47TH ANNUAL MEETING

New England Society for Vascular Surgery

SEPTEMBER 11-12, 2020
[ VIRTUAL ]
2019 - 2020 EXECUTIVE COUNCIL & COMMITTEES

President .......................................................................................................................... Marc Schermerhorn, MD
President-Elect ................................................................................................................... Alan Dardik, MD, PhD
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Secretary .......................................................................................................................... Andres Schanzer, MD
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Recorder .............................................................................................................................. Sean P. Roddy, MD
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Past President .................................................................................................................... Glenn M. LaMuraglia, MD
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Councilor-at-Large ............................................................................................................ Courtney J. Warner, MD
Councilor-at-Large ............................................................................................................ Robert T. Lancaster, MD
Postgraduate Course Director .......................................................................................... C. Keith Ozaki, MD

PROGRAM COMMITTEE

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  David Stone, MD
  Mark Conrad, MD
  Mark Wyers, MD
  Andres Schanzer, MD, Ex-Officio
  Sean P. Roddy, MD, Ex-Officio

ISSUES COMMITTEE

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  Raul Guzman, MD
  Jeffrey Siracuse, MD
  Andres Schanzer, MD

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Jeffrey Siracuse, MD, Chair
  Jessica Wallaert, MD
  Matthew Alef, MD
  Carla Moreira, MD
  Andres Schanzer, MD, Ex-Officio
  Sean P. Roddy, MD, Ex-Officio

NOMINATING COMMITTEE

Glenn M. LaMuraglia, MD
  Richard J. Powell, MD
LIAISON DELEGATE TO SVS
Andres Schanzer, MD

VASCULAR SURGERY BOARD OF THE ABS
C. Keith Ozaki, MD

VLFDC RESEARCH COUNCIL DELEGATE
Courtney J. Warner, MD

POSTGRADUATE COURSE DIRECTOR
C. Keith Ozaki, MD

CONTRACTOR ADVISORY COMMITTEE (VASCULAR SURGERY)
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AWARDS COMMITTEE
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Glenn M. LaMuraglia, MD
Sean P. Roddy, MD
Andres Schanzer, MD
Jessica Simons, MD

STUDENT/RESIDENT INITIATIVE COMMITTEE
Palma Shaw, MD, Chair
Julie Lahiri, MD
Courtney J. Warner, MD
Robert T. Lancaster, MD
Andres Schanzer, MD, Ex-Officio

AUDIT COMMITTEE
Julie Lahiri, MD
Courtney J. Warner, MD
Robert T. Lancaster, MD
ALLIED HEALTH COMMITTEE

Palma Shaw, MD, Chair
Alik Farber, MD, Chair
Julianne Stoughton, MD
Andres Schanzer, MD
Cassius Chaar, MD
Matthew T. Menard, MD
Alexis Cascadden, PA-C
Devon Robichaud, NP
Athena Drosos, PA-C
Nicole Meregian, PA-C
Pam Garofalo, APRN
Mary Sytek, MSN
# PAST PRESIDENTS

<table>
<thead>
<tr>
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<th>Year</th>
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<tbody>
<tr>
<td>Robert R. Linton</td>
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<td>David C. Brewster</td>
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<td>William Abbott</td>
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<td>Robert M. Zwolak</td>
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<td>Magruder C. Donaldson</td>
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<td>Daniel B. Walsh</td>
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<td>Richard P. Cambria</td>
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<td>Jens Eldrup-Jorgensen</td>
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<td>Frank B. Pomposelli</td>
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<td>Michael Belkin</td>
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<td>Mark F. Fillinger</td>
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<td>Robert B. Patterson</td>
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<td>Michael T. Watkins</td>
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<td>Glenn M. LaMuraglia</td>
<td>2017</td>
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<td>Richard J. Powell</td>
<td>2018</td>
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</tbody>
</table>
PAST VICE PRESIDENTS

Richard C. Britton ................................................................. 1974
Thomas J. Donovan ................................................................. 1975
Ferris S. Ray ................................................................. 1976
Rodger E. Weismann ................................................................. 1977
Emerson H. Drake ................................................................. 1978
John H. Davis ................................................................. 1979
Clement A. Hiebert ................................................................. 1980
Michael Hume ................................................................. 1981
Robert W. Hopkins ................................................................. 1982
Donald C. Nabseth ................................................................. 1983
Carl S. Hoar ................................................................. 1984
H. Brownell Wheeler ................................................................. 1985
James M. Shannon ................................................................. 1986
David B. Pilcher ................................................................. 1987
Richard C. Karl ................................................................. 1988
Thomas F. O’Donnell, Jr ................................................................. 1989
John B. Herrmann ................................................................. 1990
David M. Sensenig ................................................................. 1991
James O. Menzoian ................................................................. 1992
John J. Skillman ................................................................. 1993
James W. Squires ................................................................. 1994
Gary W. Gibbons ................................................................. 1995
Nicholas A. Sannella ................................................................. 1996
Baltej S. Maini ................................................................. 1997
Richard J. Gusberg ................................................................. 1998
Magruder C. Donaldson ................................................................. 1999
Charles E. Dixon ................................................................. 2000
A. David Dreznner ................................................................. 2001
Nancy L. Cantelmo ................................................................. 2002
Wilfred I. Carney, Jr ................................................................. 2003
Robert B. Patterson ................................................................. 2004
Elias J. Arous ................................................................. 2005
Randolph D. Maloney ................................................................. 2006
Andrew C. Stanley ................................................................. 2007
Paul A. Skudder ................................................................. 2008
Steven T. Ruby ................................................................. 2009
James J. Gallagher ................................................................. 2010
Lawrence M. Hoepp ................................................................. 2011
David R. Campbell ................................................................. 2012
Hubert A. Johnson ................................................................. 2013
Robert E. Hawkins ................................................................. 2014
Roger C. Rosen ................................................................. 2015
Guy Lancellotti ................................................................. 2016
Julianne Stoughton ................................................................. 2017
Samuel C. Aldridge ................................................................. 2018
PAST SECRETARIES

R. Clement Darling ................................................................. 1973–1979
Nathan P. Couch ................................................................. 1979–1984
Bruce S. Cutler ................................................................. 1984–1991
James O. Menzoian ............................................................ 1997–2000
Magruder C. Donaldson ....................................................... 2000–2004
Frank B. Pomposelli ......................................................... 2004–2009
Robert B. Patterson .......................................................... 2009–2013
Richard J. Powell .............................................................. 2013–2017
Andres Schanzer ............................................................... 2017–Present

PAST TREASURERS

R. Clement Darling ................................................................. 1973–1978
David C. Brewster ............................................................... 1978–1982
Rudolph W. Vollman ........................................................... 1982–1987
James W. Squires ............................................................... 1987–1992
Nancy L. Cantelmo ............................................................... 1997–2001
William C. Mackey ............................................................. 2001–2004
Jens Eldrup-Jorgensen .......................................................... 2004–2007
Michael Belkin ................................................................. 2007–2011
Glenn M. LaMuraglia .......................................................... 2011–2016
Marc Schermerhorn ............................................................ 2016–2018
Robert A. Cambria ............................................................ 2018–Present

PAST RECORDERS

William M. Abbott ............................................................... 1979–1982
M. David Tilson ................................................................. 1982–1987
Paul Friedmann ................................................................. 1987–1990
Anthony D. Whittemore ..................................................... 1990–1995
Frank W. LoGerfo .............................................................. 1995–1999
Daniel B. Walsh ................................................................. 1999–2003
Richard P. Cambria ........................................................... 2003–2004
Bauer E. Sumpio ................................................................. 2004–2007
Mark F. Fillinger ............................................................... 2007–2012
Andrew C. Stanley ............................................................ 2012–2017
Sean P. Roddy ................................................................. 2017–Present
DETERLING AWARD

The Deterling Award of the New England Society for Vascular Surgery was established to stimulate and encourage original investigation in vascular disease conducted by vascular fellows, surgical residents or medical students.

