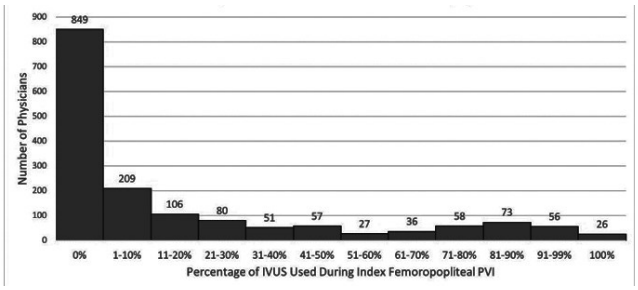
INTRODUCTION AND OBJECTIVES: Intravascular ultrasound (IVUS) may be a useful adjunct to lower extremity peripheral vascular interventions (PVI) in certain clinical scenarios. We aimed to identify patient- and physician-level characteristics associated with the use of IVUS during first-time femoropopliteal PVI.

METHODS: We included all Medicare beneficiaries undergoing elective femoropopliteal PVI for claudication or chronic limb-threatening ischemia between 01/01/2019 and 12/31/2019. We excluded patients with prior open or endovascular femoropopliteal intervention and physicians performing <11 PVI during the study period. We calculated the proportion of patients who had IVUS performed as part of their index PVI for each physician. Hierarchical logistic regression was used to evaluate patient- and physician-level factors associated with use of IVUS.

RESULTS: We identified 58,552 patients who underwent index femoropopliteal PVI, of whom 11,394 (19%) received IVUS. A total of 1,670 physicians performed >10 procedures during the study period, with IVUS utilization ranging from 0% to 100% (Figure). After hierarchical regression, claudication (vs. chronic limb-threatening ischemia: OR 1.22, 95% CI 1.11-1.35) and atherectomy (vs. angioplasty: OR 2.08, 1.82-2.38) were associated with higher odds of IVUS utilization. Higher-volume providers (tertile 3 vs. tertile 1: OR 44.67, 41.06-48.61) and those with high rates of service provided in an office-based laboratory (tertile 3 vs. tertile 1: OR 3.65, 2.59-5.15) were also more likely to utilize IVUS. Radiologists (OR 3.73, 2.51-6.57) and cardiologists (OR 1.93, 1.43-2.60) used IVUS more frequently than vascular surgeons.

CONCLUSIONS: Wide variability exists in utilization of IVUS for first-time femoropopliteal PVI. The association of IVUS with claudication, atherectomy, and office-based laboratories raises concern about its potential overutilization by certain physicians.

Figure 1. Distribution of Physician IVUS Rates for Index Femoropopliteal PVI



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8:00 am 32 (RF)

Contemporary Rates of Inferior Vena Cava Filter Thrombosis and Risk Factors

Ryan King, Mathew Wooster, Ravi Veeraswamy, Elizabeth Genovese - Medical University of South Carolina, Charleston, SC

OBJECTIVE: Inferior vena cava filter (IVCF) thrombosis is an uncommon event with most literature citing rates ranging from 1% to 31%. Few observational studies describe risk factors associated with IVCF thrombosis, despite the significant clinical sequelae such as post-thrombotic syndrome, venous claudication, and venous ulceration. To better describe IVCF thrombosis and risk factors, data were queried from US and Canadian VQI-participating centers.

METHODS: The international VQI database was queried for patients with IVCF placement from years 2013 – 2019. Baseline demographics, comorbidities, medications, procedural and anatomical information, and post-operative variables were assessed for patients with and without IVCF thrombosis using Kaplan-Meier survival curves truncated at two years. Cox regression analyses identified independent predictors of IVCF thrombosis at two years.

RESULTS: There was a total of 12,874 cases of IVCF placement; 5,780 patients had at least one follow up in the two-year period, of which there were 78 cases (1.3%) of IVCF thrombosis. Patients without diabetes or underlying coronary disease, who lacked preoperative or post - operative antiplatelet therapy, lacked preoperative statin therapy, on anticoagulation, with a DVT/PE or access site thrombosis, who received a temporary IVCF, or had another type of IVCF complication, had significantly higher rates of IVCF thrombosis at two years (Table I). Patients with IVCF thrombosis had significantly longer implantation times compared to those without thrombosis, 211 days vs 142 days. On multivariable analysis, statistically significant risk factors for IVCF thrombosis included post-operative IVCF complications including migration, angulation, fracture or perforation (hazard ratio [HR] = 7.13, 95% confident interval (CI) = 2.84

– 17.87, P<.001), access site thrombosis (HR=7.27, 95% CI=2.38 – 22.26, P=.001), other access than femoral vein (HR= 2.22, 95% CI=1.41 – 3.57, P=.001), lack of follow-up aspirin use (HR=3.85, 95% CI= 1.54 – 10.00, P=.004), ambulation with assistance or wheelchair (HR=1.99, 95% CI= 1.20 – 3.29, P=.008), follow-up anticoagulation use (HR=1.90, 95% CI= 1.15 – 3.14, P=.012), and current DVT/PE (HR=1.93, 95% CI= 1.03 – 3.61, P=.040), (Table II). IVCF thrombosis was associated with failed filter retrieval (15.5 % vs 2.2%), P<.001; but it was not associated with mortality.

CONCLUSIONS: The rate of IVCF thrombosis remains low in a contemporary cohort. Post-operative IVCF complications including migration, angulation, fracture and perforation, DVT/PE, limited ambulatory status, and anticoagulation therapy, which was likely a marker of high-risk of thrombosis, may predict IVCF thrombosis. Aspirin use may be protective against IVCF thrombosis.

Table 1. Inferior Vena Cava Filter Thrombosis and Demographic, Medication, Procedural, Anatomical, and Post-Operative Variables Compared with Log-Rank Tests

Categorical Variables		
Variable	IVC Filter Thrombosis *n* event/total (%)	*P*-Value
Male Female	39/2959 (1.3) 39/2820 (1.4)	.84
Non-African American African American	60/4735 (1.3) 18/1042 (1.7)	.43
Never Smoker Smoking History	48/3091 (1.6) 29/2667 (1.1)	.06
No Hypertension Hypertension	29/2198 (1.3) 49/3573 (1.4)	.79
No Diabetes Diabetes	67/4380 (1.5) 11/1392 (0.8)	.023
No Coronary Artery Disease Coronary Artery Disease	76/5196 (1.5) 2/575 (0.3)	.016
No COPD COPD	66/4867 (1.4) 12/901 (1.3)	.67
No Wheelchair or Assistance for Ambulation Wheelchair or Assistance for Ambulation	55/4627 (1.2) 23/1137 (2.0)	.062
No Pre-op Oral Anticoagulation Pre-op Oral Anticoagulation	63/4675 (1.3) 15/1096 (1.4)	.88
No Estrogen Use Estrogen Use	38/2669 (1.4) 1/141 (0.7)	.68
No Prior VTE Prior VTE	32/2520 (1.3) 31/1805 (1.7)	.28
No Family History of VTE Family History of VTE	73/5448 (1.3) 5/310 (1.6)	.31
No Pre-op Aspirin Pre-op Aspirin	70/4409 (1.6) 8/1364 (0.6)	.004
No Pre-op P2Y12 Inhibitor Pre-op P2Y12 Inhibitor	78/5564 (1.4) 0/210 (0)	.07
No Pre-op Statin Pre-op Statin	66/4127 (1.6) 12/1647 (0.7)	.006
No CHF CHF	74/5239 (1.4) 4/533 (0.8)	.17

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No History of Malignancy History of Malignancy	58/4265 (1.4) 20/1504 (1.3)	.93
No History of Thrombophilia History of Thrombophilia	73/5229 (1.4) 5/5302 (1.0)	.78
No Current PE Current PE	45/3637 (1.2) 33/2132 (1.5)	.17
No Current DVT/PE Current DVT/PE	13/1679 (0.8) 65/4100 (1.6)	.022
No Contraindication to Anticoagulation Contraindication to Anticoagulation	19/1601 (1.2) 45/2471 (1.8)	.67
Non-Femoral Vein Access Site Femoral Vein Access Site	40/2124 (1.9) 38/3596 (1.0)	.001
No Infra-Renal Landing Zone Infra-Renal Landing Zone	5/270 (1.9) 73/5470 (1.3)	.27
No Temporary IVC Filter Temporary IVC Filter	7/698 (1.0) 71/5045 (1.4)	.047
No Discharge Aspirin Discharge Aspirin	68/4368 (1.6) 10/1402 (0.7)	.010
No Discharge P2Y12 Inhibitor Discharge P2Y12 Inhibitor	77/5540 (1.4) 1/229 (0.4)	.21
No Discharge Anticoagulation Discharge Anticoagulation	41/2654 (1.5) 37/3037 (1.2)	.87
No Lower Extremity DVT at Follow Up Lower Extremity DVT at Follow Up	71/5539 (1.3) 7/190 (3.7)	.067
No Follow Up PE Follow Up PE	74/5644 (1.3) 2/54 (3.7)	.34
No Follow Up Aspirin Follow Up Aspirin	71/4325 91.6) 5/1322 (0.4)	<.001
No Follow Up P2Y12 Inhibitor Follow Up P2Y12 Inhibitor	76/5415 (1.4) 0/229 (0)	.064
No Follow Up Anticoagulation Follow Up Anticoagulation	24/2660 (0.9) 52/2992 (1.7)	<.001
No Follow Up Access Site Thrombosis Follow Up Access Site Thrombosis	73/5676 (1.3) 4/38 (10.5)	<.001
No Follow Up IVC Filter Complication* Follow Up IVC Filter Complication*	73/5718 (1.3) 5/61 (8.2)	<.001

Continuous Variables

	IVC Filter Thrombosis mean±standard deviation	No IVC Filter Thrombosis mean±standard deviation	*P*-Value
Age (Years)	58.1±16	60.7±16	0.15
BMI (kg/m^2)	31.4±9	32.7±11	0.16
Pre-op Creatinine (mg/dL)	0.92±0.4	1.00±0.6	0.08
Retrieval Time (Days)	211±212	142±134	0.03

*Fracture, perforation, migration >20 mm, angulation >15 degrees.

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Table II: Cox Regression Analysis of Factors Predictive of IVCF Thrombosis

	Hazard Ratio	95% Confidence Intervals		P-Value
		Lower	Upper	
IVC Filter Complication*	7.13	2.84	17.87	<.001
Access Site Thrombosis at Follow Up	7.27	2.38	22.26	.001
Other Access Than Femoral Vein	2.22	1.41	3.57	.001
Lack of Follow Up Aspirin	3.85	1.54	10.00	.004
Ambulatory with Assistance or Wheelchair	1.99	1.20	3.29	.008
Follow Up Anticoagulation	1.90	1.15	3.14	.012
Current DVT/PE	1.93	1.03	3.61	.040
Temporary IVC Filter Planned	1.83	.83	4.04	.136
Smoking History	.72	.45	1.17	.186
Coronary Artery Disease	.40	.09	1.65	.204
Diabetes	.64	.32	1.27	.205
Pre-op Statin	.68	.36	1.29	.240
Lower Extremity DVT at Follow Up	1.44	.61	3.40	.399
Pre-op Creatinine (mg/dL)	.89	.58	1.37	.605

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8:10 am

33 (RF)

Analysis of Medicare Payments for Pre-Operative Imaging Prior to Carotid Endarterectomy

Nathan Itoga, Krishna Martinez-Singh, John Harris, Jason Lee, Laurence Baker, Manuel Garcia-Toca - Stanford University, Stanford, CA

OBJECTIVE: Evaluation of carotid disease may be performed using multiple radiographic modalities. Current guidelines do not have strong recommendation regarding the use of cross - sectional imaging (CSI): CT or MRI of the neck, prior to surgical intervention. We sought to describe the use and Medicare payments in pre-operative carotid imaging and associated outcomes for patients undergoing carotid endarterectomy (CEA) for asymptomatic disease.

METHODS: We used a 20% Medicare sample from 2006-2014 identifying patients undergoing CEA. We evaluated pre-operative carotid ultrasound and CSI use prior to CEA. We calculated average payments of each study from the carrier file and revenue center file. Imaging payments included both the professional component (PC) and the technical component (TC). Claims with a reimbursement of $0 and studies where payment for both the TC and PC could not be identified were excluded from the overall calculation to determine average payment per study. Inpatient reimbursements according to DRG 37-39 were calculated according to CSI use. After stratifying by CSI use we compared hospital length of stay (LOS), post-operative stroke, and carotid re-exploration rates using multivariable regression.

RESULTS: A total of 58,993 CEAs were identified with pre-operative carotid imaging. The average age was 74.8±7.5 years, and 56.0% were men. Of these, 19,678 (33%) patients has ultrasound alone with an average of (2.4±1.9) exams prior to CEA. The CSI cohort had 39,315 patients with an average of 0.95±0.86 neck CTs and 0.47±0.7 MRIs in addition to 2.5±2.1 ultrasounds. The average payment for ultrasound was $140±40, $282±94 for CT and $410±146 for MRI, see Table 1. The average inpatient reimbursements were $6088±4125 for patients without CSI compared with $6784±3989 for patients with CSI, P<.001, see Table 2. The average LOS during CEA admission was 2.5±3.7 days. Higher age and female gender were associated with longer LOS; however pre-operative CSI was not associated with shorter LOS. The overall post-operative stroke rate was 0.5% and carotid re-exploration rate was 0.5%; CSI was not associated with lower rates of post-operative stroke or re-exploration.

CONCLUSIONS: Our analysis found pre-operative imaging to include CSI in nearly two-thirds of patients prior to CEA for asymptomatic disease. CSI was not associated with improved patient outcomes regarding shorter LOS, lower post-operative stroke, and lower rates of re-operation. As imaging and inpatient payments were higher in patients with CSI, further work is needed to understand when CSI is appropriate prior to surgical intervention to appropriately allocate healthcare resources.

Table 1. Payments for Pre-Operative Imaging, Expressed in US Dollars

	Carotid Ultrasound	CT neck	MRI neck
Total (mean±SD)	140±40	282±94	410±146
Median (IQR)	136 (116-154)	276 (236-320)	380 (311-470)
Professional Component (mean±SD)	26±6	56±17	55±18
Median (IQR)	24 (23-25)	63 (46-60)	51 (46-71)
Technical Component (mean±SD)	114±35	213±75	353±156
Median (IQR)	117 (107-129)	234 (179-256)	348 (265-428)

Table 2. Average Pre-Operative Imaging Studies with Associated Payments and Inpatient Reimbursements

Medicare Payments	No CSI (n=19,678)	With CSI (n=39,315)	P-value
Average number of Carotid DUS	2.4±1.9	2.5±2.1	<.001
Average number of CT neck	0	0.95±0.86	n/a
Average number of MRI neck	0	0.47±0.7	n/a
Total Pre-operative imaging payments	$336±54	$872±120	<.001
Average inpatient reimbursements	$6088±4125	$6784±3989	<.001
Pre-operative imaging + inpatient payments	$6424±4133	$7656±4050	<.001

8:20 am

34 (RF)

Acute Thrombotic Event from COVID-19 Infection: Short-Term Follow-Up

Christopher M. Faries, Ajit Rao, Nicole Ilonzo, Songhon Hwang, Prakash Krishnan, Serdar Farhan, Windsor Ting, John Lantis, Michael L. Marin, Peter L. Faries – Icahn School of Medicine at Mount Sinai, New York, NY

INTRODUCTION AND OBJECTIVES: COVID-19 infection appears to result in a hypercoagulable state with subsequent thrombotic events. We describe the short-term follow-up of thirty patients with COVID-19 and a concurrent acute vascular event.

METHODS: A retrospective review was performed on a prospectively maintained database from March to May, 2020, of patients with COVID-19 and a thrombotic event. The primary outcome was clinical patency, defined as freedom from symptoms after intervention. Secondary outcomes included mortality, length of stay (LOS), and morbidity.

RESULTS: Average age was 64.8 years old. 25 (83.3%) patients experienced arterial thrombotic events and 5 (16.7%) patients experienced venous thrombotic events. Patients with arterial events were older than those with venous events (65.2 vs. 63.0 years old, p< 0.05). The admitting diagnosis was an acute thrombotic event in 22 (73.3%) patients, COVID-19 infection in 7 (23.3%) patients, and hypertension for 1 patient (3.3%). Average LOS was 9.9 days.

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Procedures performed included 11 (36.7%) surgical embolectomies or bypasses, 7 (23.3%) percutaneous angiograms or venograms, 6 (20.0%) major amputations, and 2 (6.7%) minor amputations. 10 (33.3%) patients were treated conservatively. At one-month follow-up, 8 patients (26.7%) expired. 100% of patients who expired did so during the initial hospital stay. One-month clinical patency was 70.0%, (62.5% in arterial cases and 100% in venous cases). There were 6 readmissions (20.0%). Complications included wound infections (20.0%), acute kidney injuries (13.3%), hemorrhage (13.3%), and major amputations (10.0%).

CONCLUSIONS: Patients with COVID-19 infections who experienced thrombotic events saw high mortality and complication rates, and low patency rates.

Table 1. Demographics and Comorbidities

Demographics	All patients	Arterial Cases	Venous Cases	p-value
Number of patients	30 (100%)	25 (83.3%)	5 (16.67%)	--
Age	64.8	65.2	63	<0.05
Female	10 (33.33%)	9 (36.0%)	1 (20.0%)	0.49
Ethnicity				
Caucasian	9 (30.0%)	9 (36.0%)	0 (0%)	0.11
Hispanic	6 (20.0%)	5 (20.0%)	1 (20.0%)	1.00
African American	7 (23.33%)	5 (20.0%)	2 (40.0%)	0.33
Asian	3 (10.0%)	2 (8.00%)	1 (20.0%)	0.41
Unknown/other	5 (16.67%)	4 (16.0%)	1 (20.0%)	0.83
Medical Comorbidities	**All Patients (n=30)**	**Arterial (n=25)**	**Venous (n=5)**	**p-value**
Hypertension	21 (70.0%)	18 (72.0%)	3 (60.0%)	0.59
Hyperlipidemia	12 (40.0%)	11 (44.0%)	1 (20.0%)	0.32
Peripheral Vascular Disease	10 (33.33%)	10 (40.0%)	0 (0%)	0.08
Diabetes Mellitus	13 (43.33%)	11 (44.0%)	2 (40.0%)	0.87
Chronic Kidney Injury	2 (6.67%)	2 (8.0%)	0 (0%)	0.51
ESRD on HD	1 (3.33%)	1 (4.0%)	0 (0%)	0.65
Coronary Artery Disease (CAD)	7 (23.33%)	6 (24.0%)	1 (20.0%)	0.85
Stroke	5 (16.67%)	4(16.0%)	1 (20.0%)	0.83
Obesity	8 (26.67%)	7 (28.0%)	1 (20.0%)	0.71
Former Smoker	8 (26.67%)	8 (32.0%)	0 (0%)	0.14
Current Smoker	5 (16.67%)	3 (12.0%)	2 (40.0%)	0.13
Covid Severity				
Mild	14 (46.67%)	11 (44.0%)	3 (60.0%)	0.51
Moderate	12 (40.0%)	12 (48.0%)	0 (0%)	0.03
Severe	4 (13.33%)	2 (8.0%)	2 (40.0%)	0.05

Table 2. Outcomes of COVID-19 Infection and an Acute Thrombotic Event Upon One-Month Follow-Up