It is named in honor of Ralph A. Deterling, Jr., MD (1917–1992), the second president of the NESVS, who contributed much to the formation of this Society. Dr. Deterling served as Professor of Surgery and Chairman of the Department of Surgery at Tufts University School of Medicine and Surgeon-in-Chief of the New England Medical Center. This award was established in his name in recognition of the high regard his trainees, colleagues and members of the Society held for him.

The Deterling Award is presented annually in recognition of an outstanding original paper presented by a fellow, resident, or medical student at the Society’s annual meeting. Work considered for the Deterling Award may be either in basic science or clinical research. Recipients currently receive an award of $1,000 and a certificate of recognition.

DETERLING AWARD RECIPIENTS

<table>
<thead>
<tr>
<th>Name</th>
<th>Year</th>
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<tbody>
<tr>
<td>Mark F. Fillinger</td>
<td>1993</td>
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<td>Sidhu P. Gangadharan, B.S.</td>
<td>1994</td>
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<td>David Marshall Lee, B.A.</td>
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<td>Khurram Kamal</td>
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<td>Wallace Tarry</td>
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<td>Gilbert R. Upchurch, Jr.</td>
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<td>Joerg Heckencamp</td>
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<td>Hong T. Hua</td>
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<td>Kristina Giles</td>
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<td>Jennifer L. Perri</td>
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<td>Rens Varkevisser</td>
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<td>Mohammad Alqaim &amp; Gaurav Sharma</td>
<td>2019</td>
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R. CLEMENT DARLING AWARD

The Darling Award of the New England Society for Vascular Surgery was originally established to stimulate and recognize excellence in clinical research on vascular disease conducted by a fellow, resident or medical student. The Darling Award will now recognize both basic science and clinical research.

The award was established in 1998 in honor of R. Clement Darling, Jr., MD (1927–1999), a founding member and eighth president of the NESVS. Dr. Darling was a native New Englander who served for over 35 years as a vascular surgeon and teacher at the Massachusetts General Hospital. The award celebrates Dr. Darling’s lasting contributions to patient care, surgical education and the NESVS.

The Darling Award is presented annually in recognition of an outstanding original paper presented by a fellow, resident or medical student at the Society’s annual meeting. Work considered for the Darling Award may be either in basic science or clinical research. Recipients currently receive an award of $1,000 and a certificate of recognition.

DARLING AWARD RECIPIENTS

Peter R. Nelson........................................................................................................... 1999
Stephen R. Lauterbach................................................................................................. 2000
Amy B. Reed................................................................................................................. 2001
Malachi Sheahan.......................................................................................................... 2002
Carlos Timaran........................................................................................................... 2003
Brian W. Nolan........................................................................................................... 2004
Virendra I. Patel.......................................................................................................... 2005
Christopher Owens...................................................................................................... 2006
Robert Chang.............................................................................................................. 2007
Adam W. Beck & Philip Goodney.............................................................................. 2008
Christopher J. Abularrage......................................................................................... 2009
Jessica Wallaert........................................................................................................... 2010
Matthew Sweet........................................................................................................... 2011
Jessica Simons............................................................................................................ 2012
Edward Arous............................................................................................................ 2013
Jesse Columbo............................................................................................................ 2014
Peter Soden................................................................................................................. 2015
Katie Shean................................................................................................................ 2016
Leia Edenfield............................................................................................................ 2017
Jahan Mohebali.......................................................................................................... 2018
Jesse Columbo............................................................................................................ 2019
PAST DISTINGUISHED ADDRESSES

1986  Robert A. Leather, MD  
Current Status of In Situ Saphenous Vein Bypass Grafting  

1987  Lester R. Sauvage, MD  
A Unified Perspective of Arterial Grafts  

1988  John J. Bergan, MD  
Problems in the Popliteal Fossa  

1989  D. Eugene Strandness, Jr., MD  
The Non-Invasive Evaluation of Renovascular and Mesenteric Artery Occlusive Disease  

1990  Alexander W. Clowes, MD  
Prevention of Stenosis After Vascular Reconstruction: Pharmacological Control of Intimal Hyperplasia  

1991  Jesse E. Thompson, MD  
Some Observations of Vascular Surgery History  

1992  Robert W. Barnes, MD  
Vascular Surgery: The Burr Under the Saddle  

1993  Norman R. Hertzer, MD  
Health Care Reform in Vascular Surgery: Where We Stand and How We Got There  

1994  Frank J. Veith, MD  
Endovascular Stented Grafts: Role and Impact on Vascular Surgeons  

1995  James S. T. Yao, MD  
Vascular Injuries in Athletes  

1996  F. William Blaisdell, MD  
Heparin: Controversies and Misconceptions  

1997  Juan C. Parodi, MD  
Evolution and Current Results of Endovascular Aneurysm Repair  

1998  James C. Stanley, MD  
Renovascular Hypertension at the Close of the Millennium: Pharmacologic, Endovascular and Conventional Surgical Therapy  

1999  C. Melville Williams, MD  
What We Know and Don’t Know About the Natural History of Dissecting Aneurysms of the Descending Thoracic Aorta: Implications for Stent Graft Therapy  

2000  Thomas Fogarty, MD  
Vascular Surgeons in the New Millennium  

2001  Colleen M. Brophy, MD  
Stress of Life From Man To Molecules  

2002  Peter J. Deckers, MD  
Professionalism, Quality and an Evolving Health Care Delivery System  

2003  Wesley S. Moore, MD  
50 Years of Progress in the Management and Prevention of Ischemic Stroke
PAST DISTINGUISHED ADDRESSES (CONTINUED)

2004  Julie Freischlag, MD  
       Abdominal Aortic Aneurysms: How Things Have Changed Over 50 Years

2005  Patrick Morrisey, JD  
       The Impact of the MMA: Healthcare From the Inside

2006  Anthony D. Whittemore, MD, FACS  
       Impact of Professionalism of Safe Surgical Care

2008  Brian H. Annex, MD  
       Advances in Lower Extremity PAD: From Genetics to Novel Therapeutics

2009  Ronald L. Dalman, MD  
       Modifiable Risks for Aneurysm Progression: Updates From the Stanford SCCOR in AAA Disease

2010  David Hanscom, MD & David Elaimy  
       Awake at the Wound

2011  Glenn D. Steele, Jr., MD, PhD  
       Re-Engineering Systems of Care – Surgical Leadership

2012  Professor Christos Liapis  
       Carotid Artery Interventions in the Post-RCTs Era

2014  Joseph P. Vacanti, MD  
       Regenerative Medicine Through the Eyes of a Surgeon  
       Bao-Ngoc Nguyen, MD  
       Vascular Surgeons and Wound Healing—Beyond the Successful Revascularization

2018  Bruce Perler, MD  
       An Evidenced-Based Approach to Asymptomatic Carotid Artery Disease: Nihilism is Not Appropriate or Acceptable

2019  Jack Cronenwett, MD  
       The Vascular Quality Initiative: Innovation and Inspiration from New England
PAST LINTON LECTURERS

1989 Allan D. Callow, MD
Gene Therapy and the Vascular Surgeon

1990 John A. Mannick, MD
Reflections on Surgery for Aortic Aneurysm

1991 Michael A. Gimbrone, Jr., MD
Vascular Endothelial Leukocyte Interactions: Molecular Mechanisms and Pathophysiological Consequences

1992 Robert S. Lees, MD
Arteriosclerosis: A Reversible Disease

1993 Valentin Fuster, MD
Pathogenesis of Atherosclerosis: New Advances Based on the Understanding of Coronary Vascular Biology

1994 Jeffrey A. Gelfrand, MD
A New Role for Coagulation and the Platelet in Atherogenesis: Modulation of Cytokine Synthesis

1995 Peter Libby, MD
Regulation of the Stability of Atherosclerotic Plaques

1996 Margot Kruskall, MD
Creating A Universal Blood Supply: The Enzymatic Conversion to Group O of A and B Red Cells

1997 Victor Dzau, MD
Gene Transfection Therapy for Preventing Vein Graft Stenosis in Infrainguinal Grafts

1998 Robert S. Langer, ScD
Biomaterials and How They Will Change Our Lives

1999 Thomas Maciag, PhD
Molecular Mechanisms of Angiogenesis

2000 William M. Abbott, MD
The Science of Arterial Prosthesis: Past Frustrations and Future Promise

2001 Gregario A. Sicard, MD
The Impact of Endovascular Surgeons in the Training of Vascular Residents

2002 John A. Mannick, MD
Fifty Years of Infrainguinal Reconstruction: What Have We Learned

2003 Judah Folkman, MD
Angiogenesis-Dependent Disease

2004 Edith Tzeng, MD
Molecular Therapies and the Vascular Surgeon

2005 Richard M. Green, MD
Challenges for the Practicing Vascular Surgeon

2006 Daniel Levy, MD
Toward A Modern Understanding of Vascular Disease: The Journey From Futility to Promise

2007 Paul Friedmann, MD
Surgical Competence
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<td>2008</td>
<td>Peter Gloviczki, MD</td>
<td>Open Venous Surgery in the Era of the Endovenous Revolution</td>
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<td>Robert Rutherford, MD</td>
<td>Changing Perspectives in the Management of Abdominal Aortic Aneurysm</td>
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<td>Jack L. Cronenwett, MD</td>
<td>The Role of Vascular Surgeons in Quality Improvement</td>
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<td>Frank W. LoGerfo, MD</td>
<td>The Biology of Vascular Injury</td>
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<td>2012</td>
<td>Frans Moll, MD, PhD, Professor</td>
<td>Reflections on Predicting the Unpredictable AAA</td>
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<td>2013</td>
<td>Paul Ridker, MD, MPH</td>
<td>Inflammation and Atherothrombosis: Where Have We Been? Where Are We Going?</td>
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<td>2015</td>
<td>Tara Mastracci, MD</td>
<td>Ensuring the Durability of Endovascular Aortic Repair</td>
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<td>2016</td>
<td>Spence M. Taylor, MD</td>
<td>Lower Extremity Peripheral Arterial Disease: A Perspective After 25 Years</td>
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<td>2017</td>
<td>Omaida C. Velazquez, MD</td>
<td>Leap Forward Innovations in Vascular Disease: The Surgeon’s Role</td>
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<tr>
<td>2019</td>
<td>Peter A. Schneider, MD</td>
<td>Where Do Innovations Come From?</td>
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</table>
LEARNING OBJECTIVES

The overall purpose of this activity is to enable the learner to:

1. Become familiar with current data on endovascular aneurysm repair, including indications, sizing, and outcomes such as endoleak.
2. Become familiar with current trends and evidence for various options for carotid revascularization.
3. Review current data in lesser-studied areas of vascular care including wound infections, venous ulcers, postoperative medication regimens, vascular training paradigms, etc.
NEW ENGLAND SOCIETY FOR VASCULAR SURGERY

ACCREDITATION INFORMATION

ANNUAL MEETING ACCREDITATION STATEMENT & CREDIT DESIGNATION
In support of improving patient care, this activity has been planned and implemented by Amedco, LLC and the NESVS. Amedco, LLC is jointly accredited by the Accreditation Council for Continuing Medical Education (ACCME), the Accreditation Council for Pharmacy Education (ACPE) and the American Nurses Credentialing Center (ANCC) to provide continuing education for the healthcare team.

PHYSICIANS
Amedco, LLC designates this live activity for a maximum of 5.5 AMA PRA Category 1 Credits™. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

NURSES
Amedco, LLC designates this activity for a maximum of 5.5 ANCC contact hours.

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.

POSTGRADUATE COURSE ACCREDITATION STATEMENT & CREDIT DESIGNATION
In support of improving patient care, this activity has been planned and implemented by Amedco, LLC and the NESVS. Amedco, LLC is jointly accredited by the Accreditation Council for Continuing Medical Education (ACCME), the Accreditation Council for Pharmacy Education (ACPE) and the American Nurses Credentialing Center (ANCC) to provide continuing education for the healthcare team.

PHYSICIANS
Amedco, LLC designates this live activity for a maximum of 2.75 AMA PRA Category 1 Credits™. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

NURSES
Amedco, LLC designates this activity for a maximum of 2.75 ANCC contact hours.

ALLIED HEALTH PROGRAM ACCREDITATION STATEMENT & CREDIT DESIGNATION
In support of improving patient care, this activity has been planned and implemented by Amedco, LLC and the NESVS. Amedco, LLC is jointly accredited by the Accreditation Council for Continuing Medical Education (ACCME), the Accreditation Council for Pharmacy Education (ACPE) and the American Nurses Credentialing Center (ANCC) to provide continuing education for the healthcare team.

PHYSICIANS
Amedco, LLC designates this live activity for a maximum of 3.50 AMA PRA Category 1 Credits™. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

NURSES
Amedco, LLC designates this activity for a maximum of 3.50 ANCC contact hours.
NEW ENGLAND SOCIETY FOR VASCULAR SURGERY

2020 ALLIED HEALTH PROGRAM (SEPARATE SUBSCRIPTION)

(Presentations available beginning Friday, September 11 and will remain online for 90-days in the NESVS library.)

Co-Directors: Palma Shaw, MD & Alik Farber, MD

SESSION 1: ANEURYSMS, CAROTID DISEASE AND CRITICAL CARE

1. SVS Guidelines for Aortic Aneurysm Management: Current Recommendations for Surveillance, When to Treat and How to Follow These Patients after Repair
   Jessica Fernandes, PA-C, Boston Medical Center, Boston, MA

2. Repair of Abdominal Aortic Aneurysms – Open vs. EVAR: Pre-Operative Planning and Decision Making
   Alik Farber, MD, MBA, Boston Medical Center, Boston, MA

3. Strategies for Post-Operative Management of Patients Undergoing Open Thoracic Aneurysm Repair and TEVAR
   Palma Shaw, MD, SUNY Upstate Medical Center, Syracuse, NY

4. Evaluation and Work Up of Carotid Stenosis
   Athena Drosos, PA-C, Boston Medical Center, Boston, MA

   Robin Rose, PA Yale School of Medicine, New Haven, CT

6. Immediate Post-Operative Management after Carotid Intervention
   Jennifer Gonzalez, PA, Boston Medical Center, Boston, MA

SESSION 2: PAD, DIALYSIS ACCESS AND VENOUS DISEASE

7. Strategies for Evaluation and Work Up of a Patient with Peripheral Arterial Disease: When to Intervene?
   Cassius Chaar, MD, Yale Medical Group, New Haven, CT

8. What Happens after Major Amputation: Timeline to Recovery
   Jennifer Gonzalez, PA, Boston Medical Center, Boston, MA

9. Hemodialysis Access: How to Decide on the Best Surgical Dialysis Access
   Colin Flynn, PA-C, Boston Medical Center, Boston, MA

10. Diagnosis and Treatment of Dialysis Access Complications
    Jonathan Cardella, MD, Yale Medical Group, New Haven, CT

11. Latest Therapies in Management of Varicose Veins and Superficial Venous Insufficiency
    Julianne Stoughton, MD, Massachusetts General Hospital, Boston, MA

12. Acute Deep Vein Thrombosis: How to Treat and When to Intervene
    Pamela Garofalo, APRN, Yale University, New Haven, CT

13. Post-Operative Delirium Following Vascular Surgery
    Ashley Volles, PA, SUNY Upstate Medical Center, Syracuse, NY

SESSION 3: MEDICAL MANAGEMENT AND CLINICAL PRACTICE

14. New Anticoagulants: What You Need to Know
    Lauren O’Connell, ACNP, UMass Memorial, Worcester, MA
2020 ALLIED HEALTH PROGRAM (CONTINUED)