Mortality	All Patients (n=30)	Arterial (n=25)	Venous (n=5)	p-value
Total Mortality	8 (26.67%)	8 (32.0%)	(0%)	0.14
Cardiac Arrest	3 (10.0%)	4 (8.0%)	0 (0%)	0.40
Pneumonia	4 (13.33%)	4 (16.0%)	0 (0%)	0.40
Multisystem Organ Failure	1 (3.33%)	1 (4.0%)	0 (0%)	0.34
1 Month Clinical Patency	14 (70.0%)	10 (62.5%)	4 (100%)	0.23
Postoperative Complications				
Total Readmissions	6 (20.0%)	4 (16.0%)	2 (40.0%)	0.42
Unplanned Readmissions	5 (16.67%)	3 (12.0%)	2 (40.0%)	0.26
Deep Vein Thrombosis	2 (6.67%)	2 (8.0%)	0 (0%)	0.50
Hemorrhage	4 (13.33%)	3 (12.0%)	1 (20.0%)	0.66
Wound Infection	6 (20.0%)	6 (24.0%)	0 (0%)	0.21
Myocardial Infarction	2 (6.67%)	1 (4.0%)	1 (20.0%)	0.20
Major Amputation	3 (10.0%)	3 (12.0%)	0 (0%)	0.40
Acute Kidney Injury	4 (13.33%)	4 (16.0%)	0 (0%)	0.40
Stroke	2 (6.67%)	2 (8.0%)	0 (0%)	0.50
Pneumonia	1 (3.33%)	1 (4.0%)	0 (0%)	0.65
Reintubation	1 (3.3%)	1 (4%)	0	0.65

8:30 am **AWARD SESSION**
Moderators: Matthew Corriere, MD & Christopher Smolock, MD

Update from 2020 Winner(s)

- Travel Award – Postponed Until 2021
- Resident Research Award – Christopher Audu
- Early Career Faculty Award – Sam Tyagi

2021 Award Winners

- VESS Travel Award
- VESS/Medtronic Resident Research Award
- VESS Early Career Faculty Research Award

9:00 am **Introduction of the President**
Jason Lee, MD

9:10 am **PRESIDENTIAL ADDRESS**
Matthew Corriere, MD

10:00 am **PANEL ON IMPLICIT BIAS**
Supported by: Medtronic

Panelists: Jean Starr, MD, Jeannie Ruddy, MD, Christine Shokrzadeh, MD & Vik Kashap, MD

3:45 pm **INDUSTRY-SPONSORED SYMPOSIUM**
Presented by: Silk Road Medical

2021 ANNUAL MEETING ABSTRACTS

4:00 pm **SCIENTIFIC SESSION V**
Moderators: Misty Humphries, MD & Manuel Garcia Toca, MD

4:00 pm 35
Long-Term Durability of Superficial Femoral Vein AV Fistula for Dialysis Access
Kristine C. Orion[1], Tanner Kim[2], Anthony Rizzo[1], Jonathan Cardella[2], Anthony Rizzo[3], Timur Sarac[1] - [1]Ohio State University Wexner Medical Center, Columbus, OH; [2]Yale University School of Medicine, New Haven, CT; [3]Cleveland Clinic, Columbus, OH

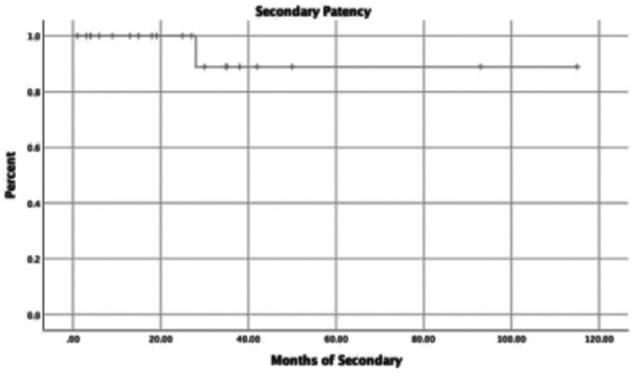
OBJECTIVE: Over the last half century, the numbers of patients on dialysis continue to increase. Central venous stenosis or occlusion, inadequate arm veins, and ultimate failure of repeated interventions are not uncommon. Many patients, especially the young, face exhaustion of traditional dialysis access options and abandonment of the upper extremities. Superficial femoral vein (SFV) arterial venous fistula of the lower extremity has been previously described as a final salvage effort, but there is little data on long-term patency. This study looks at the long-term durability of SFV av fistulae.

METHODS: 21 patients had an average of 5 failed dialysis procedures and underwent creation of a SVF fistula at three institutions. Preoperative imaging included ABI, vein mapping, CTA or diagnostic angiogram when appropriate. A SFV fistula was created by harvesting the vein from the common femoral, SFV junction to the popliteal vein junction and transposing it to the distal superficial femoral artery at the level of the adductor canal. Baseline characteristics, patency, complications, and follow up were evaluated in a retrospective manner.

RESULTS: The average age was 52 (18-77), There were 14 men and 7 women. 50% had diabetes, 43% with coronary artery disease, and 5 patients had known hypercoagulable disorders. Follow - up ranged from 1 to 114 months. There were no failed procedures. Univariate analysis revealed no independent risk factors associated with patency. Kaplan Meier primary patency at 1, 3 & 5 years was 93%, 71% and 71%. Assisted primary patency and secondary patency were similar at 1, 3 and 5 years: 100%, 89%, and 89%. Kaplan Meier Survival was 80% at 1 and 3 years and 53% at 5 years. Complications included 4 patients with wound, and 3 patients with compartment syndrome.

CONCLUSIONS: Utilizing the SFV for hemodialysis provides a durable alternative for patients without conventional surgical options. Complications such as limb loss or compartment syndrome are infrequent. Patency of deep AVF is comparable to traditional fistula.

Figure 1.



4:15 pm 36
Vascular Surgery Program Director Work Hours and Compensation Do Not Align with ACGME Proposed Requirements
Murray Shames[1], Kapland Owens[1], William Robinson[2], Amy Reed[3], Jason Lee[4], William Jordan[5], Malachi Sheahan[6] - [1]University of South Florida, Tampa, FL; [2]East Carolina University, Greenville, NC; [3]University of Minnesota, Minneapolis, MN; [4]Stanford University, Stanford, CA; [5]Emory University School of Medicine, Atlanta, GA; [6]Louisiana State University Health Sciences Center, New Orleans, LA

OBJECTIVE: In 2019, The ACGME has proposed significant changes to the common program requirements, mandating Vascular Surgery Program Directors to spend 50% of a 40hr work week on non-clinical, non-teaching, administrative programmatic duties. The objective of this study was to determine the current time commitments and financial support PDs receive for these duties and assess PD belief's regarding appropriate time commitment.

METHODS: A 15 question survey was sent to all Vascular PDs. Responses where anonymized and tabulated electronically using SurveyMonkey.

RESULTS: Sixty-eight Vascular PDs responded to the survey. The majority were male (88%) and were Associate Professors (40%) or Professors (38%). 35 respondents (52%) indicated they are the PD of both an integrated and independent vascular surgery training pathway, while 24 (5%) are the PD of only an independent (5+2) fellowship and 9 (13%) only of an integrated residency. (2% of programs have a dedicated program coordinator, and 66% of programs coordinators also work for another subspecialty. Only 56% of the total PD's are compensated by GME or their department for their efforts (fellowship -78%, integrated residency - 57%, and both - 45%). In all three groups, over half of PD's receive less than $20,000/year for their role (fellowship -78%, integrated residency - 57%, and both - 89%). All reported this salary support was not adjusted for the number of trainees and in 84% this was less than 10% of their gross salary. Among respondents who oversee both a fellowship and residency, 87% have more than 5 trainees in their program. PD's of only an integrated residency or independent fellowship were more likely to have 5 or less trainees-71% and 100%, respectively. 82% of PD's with just a fellowship, 100% of PD's with just an integrated residency, and 79% of PD's with both pathways indicated that they spend less than 10 hours/week on PD administrative duties. More than 75% of PD's suggested that less than 20% time commitment was necessary to perform the required administrative duties (0-10%, 25%; 11-20%, 54%; 21-30%, 16%; 31-40%, 1.5%; 41-50%, 3%).

CONCLUSIONS: Current ACGME program requirements are grossly misaligned with current vascular surgery program director work effort and compensation as well as the work effort PDs believe is optimal. The survey results suggest that the ACGME should re-evaluate the Vascular Surgery PD administrative time requirements and support efforts to ensure compensation matches the work effort required.

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4:30 pm 37

Laser In Situ Fenestration for Revascularization in Thoracic Endovascular Aortic Arch Repair: A Single Center Analysis

Elizabeth Evans, Ravikumar Veeraswamy, Sanford Zeigler, Mathew Wooster - Medical University of South Carolina, Charleston, SC

INTRODUCTION AND OBJECTIVES: Laser *in situ* fenestration (LISF) is an emerging technique for branch revascularization in thoracic endovascular aortic arch repair (TEVAR). We present a single center's early/midterm outcomes using LISF for treatment of various arch pathologies.

METHODS: 24 patients underwent TEVAR with LISF (2017-2020). Patients were evaluated by an Aortic Team consisting of cardiothoracic and vascular surgeons and were deemed unfit for open surgical repair. Informed consent emphasized the procedure's off-label nature. Thoracic stent-grafts were sized by preoperative CTA and intraoperative IVUS with oversizing determined by pathology. Extra-anatomic debranching was performed in staged or concurrent fashion based on urgency of repair and access site options for branch fenestration. A 2.3mm Spectranetics laser was used, with access site determined at surgeon discretion. Covered balloon expandable stent-grafts were deployed without oversizing.

RESULTS: In 24 patients, a total of 30 fenestrations were created (LSA N = 19, LCCA N = 3, Innominate N = 7, RSA N = 1) with one (N = 18) or two (N = 6) fenestrations/patient. Indications included TAA/TAAA (8), chronic dissection with aneurysmal degeneration (7), acute dissection (5), intramural hematoma (2), and pseudoaneurysm (2). 3 cases were emergent, 8 urgent, and 13 elective. Technical success was 100%. 12 patients underwent concurrent (N = 7) or staged (N = 5) extra-anatomic bypass. The major complication rate was 17%, including CVA (N=2) and 30-day mortality (N=2). Over a mean follow up of 261 days (15-864 days), 7 patients (32%) have required reinterventions.