15  Best Medical Therapy for the Vascular Patient: What You Need to Know
    Mallory Gibbons, ACNP, UMass Memorial, Worcester, MA

16  Outpatient Practice: Surveillance for Lower Extremity Revascularization, Carotid Disease and Aneurysmal Disease
    Tracy Vaughn, PA, SUNY Upstate Medical Center, Syracuse, NY

17  Type B Aortic Dissection: Medical vs. Intervention – When and How
    Andres Schanzer, MD, UMass Memorial, Worcester, MA

18  Lumbar Drains – Indications, Care of, Management and Complications
    Devon Robichaud, NP, UMass Memorial, Worcester, MA

19  Varicose Vein Management for the Vascular PA/NP: What You Need to Know
    Kristin Maurer, PA, Brigham & Women’s Hospital, Boston, MA

INTERESTING CASES: COMPLICATIONS AND MANAGEMENT

Interesting Case #1: AAA Repair
    Devon Robichaud, NP, UMass Medical, Worcester, MA

Interesting Case #2: Acute Limb Ischemia
    Carla Moreira, MD, Brown Physicians, Providence, RI

Interesting Case #3: Acute Iliofemoral DVT
    Jeffrey Siracuse, MD, Boston Medical Center, Boston, MA

Interesting Case #4: PAD – Diabetic Foot/Limb Salvage
    Jessica Fernandes, PA-C, Boston Medical Center, Boston, MA
2020 ANNUAL MEETING SCHEDULE-AT-A-GLANCE

FRIDAY, SEPTEMBER 11, 2020

8:00 am – 10:50 am  POSTGRADUATE COURSE (Separate Subscription)
Practical Technical Tips—How I Do It
Moderators: C. Keith Ozaki, MD & Rebecca Scully, MD

8:00 am – 8:05 am  Welcome

8:05 am – 8:15 am  PG1
Endovascular Carotid Artery Interventions Including TCAR
Palma Shaw, MD
SUNY Upstate Medical Center, Syracuse, NY

8:15 am – 8:25 am  PG2
Eversion Carotid Artery Endarterectomy
Courtney Warner, MD
Albany Med Vascular Surgery, Albany, NY

8:25 am – 8:35 am  PG3
Carotid Artery Endarterectomy Under Regional Anesthetic
Jennifer A. Stableford, MD
Dartmouth-Hitchcock Medical Center, Lebanon, NH

8:35 am – 8:50 am  PG4
Percutaneous Venous Ablation
Julianne Stoughton, MD
Massachusetts General Hospital, Boston, MA

8:50 am – 9:00 am  PG5
Acute DVT Thrombolysis
Britt Tonnessen, MD
Yale Vascular Surgery, New Haven, CT

9:00 am – 9:15 am  PG6
Fenestrated Aortic Endografts
Jessica Simons, MD
University of Massachusetts, Worcester, MA

9:15 am – 9:25 am  Group Q & A (Speakers 1-6) (Live)

9:25 am – 9:40 am  PG7
Open Thoraco-Abdominal Aortic Aneurysm Repair
Sunita Srivastava, MD
Massachusetts General Hospital, Boston, MA

9:40 am – 9:55 am  PG8
Tibial Endovascular Interventions
Anahita Dua, MD
Massachusetts General Hospital, Boston, MA

9:55 am – 10:05 am  PG9
Pedal/Plantar Loop Reconstruction for CLTI
Carla C. Moreira, MD
Alpert Medical School of Brown University, Providence, RI
2020 ANNUAL MEETING SCHEDULE-AT-A-GLANCE

10:05 am – 10:20 am  PG10
Femoral-Tibial Bypass
Elizabeth Blazick, MD
Maine Medical Center, Portland, ME

10:20 am – 10:30 am  PG11
Percutaneous Hemodialysis Access Creation, Maintenance and Salvage
Dejah Judelson, MD
University of Massachusetts, Worcester, MA

10:30 am – 10:40 am  PG12
Anterior Spine Exposures
Christine Lotto, MD
Capital Health Hospital, Pennington, NJ

10:40 am – 10:50 am  Group Q & A (Speakers 7-12) (Live)

10:50 am – 10:55 am  Break

11:00 am – 12:05 pm  SCIENTIFIC SESSION I (Live)
(8-minute presentation / 4-minute Q & A)
Moderators: Marc Schermerhorn, MD & Andres Schanzer, MD

11:00 am – 11:05 am  Introduction from the Moderator

11:05 am – 11:17 am  1
Intraoperative EEG Changes During TCAR are More Frequent than Previously Reported
Laura C. Lamb, Edward Gifford, Parth Shah, Ilene Staff, Akhilesh Jain, James Gallagher,
Gaurav Rana, Thomas Divinagracia - Hartford Healthcare, Hartford, CT

11:17 am – 11:29 am  2
Natural History of Late Type 1a Endoleaks
Thomas FX O'Donnell, Jahan Mohebali, Laura T. Boitano, Glenn M. LaMuraglia, Christopher
J. Kwolek, Mark F. Conrad - Massachusetts General Hospital, Boston, MA

11:29 am – 11:41 am  3
A Significant Proportion of Current United States EVAR Practice Fails to Meet SVS Clinical
Practice Guideline Recommended AAA Diameter Treatment Thresholds
Salvatore T. Scai1, Bjoern D. Suckow2, Philip P. Goodney3, Thomas S. Huber4, Gilbert R.
Upchurch, Jr.5, Dan Neal6, Jesse A. Columbo2, Jeanwan Kang2, Marc L. Schermerhorn3,
Richard J. Powell2, David H. Stone2 - 1University of Florida, Gainesville, FL; 2Dartmouth-
Hitchcock Medical Center, Lebanon, NH; 3Beth Israel Deaconess Medical Center, Boston,
MA

11:41 am – 11:53 am  4
The Impact of Completion and Follow-Up Endoleaks on Survival, Reintervention and Rupture
Chun Li7, Livia de Guerre8, Kirsten Dansey1, Jinny Lu1, Priya B. Patel1, Mahmoud B. Malas9,
Douglas W. Jones6, Marc L. Schermerhorn1 - 1Beth Israel Deaconess Medical Center,
Boston, MA; 2University of California San Diego Health System, San Diego, CA; 3Boston
Medical Center, Boston, MA; 4UMASS Memorial Medical Center, Worcester, MA

11:53 am – 12:05 pm  5
The Medical Resource Utilization and Financial Impact of Infection on Venous Leg Ulcers
Mark D. Iafrati1, Raffi Melikian1, Thomas F. O’Donnell, Jr.1 - 1Tufts Medical Center, Boston,
MA; 2Tufts Medical School, Boston, MA

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### 2020 ANNUAL MEETING SCHEDULE-AT-A-GLANCE