CONCLUSIONS: LISF for branch revascularization in TEVAR is highly successful in treating various aortic arch pathologies, demonstrating practicality in urgent/emergent settings. With morbidity and mortality profiles favorable to open arch repair, LISF with TEVAR is a promising potential option for patients with complex anatomy and prohibitive open surgical risk.

4:45 pm 38

Closure Device Use for Common Femoral Artery Antegrade Access is Higher Risk than Retrograde Access

Joel L. Ramirez[1], Eric J.T. Smith[1], Devin S. Zarkowsky[2], Jose Lopez[1], Caitlin W. Hicks[3], Peter A. Schneider[1], Michael S. Conte[1], James C. Iannuzzi[1] - [1]University of California, San Francisco, San Francisco, CA; [2]University of Colorado, Aurora, CO; [3]Johns Hopkins Hospital, Baltimore, MD

INTRODUCTION AND OBJECTIVES: Although the use of closure devices for antegrade access (AA) is off-IFU, it has been reported to be associated with a lower incidence of access site complications compared to manual compression alone. We hypothesized that closure device use for AA would not be associated with an increased odds of access site complications compared to retrograde access (RA).

METHODS: The 2010-19 VQI was examined for infrainguinal PVIs with CFA access sites closed with a closure device. Patients who had a cutdown or multiple access sites were excluded. Cases were then stratified into whether access was antegrade or retrograde. Hierarchical multivariable logistic regressions controlling for hospital level variation were used to examine the independent association between AA and access site complications. Sensitivity analyses after coarsened exact matching were performed to reduce residual confounding.

RESULTS: Overall, 72,463 cases were identified and 6,070 (8.4%) had AA. Patients with AA were less likely to be smokers (27.2% vs 33.0%) or obese (31.5% vs 35.6%) and more likely to be on dialysis (12.8% vs 10.1%) and have ultrasound-guided access (76.4% vs 66.2%; $P<0.05$ for all). Compared to RA, patients with AA were more likely to develop any access site hematoma (2.5% vs 1.8%; $P<0.01$) or a hematoma requiring intervention (0.7% vs 0.5%; $P=0.03$) but had no difference in access site stenosis or occlusion (0.3% vs 0.2%; $p=0.21$). On multivariable analyses, AA had increased odds of developing any access site hematoma (OR=1.46; 95% CI=1.22-1.76) and a hematoma requiring intervention (OR=1.48; 95% CI=1.10-1.98). Sensitivity analyses after matching confirmed these findings.

CONCLUSIONS: In this nationally representative sample, closure device use for AA was associated with higher odds of access site hematoma compared to RA. When operative planning and selecting access site orientation, it is important to consider access site complications, regardless of closure options.

5:00 pm 39 (RF)

Risk Factors and Management of Steal Syndrome after Hemodialysis Access Creation

Shin-Rong Lee[1], Alan Dardik[1], Jeffrey Siracuse[2], Cassius Ochoa Chaar[1] - [1]Yale University School of Medicine, New Haven, CT; [2]Boston University School of Medicine, Boston, MA

OBJECTIVE: Steal syndrome is an uncommon but significant complication after hemodialysis access creation that may require intervention. This study examines the risk factors for steal syndrome requiring intervention and compares the outcomes of the different treatment modalities.

METHODS: The Vascular Quality Initiative dialysis access (2011-2018) registry was reviewed. Patients were classified based on the occurrence of steal syndrome requiring intervention or its absences and the respective characteristics were compared. Multivariable logistic regression was used to identify independent factors associated with steal syndrome. Kaplan Meier curves of secondary patency after different modalities of intervention were compared.

RESULTS: There were 35,236 vascular access creations and 970 (2.75%) were complicated by steal syndrome requiring intervention. Steal occurred more frequently in patients who were white, female, had diabetes, coronary artery disease, peripheral artery disease, and prior vascular access procedures, and were also more prevalent with upper arm prosthetic grafts placed in larger target vessels. Treatment was performed with access ligation in 224 patients (23%) and catheter-based techniques in 394 (41%). Open surgical revision consisted of banding in 127 (13%), distal revascularization interval ligation (DRIL) 196 (20%), proximalization of arterial inflow (PAI) in 15 (1.5%), and revision using distal inflow (RUDI) in 14 (1.4%) patients. Median time to intervention was 49 days (IQR 17-91 days). Multivariate regression demonstrated that white race, female sex, peripheral artery disease, coronary artery disease, diabetes, post-procedure antiplatelets, prosthetic grafts, upper arm access, and target vein diameter greater than 4 mm were significantly associated with increased risk for steal (Table 1). When compared to procedures without steal, the secondary patency of the access at 12 months was decreased when an intervention (excluding access ligation) for steal was performed (89% vs 92.4%, $p<0.01$). However, after multivariate Cox adjustment, revision for steal was not significantly associated with decreased secondary patency ($p=0.48$). There was a trend towards decreased secondary patency at 12 months with banding compared to open revision or endovascular intervention but that did not reach statistical significance ($p=0.16$, Figure 1). Overall survival was not significantly different between patients with or without steal ($p=0.17$).

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CONCLUSIONS: Steal syndrome complicates 2.75% of hemodialysis access cases and is more likely in white females with arterial disease after upper arm graft placement. The patency of dialysis access does not seem to be negatively impacted by the various methods of access revision for steal syndrome.

Figure 1. Access Patency with Different Salvage Procedures for Steal

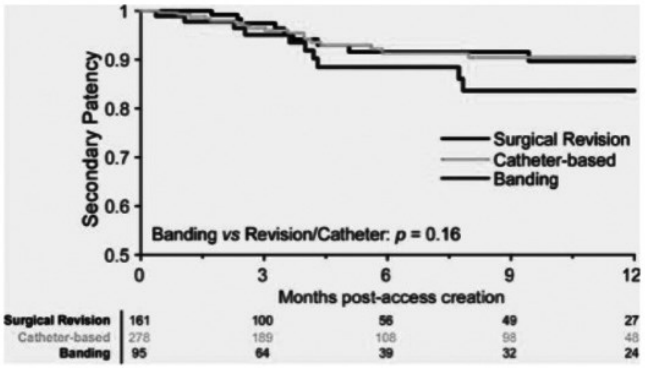

Table 1. Risk Factors for Steal Requiring Intervention

Predictors	OR (95% CI)	p
White	1.65 (1.40 - 1.94)	<0.001
Female	1.68 (1.43 - 1.98)	<0.001
Peripheral Artery Disease	1.48 (1.17 - 1.87)	0.001
Coronary Artery Disease	1.36 (1.14 - 1.63)	0.001
Diabetes mellitus	1.40 (1.17 - 1.66)	<0.001
Prior access	0.99 (0.83 - 1.18)	0.895
Prosthetic Graft	1.86 (1.54 - 2.23)	<0.001
Post-op antiplatelet therapy	1.26 (1.07 - 1.49)	0.006
Upper arm Procedure	1.31 (1.05 - 1.62)	0.016
Target Vein Diameter > 4mm	1.24 (1.03 - 1.48)	0.020
Target Artery Diameter > 3.9mm	0.98 (0.82 - 1.17)	0.810

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5:10 pm

40 (RF)

Adjunctive Superior Mesenteric/Portal Venous Reconstruction in the Treatment of Borderline Resectable Pancreatic Adenocarcinoma

William Duong, Roy Fujitani, Steven Tohmasi, Cyrus Farzaneh, Nii-Kabu Kabutey, Shelley Maithel, Carlos Donayre, Zeljka Jutric, David I magawa - University of California, Irvine, Orange, CA

INTRODUCTION AND OBJECTIVES: Pancreatic cancer is a leading cause of cancer-death, with a 9% 5-year survival rate. Surgery remains the only potential curative therapy, but most patients present with advanced stage disease at the time of diagnosis. Patients with tumors which involve the superior mesenteric vein–portal vein (SMV-PV) confluence are considered "borderline resectable" and are at higher risk for perioperative complications and margin-positive resection. We present our single institutional experience in the utility of adjunctive SMV-PV reconstruction for these tumors to assess viability and survival.

METHODS: A retrospective single institution review was completed identifying all patients who had a pancreaticoduodenectomy (PD) or total pancreatectomy (TP) over a 5-year period from 1/2014 to 12/2018. All vascular surgical reconstructions were performed by a multidisciplinary team approach with experienced hepatobiliary and vascular surgeons.

RESULTS: Over the 5-year period, 160 pancreatic resections (152 PD (95.0%) and 8 TP (5.0%)) were performed, of which 85 (53.1%) were for pancreatic adenocarcinoma. The average age was 69.2 years (60.3% male, 39.7% female). Of the 85 operations for adenocarcinoma, 35 (41.2%) underwent vascular reconstructions, with the majority being Stage IIb (65.7%). Of these, 22 (62.9%) received neoadjuvant chemotherapy. Vascular reconstructions of the portal vein consisted of 16 (45.7%) primary repairs, 9 (25.7%) resections with cryopreserved vein allograft interposition grafting, 5 (14.3%) resections with primary end-to end anastomosis, and 3 (8.6%) lateral venorrhaphy with patch angioplasty. Margin negative resection was achieved in 29 (85.3%). 1-year survival was 74.3%. There were 3 (8.6%) thromboses requiring intervention.

CONCLUSIONS: This study demonstrates that when surgical treatment is deemed appropriate, adjunctive SMV-PV resection may further extend opportunity for an R0 resection with comparable survival for Stage II tumors. Vascular surgeons are being consulted to participate in these advanced vascular reconstructions with increased frequency and should be familiar with the various reconstruction techniques.

5:20 pm

41 (RF)

The 2014 U.S. Preventive Services Task Force Abdominal Aortic Aneurysm Screening Guidelines Negligibly Impacted Repair Rates in Male Never Smokers and Female Smokers

Scott R. Levin[1], Alik Farber[1], Philip P. Goodney[2], Marc L. Schermerhorn[3], Mohammad H. Eslami[4], Katharine L. McGinigle[5], Julia Raifman[6], Jeffrey J. Siracuse[1] - [1]Boston University, Boston, MA; [2]Dartmouth-Hitchcock Medical Center, Lebanon, NH; [3]Beth Israel Deaconess Medical Center, Harvard Medical School, Boston, MA; [4]University of Pittsburgh Medical Center, Pittsburgh, PA; [5]University of North Carolina Medical Center, Chapel Hill, NC; [6]Boston University School of Public Health, Boston, MA

INTRODUCTION AND OBJECTIVES: In 2014, in addition to male smokers aged 65-75, the U.S. Preventive Services Task Force (USPSTF) recommended abdominal aortic aneurysm (AAA) screening for male never-smokers aged 65-75 with cardiovascular risk factors (Grade C). The USPSTF evolved from a negative to neutral position on screening for female smokers aged 65-75

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(Grade I). We sought to determine whether 2014 guidelines resulted in more AAA repairs in these populations.

METHODS: We queried the Vascular Quality Initiative national database (2013-2018) for elective endovascular aortic repairs and open aortic repairs. We implemented difference-in-differences (DID) analysis, a causal inference technique that adjusts for secular time trends, to isolate changes in repair numbers due to the 2014 USPSTF guidelines. The DID models compared changes in repair numbers in patient groups targeted by the USPSTF updates (intervention group) to those in unaffected, older patient groups (control), before and after 2014. The first model compared changes in repair numbers between male never-smokers aged 65-75 (intervention group) and 76-85 (control). The second model compared repair numbers between female smokers aged 65-75 (intervention group) and 76-85 (control).

RESULTS: There was no significant change in male never-smokers (n=1,1295) aged 65-75 (58%) vs. 76-85 (42%) undergoing AAA repairs after guideline updates, averaged over 4.5 years (+2.4 percentage points [PP]; 95% CI-.56-5.26). However, when their primary insurer was Medicare, male never-smokers aged 65-75 compared with 76-85 underwent significantly more repairs over 4.5 years (+3.69 PP; 95% CI.16-7.22). Comparing female smokers (n=2,312) aged 65-75 (54%) vs. 76-85 (46%), there was no significant change in repairs over 4.5 years (-.66 PP; 95% CI-4.57-3.26).

CONCLUSIONS: The USPSTF 2014 AAA screening guidelines were associated with modestly increased repairs in male never-smokers aged 65-75 on Medicare. There was no impact among female smokers. Higher-grade recommendations and improved guideline adherence may be requisites for change.

5:30 pm 42

A Single Center 8-Year Experience of Segmental Arterial Mediolysis Management

Arvind Srinivasan, Ayokunle Olowofela, Brian Lewis, Peter Rossi, Neel Mansukhani - Medical College of Wisconsin, Milwaukee, WI

INTRODUCTION AND OBJECTIVES: Segmental Arterial Mediolysis (SAM) is a rare, poorly understood vasculopathy that involves vacuolization of the arterial wall, most commonly of the visceral arteries. There are no established therapeutic or monitoring guidelines for SAM, and intervention typically depends on patient presentation.

METHODS: Single center retrospective review of patients with SAM diagnoses from 2011-2019. Patients were included on the basis of radiographic diagnosis. Patient demographic factors, past medical history, presenting symptoms, affected vessels, management, and lesion characteristics over time were collected. Patient demographics and perioperative factors were compared for those undergoing surgery versus those managed conservatively.

RESULTS: 30 patients were included, 21 were male and 9 were female, mean age was 53.5 years. Twenty-seven patients were managed non-operatively, 3 patients required surgical intervention. Patients who underwent intervention were more likely to present with pain>30 days ($p<0.05$), and hemorrhage ($p<0.01$). Abdominal pain was the most common presenting symptom (n=24, 80%). The celiac artery and its branches were most often involved (n=22, 73%) followed by the superior mesenteric artery and its branches (n=15, 50%). Arterial dissection was the most common imaging finding at time of presentation (n=20, 67%). Non-operative management most often consisted of anti-hypertensive therapy (n=13, 43%), antiplatelet agents (n=17, 57%%), and lipid-lowering agents (n=13, 43%), with 7 patients receiving all three. Six patients demonstrated confirmed resolution of lesions during surveillance imaging, with average time to resolution of 325.5 days.

CONCLUSIONS: The only patients who underwent intervention were those who presented with either mesenteric ischemia or pseudoaneurysm rupture. In patients that present without those conditions, medical management consisting of anti-hypertensives, antiplatelet agents, and lipid-lowering therapy are effective. Non operative management resulted in symptom resolution in all patients, and surveillance imaging showed resolution of radiographic abnormalities in 6 patients in less than one year.

5:45 pm 43

Unique Failure Modes and Complications of Iliac Branch Devices

Jordan R. Stern, Kenneth Tran, Ming Li, Jason T. Lee - Stanford University, Stanford, CA

INTRODUCTION AND OBJECTIVES: Iliac branch devices (IBDs) were designed to preserve hypogastric flow during endovascular aortoiliac aneurysm repair. We describe the unique complications of these devices: inability to cannulate the hypogastric artery (technical failure), occlusion of the internal branch, and type III endoleak from separation of components between the main body and IBD.

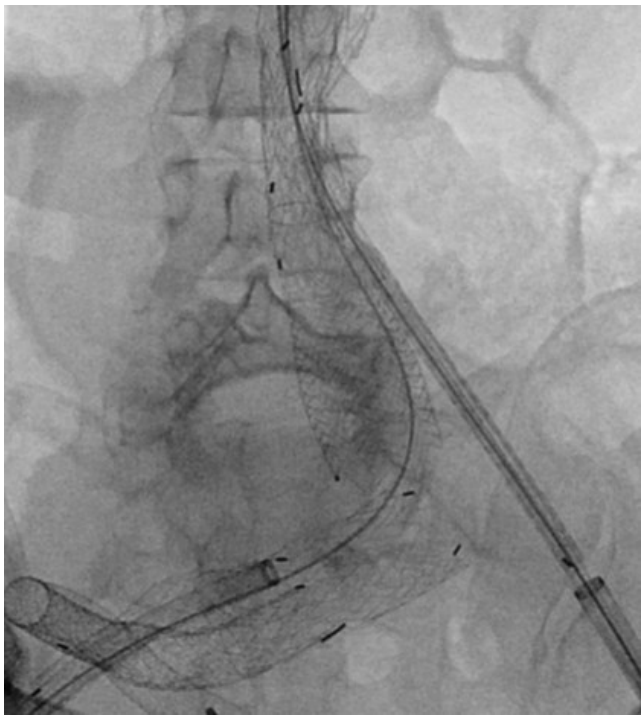
METHODS: A prospective, institutional database was reviewed for patients having one of the IBD-specific complications. Patient, anatomic, and procedural data was analyzed to identify factors associated with failures.

RESULTS: 64 hypogastric arteries in 59 patients were treated with IBDs between 2014-2019. Mean age was 71.2±8.6, and 92% were male. 74.6% of patients had a current or prior abdominal aortic aneurysm, and 9.4% had a hypogastric aneurysm. Technical success was achieved in 60/64 cases (93.8%); prior EVAR was associated with technical failure ($p=0.04$). There were 5 instances of component separation between the main body and the IBD (Figure 1): 3 occurred intraoperatively and were repaired with additional bridging components, and 2 occurred on late follow-up and required reintervention. Increased tortuosity index of both aortoiliac (1.7±0.4 vs. 1.3±02, $p=0.04$) and iliac-specific (3.9±2.4 vs. 1.9±0.9, $p=0.03$) segments were significantly associated with component separation, as was the use of larger internal iliac components (13.9±2.4 vs. 11.1±2.3 mm, $p=0.04$). Internal branch occlusions occurred in 4 patients (6.2%), all within 30 days. Two were successfully reopened with endovascular procedures. No specific factors were found to be predictive of branch occlusion.

CONCLUSIONS: IBD-specific complications occur rarely. History of prior EVAR is associated with technical failure, while increased aortic and iliac tortuosity are predictive of component separation and type III endoleak. Severe tortuosity should be carefully considered when planning for IBD.

2021 ANNUAL MEETING ABSTRACTS

Figure 1.



Sunday, January 24, 2021

7:00 am **SCIENTIFIC SESSION VI**
Moderators: Jason Lee, MD & Mark Conrad, MD

7:00 am 44
Selective vs. Routine Spinal Drain Use for Fenestrated/Branched Endovascular Aortic Repair (F-BEVAR)
Carla Scott, David Timaran, Fatemeh Malekpour, Marc Salhanick, Marilisa Soto Gonzalez, Mirza Baig, Carlos Timaran - University of Texas Southwestern Medical Center, Dallas, TX

OBJECTIVE: Spinal drains are used to ameliorate spinal cord ischemia (SCI), but their use may result in inherent morbidity and mortality. The role of spinal drains for F-BEVAR has not been demonstrated. The aim of this study was to assess the outcomes of spinal cord protection with and without the routine use of spinal drains during F-BEVAR.

METHODS: A retrospective single center study was performed using a prospectively maintained dataset of all patients undergoing F-BEVAR over a 4-year period. The primary endpoint of the study was the frequency of SCI. Prophylactic spinal drain was placed pre-operatively in 33 patients (23%) with a median time for removal of 3 days (IQR, 2-3 days). Routine intraoperative neuromonitoring (IONM) was used. Spinal cord protection relied primarily on maintaining a perioperative systolic blood pressure between140 and 160 mmHg or a mean arterial pressure >90mmHg, avoiding hypotension, preservation of as many collateral beds as possible, staged repairs and early lower extremity reperfusion based on neuromonitoring.