<table>
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<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>12:15 pm – 12:40 pm</td>
<td><strong>INDUSTRY SPONSORED SYMPOSIUM #1</strong> (Live)  Utility of a Disease-Specific Approach to TBAD—Real-World Application and Disease Management Strategies  Joseph Lombardi, MD  Presented by: Cook Medical</td>
</tr>
<tr>
<td>12:45 pm – 1:10 pm</td>
<td><strong>INDUSTRY SPONSORED SYMPOSIUM #2</strong> (Live)  The New Treo Abdominal Stent-Graft by Terumo Aortic—Introduction to the NESVS  Akhilesh K. Jain, MD, Michael Stoner, MD &amp; Naiem Nassiri, MD  Presented by: Terumo Aortic</td>
</tr>
<tr>
<td>1:10 pm – 1:40 pm</td>
<td>Break</td>
</tr>
<tr>
<td>1:45 pm – 3:02 pm</td>
<td><strong>SCIENTIFIC SESSION II</strong> (Live)  (8-minute presentation / 4-minute Q &amp; A)  Moderator: Jessica Simons, MD &amp; Kimberly Malka, MD  6 • The Degree of Oversizing in Endovascular Aortic Aneurysm Repair  Livia de Guerre¹, Rens Varkevisser¹, Nicholas Swerdlow¹, Chun Li¹, Salvatore Scalì², Virendra Patel³, Joost van Herwaarden⁴, Marc Schermerhorn¹ - ¹Beth Israel Deaconess Medical Center, Boston, MA; ²University of Florida Health, Gainesville, FL; ³Columbia University Irving Medical Center, New York, NY; ⁴UMC Utrecht, Utrecht, Netherlands  7 Contemporary Intermittent Claudication Treatment Patterns in the Commercially Insured Non-Medicare Population  Jeffrey J. Siracuse¹, Jonathan Woodson¹, Randall P. Ellis², Alik Farber¹, Sean P. Roddy³, Scott R. Levin¹, Jayakanth Srinivasan⁵ - ¹Boston University School of Medicine, Boston, MA; ²Boston University, Department of Economics, Boston, MA; ³Albany Medical Center, Albany, NY; ⁴Boston University, Questrom School of Business, Boston, MA  8 Effects of Dual Antiplatelet Therapy on Graft Patency after Lower Extremity Bypass  Nathan Belkin, Jordan Stoecker, Benjamin M. Jackson, Scott M. Damrauer, Julia D. Glaser, Venkat Kalapatapu, Grace J. Wang - Hospital of the University of Pennsylvania, Philadelphia, PA  9 The Role of Transfemoral Carotid Artery Stenting with Proximal Balloon Occlusion Embolic Protection in the Contemporary Endovascular Management of Carotid Artery Stenosis  Patric Liang¹, Peter Soden¹, Mark C. Wyers¹, Mahmoud B. Malas², Brian W. Nolan², Grace J. Wang², Richard J. Powell², Marc L. Schermerhorn¹ - ¹Beth Israel Deaconess Medical Center, Boston, MA; ²University of California San Diego, La Jolla, CA; ³Maine Medical Center, Portland, ME; ⁴University of Pennsylvania, Philadelphia, PA; ⁵Dartmouth-Hitchcock Medical Center, Lebanon, NH</td>
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2020 ANNUAL MEETING SCHEDULE-AT-A-GLANCE

2:38 pm – 2:50 pm 10 • Simultaneous Treatment of Common Carotid Lesions Increases the Risk of Stroke and Death after Carotid Artery Stenting
Charles DeCarlo¹, Adam Tanious¹, Laura T Boitano¹, Jahan Mohabai¹, David H. Stone², W. Darrin Clouse³, Mark F. Conrad¹ - ¹Massachusetts General Hospital, Boston, MA; ²Dartmouth-Hitchcock Medical Center, Lebanon, NH; ³University of Virginia Health System, Charlottesville, VA

2:50 pm – 3:02 pm 11 • Long-Term Outcomes of Flared Limbs in Aneurysmal Iliac Arteries
R. Clement Darling, III, Alexander Kryszuk, Nicholas Russo, Jeffrey Hnath - Albany Medical College, Albany, NY

3:05 pm – 4:34 pm SCIENTIFIC SESSION III (Live) (8-minute presentation / 4-minute Q & A)
Moderator: Jennifer Stableford, MD & Carla Moreira, MD

3:05 pm – 3:10 pm Introduction from the Moderator

3:10 pm – 3:22 pm 12 • Similar Five-Year Outcomes between Patients with and without Hostile Proximal Neck Anatomy Following Abdominal Aortic Aneurysm Repair with the Ovation Stent Graft Platform
Rens R.B. Varkevisser¹,², Priya B. Patel¹, Nicholas J. Swerdlow¹, Chun Li¹, Hence J.M. Verhagen², Sean P. Lyden³, Marc. L. Schermerhorn¹ - ¹Beth Israel Deaconess Medical Center, Boston, MA; ²University Medical Center Rotterdam, The Netherlands; ³Cleveland Clinic, Cleveland, OH

3:22 pm – 3:34 pm 13 (Video) • Primary Venous Leiomyosarcoma Resection, IVC Reconstruction
Erion Qaja, Edward Gifford, Oscar Serrano - UConn/Hartford Hospital, Hartford, CT

3:34 pm – 3:46 pm 14 • Transcarotid Artery Revascularization Versus Carotid Endarterectomy and Transfemoral Stenting in Octogenarians
Ambar Mehta¹, Priya Patel², Danielle Bajakian¹, Richard Schutzer¹, Nicholas Morrissey¹, Karan Garg³, Mahmoud Malas³, Marc Schermerhorn³, Virendra I. Patel¹ - ¹Columbia University Irving Medical Center, New York, NY; ²Rutgers New Jersey Medical School, Newark, NJ; ³New York University School of Medicine, New York, NY; ⁴University of California San Diego Health, San Diego, CA; ⁵Beth Israel Deaconess Medical Center, Boston, MA

3:46 pm – 3:58 pm 15 • The Effect of Thoracoabdominal Aortic Aneurysm Extent on Outcomes in Patients Undergoing Fenestrated/Branched Endovascular Aortic Repair

3:58 pm – 4:10 pm 16 (Video) • 3-Vessel Fenestrated Repair of 6cm Thoracoabdominal Aortic Aneurysm after a Chronic Type B Dissection
Mohammad Alqaim - UMASS Memorial Medical Center, Worcester, MA

• Deterling/Darling Award Finalist
## 2020 ANNUAL MEETING SCHEDULE-AT-A-GLANCE

<table>
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| 4:10 pm – 4:22 pm| **17** Stress Testing Prior to Abdominal Aortic Aneurysm Repair Does Not Prevent Postoperative Cardiac Events  
Jesse A. Columbo, Zachary J. Wanken, Daniel B. Walsh, Bjoern D. Suckow, Jocelyn M. Beach, Stanislav Henkin, Philip P. Goodney, David H. Stone - Dartmouth-Hitchcock Medical Center, Lebanon, NH |
| 4:22 pm – 4:34 pm| **18** A Multicenter, Prospective Randomized Trial of Negative Pressure Wound Therapy for Infrapuinal Revascularization Groin Incisions  
Daniel Bertges¹, Lisa Smith¹, Rebecca Scully², Mark Wyers², Jens Eldrup-Jorgenson³, Bjoern Suckow⁴, C. Keith Ozaki⁵, Louis Nguyen⁶ - ¹University of Vermont Medical Center, Burlington, VT; ²Brigham and Women’s Hospital, Boston, MA; ³Beth Israel Deaconess Medical Center, Boston, MA; ⁴Maine Medical Center, Portland, ME; ⁵Dartmouth Hitchcock Medical Center, Lebanon, NH |
| 4:45 pm – 5:00 pm| **INTRODUCTION OF THE PRESIDENT** (Live)  
Palma Shaw, MD  
SUNY Upstate Medical Center, Syracuse, NY |
| 5:00 pm – 5:30 pm| **PRESIDENTIAL ADDRESS** (Live)  
Rise to the Challenge  
Marc Schermerhorn, MD  
Beth Israel Deaconess Medical Center, Boston, MA |

### SATURDAY, SEPTEMBER 12, 2020

<table>
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<tr>
<th>Time</th>
<th>Session</th>
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| 7:30 am – 7:55 am| **ANNUAL MEMBER BUSINESS MEETING** (Members Only)  
- Society Updates  
- Vote—Bylaw Amendments  
- Vote—New Members  
- Proposed Slate (2020-2021)  
- Introduction of the Incoming President, Dr. Alan Dardik |
| 8:00 am – 8:25 am| **INDUSTRY SPONSORED SYMPOSIUM #3** (Live)  
Shockwave IVL for Calcified BTK, CFA and Iliac Disease  
Paul Bloch, MD, Matthew Alef, MD & Nathan Aranson, MD  
Presented by: Shockwave Medical |
| 8:30 am – 8:55 am| **INDUSTRY SPONSORED SYMPOSIUM #4** (Live)  
GORE® EXCLUDER® Conformable AAA Endoprosthesis: Clinical Trial Update and Early Experience  
Robert Rhee, MD  
Presented by: W. L. Gore |
| 9:00 am – 9:55 am| **SCIENTIFIC SESSION IV – RAPID FIRE PAPERS** (Live)  
(3-minute presentation / 2-minute Q & A)  
Moderators: Palma Shaw, MD & Alan Dardik, MD, PhD |
| 9:00 am – 9:05 am| Introduction from the Moderator |
2020 ANNUAL MEETING SCHEDULE-AT-A-GLANCE