RESULTS: A total of 145 patients, 104 men (71%) and 41 women (28%) with a median age of 70 years (Interquartile range [IQR], 53-62) underwent F- BEVAR. Branched custom-made devices (CMDs) (11%), fenestrated CMDs (70%) and off-the-shelf T-Branch device (17%) were used with a median number of branches/fenestrations of 4(IQR, 3-4). SVS classification of implantation zones was determined as follows: 9(6%) zone 2, 17(13%) zone 3, 16(12%) zone 4 and 89(68%) zone 5. SCI was present in 8 patients (5.5%) and classified according to the SVS SCI grading system as follows: 1 grade 1, 5 grade 2 and 2 grade 3a. A high implantation zone (1-4) was not associated with SCI (p= 0.9). Similarly, prophylactic spinal drain did not demonstrate association with the occurrence of SCI (3 [9%] versus 5[4%], with and without spinal drain, respectively) (p=0.3). For patients with high implantation zones, staged repair was performed in 38 patients (26%) at a median time of 2 months (IQR, 2-6 months). Among these patients, the frequency of SCI was 13%. Staged repair was associated with an 80% reduction in the frequency of SCI (OR, 0.19[95%CI, 0.04-.084]) (p=0.02).

CONCLUSIONS: F-BEVAR can be performed with a minimal risk of SCI without the need for routine prophylactic spinal drains. High implantation zones did not predict SCI after F-BEVAR; however, staged repair significantly decreased the risk of SCI after F-BEVAR.

7:15 am 45
Development of a Convolutional Neural Network to Detect Infrarenal Abdominal Aortic Aneurysms
Justin Camar, Andrew Pop, Mathew Shedd, Brandon Dobrowsky, Cole Knox, Roger Tomihama, Sharon C. Kiang - Loma Linda University School of Medicine, Loma Linda, CA

INTRODUCTION AND OBJECTIVES: To train a foundational convolutional neural network (CNN) for screening computed tomography angiography (CTA) scans for the presence of infrarenal abdominal aortic aneurysms for future predictive modeling and other artificial intelligence applications.

METHODS: From January 2015 to January 2020, a HIPAA-compliant, institutional review board-approved, retrospective clinical study used analyze contrast enhanced abdominopelvic CTA scans from 200 patients with infrarenal abdominal aortic aneurysms and 200 propensity matched control patients with non-aneurysmal infrarenal abdominal aortas. A CNN was trained to binary classification on the input. For model improvement and testing, transfer learning using the ImageNet database was applied to the VGG16 base model. The image dataset was randomized to sets of 50%, 20%, and 30% for model training, validation, and testing, respectively. Stochastic gradient descent was used for optimization. Models were assessed by testing validation accuracy and area under the receiver operating characteristic curve (AUC).

RESULTS: Preliminary data demonstrated a non-random pattern of accuracy and detectability. Iterations (up to 10) of model characteristics generated a final custom CNN model reporting a validation accuracy of 0.92 and AUC of 0.99. Misjudgments were analyzed through review of heatmaps generated via gradient weighted class activation mapping overlaid on original CT images. The highest misjudgments were seen in small aneurysms (< 3.3 cm) with mural thrombus (11.6%).

CONCLUSIONS: Preliminary data from a CNN model can accurately screen and identify CTA findings of infrarenal abdominal aortic aneurysms. This model serves as a proof-of-concept to proceed with potential future directions to include expansion to predictive modeling and other artificial intelligence-based applications.

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7:30 am

46

Hybrid and Total Endovascular Approaches to Tandem Carotid Artery Have Similar Short- and Long-Term Outcomes

Charles Decarlo[1], Adam Tanious[1], Laura T. Boitano[1], Jahan Mohebali[1], David H. Stone[2], W. Darrin Clouse[3], Mark F. Conrad[1] - [1]Massachusetts General Hospital, Boston, MA; [2]Dartmouth-Hitchcock Medical Center, Lebanon, NH; [3]University of Virginia, Charlottesville, VA

BACKGROUND: Addition of ipsilateral proximal endovascular intervention (PEI, common carotid/innominate) increases the risk of perioperative stroke/death for both carotid endarterectomy (CEA) and carotid stenting (CAS). However, these approaches have not been directly compared and is the subject of this study.

METHODS: VQI (2005-2020) was queried for CEA and CAS with PEI, excluding emergent, bilateral, and repeat procedures, patients with prior ipsilateral CAS, ICA lesions with stenosis<50%, and transcarotid ICA stents. Primary outcome were the composite of perioperative neurologic events/death and long-term neurologic events/reintervention/death. Operative approach was evaluated with logistic regression, adjusted propensity scores, symptomatic status, and stenosis>70%. Long-term outcomes were compared with Kaplan-Meier Analysis.

RESULTS: There were 1,433 patients (795 endovascular;638 hybrid); mean age 69.8±9.4 years. Patients undergoing hybrid procedures were more likely to be female (49.4% vs. 37.5%;p<0.001), less likely to have diabetes (29.5% vs. 38.2%;p<0.001), less likely to have a prior ipsilateral CEA, (3.8% vs. 32.2%;p<0.001), less likely to be symptomatic (34.6% vs. 52.8%;p<0.001), and less likely to have >70% stenosis (77.3% vs. 95.6%%;p<0.001). Perioperative stroke/death was 4.7% for hybrid and 5.0% for endovascular approaches (p=0.77, Table). In the multivariable model, hybrid approach was associated with stroke/death (OR 0.93;95%CI:0.50-1.71; p=0.80). For the 981 patients with long-term follow-up (556 endovascular;425 hybrid), 1-year freedom from neurologic events/reintervention/death was 92.9% (95%CI:89.8%-95.2%) for hybrid approach vs. 90.5% (95%CI:87.4%-92.8%) for endovascular approach (p=0.15).

CONCLUSION: Although simultaneous repair of tandem carotid lesions portends worse outcomes when compared to CEA or CAS alone, there was no difference in short or long-term stroke and death rates with a hybrid or totally endovascular approach. Therefore, it is reasonable to use either approach in the select patients who require simultaneous repair of both lesions.

Table 1. Perioperative Outcomes

	Endovascular	Hybrid	p-value
	N=795	N=638	
Stroke*/Death	40 (5.0%)	30 (4.7%)	0.77
Stroke*/Death/MI	45 (5.7%)	37 (5.8%)	0.91
Stroke*	33 (4.2%)	25 (3.9%)	0.82
30-Day Mortality	9 (1.1%)	10 (1.6%)	0.47
MI	9 (1.1%)	13 (2.0%)	0.17
Cranial Nerve Injury	0 (0.0%)	26 (4.1%)	<0.001
CHF Exacerbation	12 (1.5%)	9 (1.4%)	0.88
New Dysrhythmia	26 (3.3%)	15 (2.4%)	0.30
Reperfusion Syndrome	5 (0.6%)	3 (0.5%)	0.69
Other Complications^	29 (3.6%)	20 (3.1%)	0.60
*Stroke refers to Stroke and/or Transient Ischemia Attack			
^Includes incision, access site, and other unspecified complications			
Abbreviations: MI -myocardial infarction, CHF - congestive heart failure			

7:45 am

47

Progression of Changes in Vascular Surgery Practices During the Novel Corona Virus SARS-CoV-2 Pandemic

Matthew R. Smeds[1], Faisal Aziz[2], Jonathan Bath[3] - [1]Saint Louis University, St. Louis, MO; [2]Pennsylvania State University, Hershey, PA; [3]University of Missouri, Columbia, MO

INTRODUCTION: The novel coronavirus SARS-CoV-2 (COVID-19) has spread rapidly since it was identified. We sought to understand its effects on vascular surgery practices stratified by VASCON surgical readiness level, and determine how these effects have changed during the course of the pandemic.

METHODS: All members of the Vascular and Endovascular Surgery Society were sent electronic surveys questioning the effects of COVID-19 on their practices in April (early pandemic-EP) and August (late pandemic-LP) 2020.

RESULTS: Response rates were 206/731(28%) in the EP group and 108/731(15%) in the LP group (p<0.0001). Most EP respondents reported VASCON levels less than 3 (168/206,82%), indicating increased hospital limitations while 6/108(6%) in the LP group reported this level (p<0.0001). The EP group were more likely to report a lower VASCON level (increased resource limitations), and decreased clinic, hospital and emergency room consults (Table). Despite an increase of average cases/week to pre-COVID-19 levels, 46/108(43%) of LP report continued decreased compensation, with 57% reporting more than 10% decrease. Respondents in the decreased compensation group were more likely to have reported a VASCON level 3 or lower earlier in the pandemic (p=0.018). 91/108 (84%) of LP group have treated COVID-19 patients for thromboembolic events, most commonly acute limb ischemia (76/108) and acute DVT (76/108). While the majority of respondents are no longer delaying the vascular surgery cases, 76/108 (70%) feel

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that vascular patient care has suffered due to earlier delays, and 36/108 (33%) report a backlog of cases caused by the pandemic.

CONCLUSIONS: COVID-19 had a profound effect on vascular surgery practices earlier in the pandemic, resulting in continued detrimental effects on the provision of vascular care as well as compensation received by vascular surgeons.

Table 1. Effects of COVID-19 on Vascular Surgery Practices

	EP (n=206)	LP (n=108)	p-value
Decrease in Referrals			
Clinic Referrals	175 (85%)	46 (43%)	<.0001
Inpatient Hospital Consults (Acute)	134 (65%)	21 (19%)	<.0001
Emergency Room Consults (Acute)	127 (62%)	18 (17%)	<.0001
Inpatient Hospital Consults (Chronic)	148 (72%)	20 (19%)	<.0001
Emergency Room Consults (Chronic)	162 (79%)	21 (19%)	<.0001
Practice Changes			
Limiting of Elective Cases	201 (98%)	21 (19%)	<.0001
Limiting of Emergent Cases	10 (5%)	4 (4%)	0.778
Limiting of In-Person Clinic Visits	192 (93%)	36 (33%)	<.0001
Increased Telehealth Visits	186 (90%)	70 (65%)	<.0001
Providing Surgical Care You Otherwise Wouldn't	23 (11%)	1 (1%)	.0005
Providing Critical Care for COVID19 Patients	25 (12%)	4 (4%)	.0136
Decreased Compensation	57 (28%)	46 (43%)	.6014
Cases/Week Performed Pre-COVID			
0-3	6 (3%)	7 (6%)	0.183
4-6	46 (22%)	30 (28%)	
7-9	69 (33%)	37 (34%)	
>10	85 (41%)	34 (34%)	
Cases/Week Performed Post-COVID			
0-3	142 (69%)	11 (10%)	<.0001
4-6	48 (23%)	38 (35%)	
7-9	7 (3%)	33 (31%)	
>10	9 (4%)	26 (24%)	

8:00 am 48 (RF)

Surgeon Volume and Established Hospital Peri-Operative Mortality Rate Together Predict Superior Outcomes after Open AAA Repair

Joshua Geiger, Fergal Fleming, Michael Stoner, Adam Doyle - University of Rochester Medical Center, Rochester, NY

INTRODUCTION AND OBJECTIVES: Higher hospital and surgeon volumes have been independently associated with improved survival after elective open abdominal aortic aneurysm (AAA) repair. The 2018 SVS guidelines recommend elective open AAA repair be performed at centers with an annual open aortic operations volume ≥10 and a perioperative mortality of <5%. Recent work suggests a surgeon volume of ≥7 cases correlates with <5% perioperative mortality. The objective of this study is to assess the importance of hospital factors and surgeon volume at these cut points in predicting 1-year mortality after elective open AAA repair.

METHODS: We evaluated patients undergoing elective open AAA repair using the New York Statewide Planning and Research Cooperative System database from 2004 to 2014. Volumes were measured as the average yearly volume of open abdominal aortic surgeries in the 3 proceeding years. Cox proportional hazards analysis was used to assess the interactions between hospital volume, established hospital peri-operative survival, and surgeon volume.

RESULTS: We studied 7,594 elective open AAA repairs performed by 542 surgeons in 137 hospitals. Hazard ratios for surgeon volume ≥7, hospital volume ≥10, and hospital prior 3-year perioperative mortality of ≤5% are 0.80 (95% CI: 0.70-0.93, p=0.003), 0.91 (0.77-1.08, p=0.298), 0.72 (0.62-0.82, p<0.001), respectively, with nonsignificant interactions. Figure 1 displays survival curves for combined surgeon volume and hospital perioperative mortality.

CONCLUSIONS: These data suggest surgeon volume ≥7 and established hospital perioperative mortality of ≤5% independently predict 1-year survival after open AAA repair, while hospital volume is less important. Together, a surgeon volume ≥7 and hospital perioperative mortality of ≤5% is a strong predictor of long-term and short-term outcomes, further supporting centralizing the care of patients requiring elective open AAA repair.

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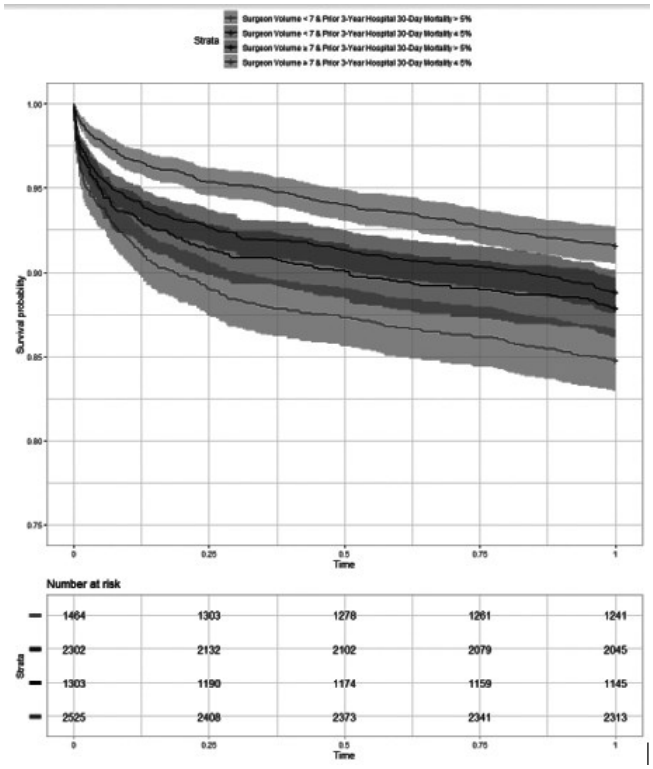
Figure 1.



8:10 am 49 (RF)

Ultrasound Screening of Abdominal Aortic Aneurysm by Junior Medical Officers in Australian Rural Hospital Setting: A Pilot Study

Vincent Wang Hon Chow, Mei Ping Melody Koo - St. Vincent's Hospital Melbourne, Victoria, Fitzroy, Victoria, Australia

INTRODUCTION AND OBJECTIVES: Cost-effectiveness of Abdominal Aortic Aneurysm (AAA) ultrasound screening in the metropolitan setting has been demonstrated. Literature suggests that trained novices can reproduce abdominal aorta measurements comparable to monographers. This study aimed to determine if, after limited training, junior doctors could perform ultrasound AAA screening reliably for rural Australian population. We hypothesized that junior doctors would be able to achieve interobserver variability within 5mm in at least 95% of patients.

METHODS: This was a 23-day prospective study carried out at the Whyalla Hospital and Health Services, a regional health provider in rural South Australia. Participants aged 50 years or above were recruited from the hospital inpatients and community volunteers. Three junior doctors who underwent 2-hour practical Point-of-Care ultrasound training performed scans sequentially on participants. The maximum anteroposterior diameter of the infrarenal aorta was measured. Measurement discrepancies between operators were compared against the clinically acceptable difference (CAD) of 5mm. Scanning efficiency and aneurysm detection were statistically analyzed.

RESULTS: Among 71 participants, measurements were successfully attained by all operators in 66(93.0%) cases, and within CAD in 58 (81.7%) cases between three operators-16(72.7%) inpatients and 42 (95.5%) volunteers. Measurement reproducibility substantially improved after standardization of ultrasound technique on day one (Figure 1). Agreement on aneurysm detection was excellent between operators. No previously known AAA was missed. Improvement in scanning efficiency from inpatients to volunteers group was statistically significant.

CONCLUSIONS: For screening purposes, junior doctors were able to efficiently reproduce infrarenal aortic diameter measurements comparable to monographers after 2-hour training. One day of supervised practice is recommended to institute standardized ultrasound technique for novices. Ultrasound AAA screening by junior doctors in rural Australia is feasible, cost-effective and should be advocated.

Figure 1. Measurement Difference versus Number of Participants Scanned by Operator

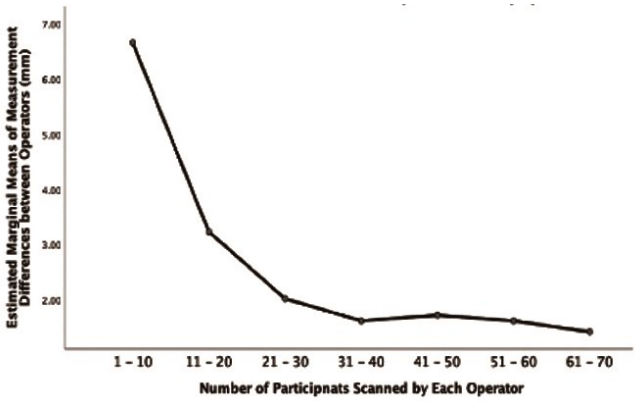
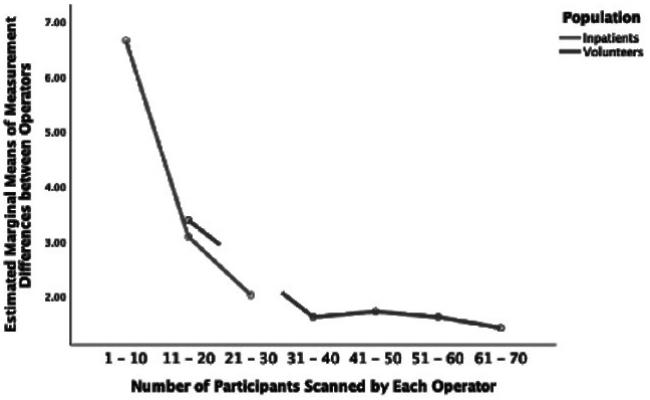


Figure 2. Measurement Difference versus Number of Participants Scanned and Recruited Population



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8:20 am

50 (RF)

Can Machine Learning Models Predict Failure of Maturation of Arteriovenous Fistula?

Siavash Bolourani, Amit Rao, Avinash Garlapati, Jeffrey Silpe, Firas Mussa, Gregg Landis, Yana Etkin - Donald and Barbara Zucker School of Medicine at Hofstra/Northwell, New Hyde Park, NY

INTRODUCTION: The long-term hemodialysis (HD) is dependent on functional vascular access. Arteriovenous fistula (AVF) is the preferred type of vascular access. Despite a growing body of literature identifying risk factors for failure of AVF maturation, no consistent criteria are applied to identify at-risk patients. Our goal is to introduce a machine learning (ML)-based framework for predicting failure of AVF maturation and identify patients for consideration of alternative HD access.

METHODS: All patients who underwent AVF creation between 2014 and 2020 at a tertiary academic medical center were retrospectively reviewed. From 783 AVFs, 143 failed to mature. Features included as potential predictors of failure, included patient's demographics, comorbidities, preoperative ultrasound findings and type of fistula created. Two XgBoost based ML models were constructed and the results were interpreted and compared with the logistic regression prediction model.