9:05 am – 9:10 am 19 (RF) Off Label Use of EVAR Devices is Associated with Adverse Outcomes and Should Be Avoided
Thomas FX O’Donnell, Laura T. Boitano, Jahan Mohebali, Glenn M. LaMuraglia, Christopher J. Kwolek, Mark F. Conrad - Massachusetts General Hospital, Boston, MA

9:10 am – 9:15 am 20 (RF) Long-Term Tunneled Dialysis Catheters Use is Not Associated with Mortality but is Associated with Increased Morbidity
Victor K. Castro, Alik Farber, Yixin Zhang, Quinten Dicken, Logan Mendez, Scott R. Levin, Thomas W. Cheng, Rebecca B. Hasley, Jeffrey J. Siracuse - Boston University School of Medicine, Boston, MA

9:15 am – 9:20 am 21 (RF) Comparative Analysis of Open Abdominal Aortic Aneurysm Repair Outcomes Across National Registries
Rebecca E. Scully, Gaurav Sharma, Andrew J. Soo Hoo, Jillian Walsh, Ginger Jin, Matthew T. Menard, Charles Keith Ozaki, Michael Belkin - Brigham and Women’s Hospital, Boston, MA

9:20 am – 9:25 am 22 (RF) Occupational and Patient Radiation Dose Reduction with a Reduced Frame Rate and Roentgen Protocol Utilizing Fixed Imaging
Alex M. Lin, Amanda C. Methe, Vincent R. Narvaez, Matthew Kronick, Volodymyr Labinskyy, Marc A. Norris, Amanda Kravetz, Avery Y. Ching, Neal C. Hadro, Marvin E. Morris - Baystate Medical Center, Springfield, MA

9:25 am – 9:30 am 23 (RF) Short and Long-Term Outcomes after Concurrent Splenectomy for Thoracoabdominal Aortic Aneurysm Repair
Christopher A. Latz, Laura T. Boitano, Charles DeCarlo, Zach Feldman, Maximilian Png, Jahan Mohebali, Anahita Dua, Mark F. Conrad - Massachusetts General Hospital, Boston, MA

Emily Fan, Allison Crawford, Edward J. Arous, Dejah R. Judelson, Francesco Aiello, Andres Schanzler, Jessica Simons - University of Massachusetts, Worcester, MA

9:35 am – 9:40 am 25 (RF) Characteristics and Outcomes of Ruptured Abdominal Aortic Aneurysms Below the Size Threshold for Elective Repair
Kirthi Bellamkonda, Naiem Nassiri, Mehran M. Sadeghi, Yawei Zhang, Raul Guzman, Cassius I. Ochoa Chaar - Yale School of Medicine, New Haven, CT

9:40 am – 9:45 am 26 (RF) Six-Year Outcomes of the Endologix AFX1 Endovascular AAA System: A Single Center Experience
2020 ANNUAL MEETING SCHEDULE-AT-A-GLANCE

9:45 am – 9:50 am 27 (RF)
Procedure-Associated Costs and Mid-Term Outcomes of Endovascular Zone 0 and Zone 1 Aortic Arch Repair
Jonathan Aaron Barnes, Zachary J. Wanken, Jesse A. Columbo, David P. Kuwayama, Mark F. Fillinger, Bjoern D. Suckow - Dartmouth-Hitchcock Medical Center, Lebanon, NH

9:50 am – 9:55 am 28 (RF)
Patients Undergoing Interventions for Intermittent Claudication in States that Increased Cigarette Tax are Less Likely to Actively Smoke
Scott R. Levin¹, Summer S. Hawkins², Alik Farber¹, Philip P. Goodney³, Nicholas H. Osborne⁴, Tze-Woei Tan⁵, Jeffrey J. Siracuse¹ - ¹Boston University School of Medicine, Boston, MA; ²Boston College, Chestnut Hill, MA; ³Dartmouth-Hitchcock Medical Center, Lebanon, NH; ⁴University of Michigan, Ann Arbor, MI; ⁵University of Arizona, Tucson, AZ

10:00 am – 10:25 am INDUSTRY SPONSORED SYMPOSIUM #5 (Live)
Unconscious Bias
Jean Starr, MD, Naiem Nassiri, MD & Elizabeth Blazick, MD
Presented by: Medtronic

10:30 am – 10:35 am AWARD ANNOUNCEMENT
• Deterling Award Winner
• Darling Award Winner

10:35 am – 10:45 am CLOSING REMARKS FROM INCOMING PRESIDENT
Alan Dardik, MD, PhD
Yale University School of Medicine
New Haven, CT

10:45 am Adjourn
2020 ANNUAL MEETING ABSTRACTS

FRIDAY, SEPTEMBER 11, 2020

8:00 am POSTGRADUATE COURSE
(Separate Subscription)

Practical Technical Tips—How I Do It
Moderators: C. Keith Ozaki, MD & Rebecca Scully, MD

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Sunita Srivastava, MD
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Capital Health Hospital, Pennington, NJ

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10:50 am Break

11:00 am SCIENTIFIC SESSION I (Live)
(8-minute presentation / 4-minute Q & A)
Moderators: Marc Schermerhorn, MD & Andres Schanz, MD

11:00 am Introduction from the Moderator

11:05 am 1
Intraoperative EEG Changes During TCAR are More Frequent than Previously Reported
Laura C. Lamb, Edward Gifford, Parth Shah, Ilene Staff, Akhilesh Jain, James Gallagher, Gaurav Rana, Thomas Divinagracia - Hartford Healthcare, Hartford, CT

OBJECTIVE: Up to 14% of patients undergoing carotid endarterectomy (CEA) with continuous electroencephalographic (EEG) neuromonitoring require shunt placement due to EEG changes. Initial studies of transcatheter artery revascularization (TCAR) found only one patient with temporary EEG changes. We report our experience with intraoperative EEG monitoring during TCAR.

METHODS: We conducted a retrospective review of patients from May 2017 to January 2020 who received TCAR at two urban hospitals within an integrated healthcare network. Data included demographic information, patient comorbidities, symptom status, prior carotid interventions, anatomic details, contralateral disease, intraoperative vital signs and EEG changes, and post-operative major adverse events (transient ischemic attack (TIA), stroke, myocardial infarction (MI), and death) both initially and 30 days post-operatively. Fisher’s Exact test was used for categorical data, while continuous data was analyzed with Wilcoxon Rank Sum.

RESULTS: A total of 89 patients underwent TCAR during the study period, of which 71 (79.8%) had intraoperative EEG neuromonitoring. 70.8% of patients were male. Median age was 75 years (IQR 68-82.5). Symptomatic patients accounted for 41.6% of the cohort. Of the 71 patients who had continuous neuromonitoring, nine had EEG changes during TCAR (12.7%). Changes resolved in 7 patients with pressure augmentation (2), low flow toggle (2), and unclamping after completing flow reversal (3). One patient who had sustained EEG changes had a new post-operative neurologic deficit. Median carotid stenosis percentage on pre-operative CT angiography was lower for patients with EEG changes than those without (67% vs 80%, p=0.009). Neither symptomatic carotid stenosis nor 30-day events were associated with EEG changes during TCAR (p=0.49 and p =0.57 respectively). Overall, there were three post-operative strokes, two post-operative deaths, and one myocardial infarction, for a 30-day stroke/death/MI rate of 7.9%.
CONCLUSION: Changes in continuous EEG were more frequent in our study than previously reported. Less severe carotid stenosis may be associated with a higher incidence of EEG changes. There is limited data on the prognostic ability of EEG to detect clinically relevant changes during TCAR, and further study is warranted.

DISCLOSURES: L.C. Lamb: None; E. Gifford: Intact Vascular; P. Shah: None; I. Staff: None; A. Jain: Cook Medical; J. Gallagher: None; G. Rana: None; T. Divinagracia: Silk Road Medical

11:17 am 2 •
Natural History of Late Type 1a Endoleaks
Thomas FX O'Donnell, Jahan Mohebali, Laura T. Boitano, Glenn M. LaMuraglia, Christopher J. Kwolek, Mark F. Conrad - Massachusetts General Hospital, Boston, MA

INTRODUCTION AND OBJECTIVES: Although early Type 1A endoleaks are well described, late appearing proximal endoleaks are less understood.

METHODS: All patients who underwent elective EVAR without prior aortic surgery at a single institution from 2010-2018 were studied. Only Type 1A endoleaks diagnosed on postoperative CT scans were considered, not completion angiograms. Late endoleaks were defined as those appearing after one year. We used Cox regression to study factors associated with late Type 1A endoleaks.

RESULTS: There were 477 patients who underwent EVAR, of whom 411 (86%) had adequate follow-up. There were 24 Type 1A endoleaks, 4 early and 20 late. The freedom from late Type 1A endoleaks was 99%, 92% and 81% at 1, 5 and 8 years with a median time to occurrence of 2.5 years (3 days to 8.2 years). Only 40% of patients with Type 1A endoleaks were treated within the initial graft instructions for use (IFU). Although 75% of the early Type 1A endoleaks appeared on completion angiogram, only 10% of patients with a late Type 1A had a proximal endoleak on completion angiogram, and 60% had no endoleak at the completion of the index case. Only 21% of late Type 1As were evident by one year, but 79% had stable or expanding sacs. Twelve (60%) of late Type 1A endoleaks had prior interventions for other endoleaks, mostly Type 2 (10/12). Age (HR 1.07 per year [1.02-1.12], P=.01), neck diameter >28mm (HR 3.5[1.2-10.3], P=.02), neck length<20mm (HR 3.0[1.1-8.6], P=.04), and neck angle>80 degrees (HR 3.4[1.5-7.9], P=.004) were all independently associated with higher rates of Type 1A endoleak, but not female sex, endograft, or the use of suprarenal fixation. Two patients had proximal degeneration and 5 experienced graft migration. There were two ruptures (10%), and 14 patients underwent repair (5 open, 9 endovascular), 3 of whom underwent multiple interventions. Median survival after late Type 1A repair was 6.6 years (0 to 8.4 years).

CONCLUSIONS: Late appearing Type 1A endoleaks have a high rate of rupture and present significant diagnostic and management challenges. Careful follow-up is needed, especially in patients with hostile neck anatomy and those undergoing intervention for other endoleaks.

DISCLOSURES: T.F. O'Donnell: None; J. Mohebali: None; L.T. Boitano: None; G.M. LaMuraglia: None; C.J. Kwolek: None; M.F. Conrad: None

11:29 am 3 •
A Significant Proportion of Current United States EVAR Practice Fails to Meet SVS Clinical Practice Guideline Recommended AAA Diameter Treatment Thresholds
Salvatore T. Scal1, Bjorn D. Suckow2, Philip P. Goodney2, Thomas S. Huber2, Gilbert R. Upchurch, Jr.,1 Dan Neal1, Jesse A. Columbo2, Jeanwan Kang2, Marc L. Schermerhorn2, Richard J. Powell2, David H. Stone2,1 University of Florida, Gainesville, FL; 2Dartmouth-Hitchcock Medical Center, Lebanon, NH; 3Beth Israel Deaconess Medical Center, Boston, MA

INTRODUCTION AND OBJECTIVES: There is mounting controversy surrounding the appropriate use of EVAR in contemporary practice. Persistent debate hinges on durability, cost and survival. Accordingly, guidelines have attempted to clarify appropriate EVAR indications. The purpose of this analysis was to examine trends in EVAR practice throughout the United States and measure compliance with SVS clinical practice diameter guidelines (CPGs).

METHODS: We analyzed all elective repairs in the SVS-VQI EVAR registry from 2015-2019(N=25,112) and included patients with aneurysms confined to the infrarenal abdominal aorta. Center and surgeon variation with CPG diameter compliance was examined. Using logistic regression for risk-adjustment, patients were stratified into predicted 1-year mortality risk tertiles and comparisons were made between subjects meeting diameter guidelines (men ≥ 5.5; women ≥ 5.0cm) and those who did not.

RESULTS: Non-compliant EVAR occurred in 38.5% (N=9,675; Compliant 61.5%, N=15,437). There was significant variation in guideline compliance when stratified by VQI participating centers (range 21%-95% [median 61%]; P<.001). This observation was amplified when categorized at the surgeon level (range 0-100% [median 63%]; P<.0001) (Figure). Notably, 82% of VQI surgeons (N=852 of 1048) remain non-compliant in over 20% of their repairs. Moreover, among the 38.5% of patients failing to meet CPG diameter thresholds, 25.4%(N=2,462) were high-physiologic risk as determined by the validated SVS-VQI 1-year mortality calculator. Notably, 1-year survival for the high-physiologic risk patients receiving non-guideline compliant EVAR was worse compared to subjects treated within recommended CPGs (89±2% vs. 94±1%; log-rank P=.0003).

CONCLUSIONS: A significant percentage of current U.S. EVAR practice fails to adhere to SVS diameter guidelines, as highlighted by the tremendous variation among VQI centers and surgeons. Furthermore, as noted by the 25% of patients receiving non-compliant repair deemed to be high physiologic risk, patient selection for EVAR appears suboptimal. Surprisingly, these findings are observed among the majority of VQI surgeons performing EVAR. In light of issues surrounding durability and cost, efforts to constrain observed deviation from recommended therapeutic guidelines would likely serve to improve AAA care throughout the United States. Figure. Variation in Rates of EVAR Guideline Compliance for Elective AAA by VQI Center and Surgeon
Figure. Variation in Rates of EVAR Guideline Compliance for Elective AAA by VQI Center and Surgeon

DISCLOSURES: S.T. Scali: None; B.D. Suckow: None; P.P. Goodney: None; T.S. Huber: None; G.R. Upchurch, Jr.: None; D. Neal: None; J.A. Columbo: None; J. Kang: None; M.L. Schermerhorn: None; R.J. Powell: None; D.H. Stone: None

INTRODUCTION AND OBJECTIVES: Literature on endoleaks focuses on outcomes after completion endoleaks, but data evaluating the effect of follow-up endoleaks on long-term outcomes is lacking.

METHODS: We reviewed patients who underwent EVAR from 2003 to 2019 within the VQI-Medicare database and identified patients with endoleak at procedure completion and follow-up. We stratified cohorts by presence of completion and follow-up endoleak subtypes. The primary outcome was 5-year survival, and secondary outcomes included freedom-from-reintervention and freedom-from-rupture. We used Kaplan-Meier estimates and log-rank tests to analyze rate differences.

RESULTS: Of 22,912 patients with completion endoleak data, 5,296 (23%) had an endoleak. Compared to those without endoleak, those with type I endoleaks had lower survival (75% vs. 80%, P<.001), type II endoleaks had higher survival (84%, P<.001), and types III, IV and indeterminate were not statistically different (82%, 89%, 79%, respectively). Freedom-from-reintervention for types I and III endoleaks were significantly lower than no endoleak cohort (I: 76%, P<.001; III: 65%, P<.001 vs. 82%), but freedom-from-rupture was higher for those with type II endoleak (94% vs. 92%, P<.001) (Figure 1a,b,c). Of 14,873 patients with follow-up endoleak data, 2,373 (16%) had an endoleak. Compared to those without endoleak, types I and III had significantly lower survival (I: 84%, P<.001; III: 67%, P<.001 vs. 88%), but there were no differences for types II (86%) and indeterminate (86%). Those with any type of follow-up endoleak had lower freedom-from-reintervention (I: 70%, P<.001; II: 76%, P<.001; III: 34%, P<.001; indeterminate: 54%, P=.01 vs. 84%), and lower freedom-from-rupture (I: 91%, P=.003; II: 89%, P=.02; III: 85%, P<.001; indeterminate: 89%, P=.07 vs. 93%) (Figure 1d,e,f).