RESULTS: XgBoost classifier was able to predict failure with accuracy of 80%, specificity of 93% and sensitivity of 22%. In order to increase the sensitivity, we used NearMiss sampling and achieved sensitivity of 74% at the cost of decreasing accuracy to 62% and specificity to 66%. Both models were superior to logistic regression on all metrics considered. The XgBoost models shared vein size, presence of arterial calcifications and venous wall thickening, female gender, and CAD as the most important variables. The more sensitive model also included ipsilateral catheter and current heart failure.

CONCLUSIONS: We have outlined a framework in which machine learning models can be integrated to augment vascular surgeons' decision making regarding AVF creations. Such models will not only improve the workflow, but may also decrease the number futile AVF creations by identifying at-risk patients.

Figure 1. ROC Curves for XgBoost

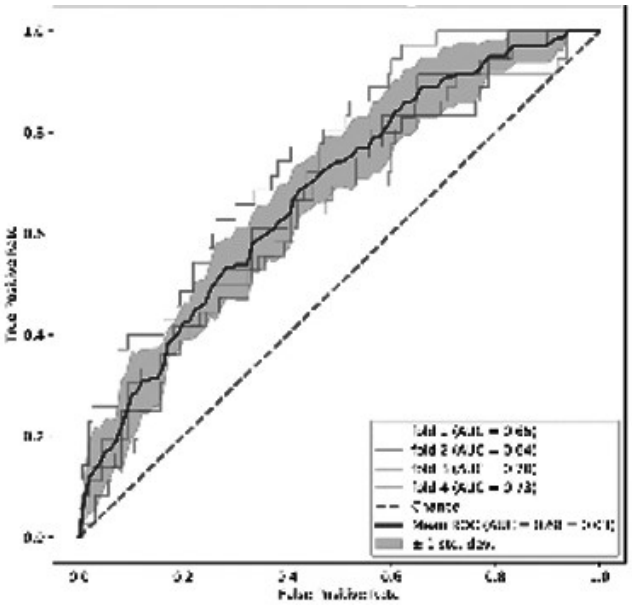


Figure 2. ROC Curves for XgBoost + Nearmiss

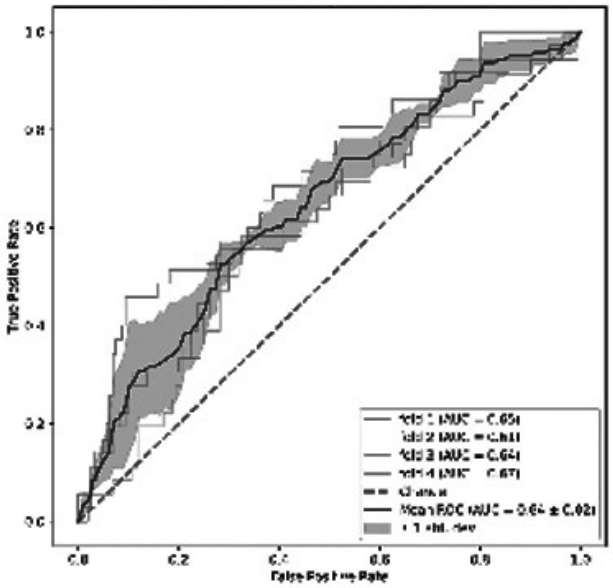
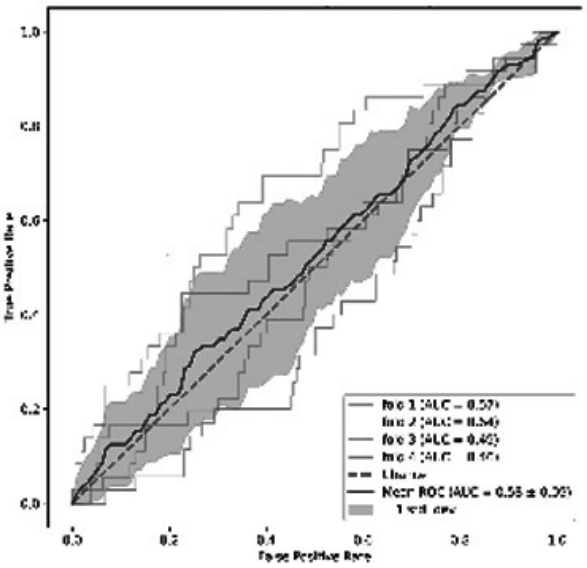


Figure 3. ROC Curves for Logistic Regression



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8:30 am 51

Impact of Vessel Size on Midterm Outcomes after Percutaneous Transluminal Angioplasty for Isolated De Novo Superficial Femoral Artery Disease

Heepeel Chang[1], Caron B. Rockman[1], Glenn R. Jacobowitz[1], Neal S. Cayne[1], Virenda I. Patel[2], Karan Garg[1] - [1]New York University, New York, NY; [2]New York Presbyterian/Columbia University Medical Center, New York, NY

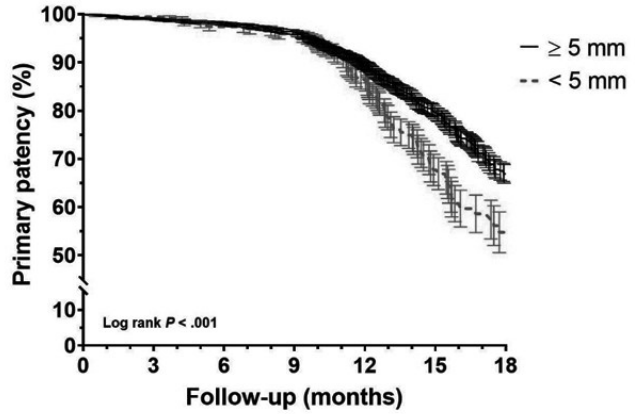
INTRODUCTION AND OBJECTIVES: We sought to assess the outcomes of percutaneous transluminal angioplasty (PTA) for isolated de novo superficial femoral artery (SFA) disease based on vessel diameter.

METHODS: The Vascular Quality Initiative database was queried for patients undergoing PTA for isolated de novo occlusive SFA disease. Based on the diameter of the angioplasty as an indirect measure of the vessel size, patients were stratified into two groups: group 1, < 5mm (354 patients) and group 2, ≥ 5mm (1,550 patients). The primary patency and freedom from major adverse limb events (MALEs) were estimated by the Kaplan-Meier method and compared with the log-rank test, based on vessel size. Cox multivariable regression analysis was used to determine factors associated with the primary patency.

RESULTS: From January 2010 through March 2019, a total of 1,904 patients met criteria for analysis, with a mean follow-up of 13.3±4.5 months. The overall primary patency rate and freedom from MALEs at 18-months were lower in group 1 (54.8% and 66.9%), compared to group 2 (66.9% and 74.4%, respectively; *P*<.001). Cox proportional hazard analysis confirmed that SFA diameter < 5mm (HR 0.71; 95% CI, 0.52-0.95; *P*=.022), occlusion length ≥ 10cm (HR 1.43; 95% CI, 1.08-1.89; *P*=.012) and Transatlantic Inter-Society Consensus C and D lesions (HR 1.33; 95% CI, 1.01-1.76; *P*=.043) were independently associated with higher loss of primary patency at 18-months.

CONCLUSIONS: In patients undergoing endovascular intervention for isolated de novo SFA stenosis, a smaller diameter of SFA, especially < 5mm, occlusion length ≥ 10cm and higher TASC lesions were associated with the worse primary patency. Patients with smaller SFAs appear to be at increased risk for treatment failure and warrant close surveillance.

Figure 1.



8:45 am 52

Aortic Neck Dilatation Following Endovascular Repair of Thoracic Aortic Aneurysm

Patricia Yau[1], Patricia Friedmann[2], Jeffrey Indes[1], Evan Lipsitz[1], Hasan Aldailami[1] - [1]Montefiore Medical Center, Bronx, NY; [2]Albert Einstein College of Medicine, Bronx, NY

INTRODUCTION AND OBJECTIVES: Thoracic endovascular aortic repair (TEVAR) has become a mainstay of treatment for thoracic aortic aneurysm (TAA). Expansion of the proximal aortic neck after endovascular repair of abdominal aortic aneurysms has been demonstrated; however, dilatation of the proximal aortic neck after TEVAR has not been well described. We sought to describe remodeling of the proximal neck following TEVAR for TAA.

METHODS: This is a retrospective, single institution review of patients who underwent TEVAR for thoracic aortic aneurysm from 2010-2019. Postoperative computed tomography (CT) scans were reviewed and aortic diameter was measured in orthogonal planes using 3-dimensional centerline reconstruction software, at the proximal extent of the graft (Na), 5 mm distal (Nb), 20 mm proximal (PNa), and 10 mm proximal (PNb). The primary outcome was change in aortic diameter as compared to the initial postoperative CT scan. Clinical and operative data were analyzed to identify factors associated with significant neck dilatation.

RESULTS: Thirty patients underwent TEVAR for TAA, with median follow up of 20.5 months. All four sites experienced a mean increase over time in aortic diameter. The distal neck (Nb) had the greatest rate of neck expansion, with median increase of 1.3 mm, 2.9 mm, and 6.2 mm at one year, two years, and three years, respectively. When comparing patients who had mean expansion at Nb of $\geq$2.0 mm/year to patients who did not, a higher percentage had dissection pathology (81.8% vs. 31.6%, p=0.008), had graft placement at aortic landing zone 2 (36.4% vs. 5.3%, p=0.028), and were smokers (100% vs. 52.6%, p=0.006).

CONCLUSIONS: Aortic neck dilatation occurs over time for the majority of patients following TEVAR for TAA, with the distal neck experiencing the highest rate of expansion. Dissection pathology, landing zone 2, and smoking were found to be associated with a higher rate of neck dilatation.

9:00am Adjourn