CONCLUSIONS: Compared to no endoleak patients, those with type I completion endoleaks have lower 5-year survival and freedom-from-reintervention. Patients with types I and III follow-up endoleaks also have lower survival, and any endoleak at follow-up is associated with lower freedom-from-reintervention and freedom-from-rupture. These data highlight the importance of close postoperative follow-up after EVAR, as the presence of endoleaks over time portends worse outcomes.

Figure 1A. KM Survival by Type of Completion Endoleak

Figure 1B. Freedom from Reintervention by Completion Endoleak Type
INTRODUCTION AND OBJECTIVES: To determine in VLU patients, the impact of infection (INF) on medical resource utilization (MRU) and cost of care.

METHODS: We performed a retrospective case-controlled study of 78 patients followed a minimum of 12 months with VLUs treated by vascular surgeons, at our wound center. To eliminate minor episodes of INF or incorrectly diagnosed episodes, only patients who had an inpatient admission specifically for INF comprised the INF GROUP, while other admissions were excluded for this group. MRU was defined as: the number of clinic visits; visiting nurse (VNA) visits, and inpatient admissions. The cost for treatment was determined using financial data provided by the hospital and physician organization billing units. The cost over the 1 year follow up was comprised of individual cost centers: inpatient and outpatient facility fees, physician fees, and visiting nurse services. Mean MRU and cost data were compared using the two-sample t test between INF and NO-INF.

RESULTS: Of the 78 VLU patients 9 (11.5%) had at least one inpatient admission for INF related to their VLU in the 1-year treatment period, for a total of 14 admissions. Out of the 69 non-INF patients, only 3 had inpatient admissions. There was no difference between INF and NO-INF for age (66; 61.3 yrs.); % males (67; 57); DVT Hx (22%; 25%); and other risk factors, but INF had a greater proportion of CHF (44%; 13%, p = 0.02). MRU and cost data are shown in Tables 1 and 2.

CONCLUSIONS: Infections in VLU patients led to an increase in MRU and cost of care; with the INF cohort requiring more inpatient admissions, outpatient visits, and VNA services. Given the major impact INF has on cost and MRU, better treatment modalities that prevent infection as well as identifying risk factors for INF in VLU patients are needed.
INTRODUCTION AND OBJECTIVES: Although most manufacturers recommend a 10-20% degree of endograft oversizing, the optimal degree and impact of endograft oversizing remain unclear. Therefore, we examined the influence of the degree of endograft oversizing on mortality, late re-interventions and rupture rates after endovascular aneurysm repair.

METHODS: We identified patients undergoing elective EVAR between 2012 and 2016 in the Vascular Quality Initiative linked to Medicare claims for long-term outcomes. We calculated the degree of oversizing by dividing the endograft diameter by the pre-operative outer aortic wall diameter of the aneurysm neck and stratified oversizing into <10%, 10-20%, and >20%. Two-year reinterventions, rupture rates, and survival were assessed using Kaplan-Meier estimations.

RESULTS: We included 4,595 patients, 20% had oversizing below 10%, 34% between 10% and 20%, and 46% above 20%. Patients with oversizing above 20% were more often female (23% vs. 16%, P<.001), and more often had any hostile neck characteristic (39% vs. 28%, P<.001). Also, patients with oversizing below 10% were more likely to have any hostile neck characteristic (46% vs. 28%, P<.001). Patients with oversizing above 20% had higher two-year reintervention rates (7% vs. 6%, log-rank P=.03; HR:1.4, 95%CI:1.0-2.0, P=.038), and similar two-year ruptures (2.7% vs. 2.2%, log-rank P=.7) and survival (88% vs. 85%, Log-rank P=.88). Patients with oversizing below 10% had higher two-year reintervention rates (11.7% vs. 6%, Log-rank P=.02; HR:1.4, 95%CI:1.0-2.2, P=.05) and two-year ruptures (5.6% vs. 2.2%, Log-rank P=.004; HR:2.1, 95%CI:1.2-3.6, P=.009) and similar survival (85% vs. 85%, Log-rank P=.08) (Figure). Patients with oversizing above 20% had higher two-year reinterventions after oversizing above 20% and below 10% and the higher rates of two-year ruptures after oversizing below 10% strengthen the importance of adherence to manufacturers’ guidelines of oversizing between 10-20%.

DISCLOSURES: M.D. Iafrati: None; R. Melkian: None; T.F. O’Donnell: None
2020 ANNUAL MEETING ABSTRACTS

Figure. Freedom from Reintervention after EVAR

<table>
<thead>
<tr>
<th>Number at risk</th>
<th>Months After Procedure</th>
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<tr>
<td></td>
<td>0</td>
</tr>
<tr>
<td>Deterling</td>
<td>100</td>
</tr>
<tr>
<td>Darling</td>
<td>124</td>
</tr>
<tr>
<td>Agree</td>
<td>44</td>
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<tr>
<td>Oversizing = &lt;10%</td>
<td>34</td>
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<tr>
<td>Oversizing = 10-20%</td>
<td>18</td>
</tr>
<tr>
<td>Oversizing = 20-30%</td>
<td>3</td>
</tr>
</tbody>
</table>

DISCLOSURES: L. de Guerre: None; R. Varkevisser: None; N. Swerdlov: None; C. Li: None; S. Scal: None; V. Patel: None; J. van Herwaarden: Philips, Abbott Vascular, Gore, Medtronic, Terumo Aortic; M. Schemerhorn: Abbott Vascular, Cook Medical, Endologix, Medtronic, Philips

2:02 pm

7 Contemporary Intermittent Claudication Treatment Patterns in the Commercially Insured Non-Medicare Population

Jeffrey J. Siracuse1, Jonathan Woodson1, Randall P. Ellis2, Alik Farber1, Sean P. Roddy3, Scott R. Levin4, Jayakanth Srinivasan4 - 1Boston University School of Medicine, Boston, MA; 2Boston University, Department of Economics, Boston, MA; 3Albany Medical Center, Albany, NY; 4Boston University, Questrom School of Business, Boston, MA

INTRODUCTION AND OBJECTIVES: The extent to which younger patients with intermittent claudication (IC) are offered guideline-recommended medical optimization and interventions, and whether this has changed over time with the expansion of endovascular treatments, is unclear. Our goal was to characterize contemporary IC treatment patterns in commercially insured non-Medicare patients.

METHODS: The IBM MarketScan database, comprising >8 billion U.S. commercial insurance claims, was queried for patients newly diagnosed with IC (2007-2016). Patient demographics, medication profiles, and interventions were evaluated. Time trends were modeled using simple linear regression, and goodness-of-fit was assessed with coefficients of determination (R^2).

RESULTS: Among 152,935,013 unique patients, 300,590 (.2%) were newly diagnosed with IC. Mean insurance coverage was 4.4 years. Median age was 58 years and 56% of patients were male. Medical optimization and interventions were evaluated. Time trends were modeled using simple linear regression, and goodness-of-fit was assessed with coefficients of determination (R^2).

CONCLUSIONS: Younger commercially insured patients with newly diagnosed IC are receiving aggressive treatment with multiple interventions and decreasing time to intervention. Interventions performed in the inpatient setting are decreasing. Outpatient, but not inpatient, procedures are increasingly utilizing atherectomy. Both inpatient and outpatient interventionists are performing interventions of unclear clinical benefit and sub-optimally prescribing statin therapy.

DISCLOSURES: J.J. Siracuse: Grants # R01 HS026485-01; J. Woodson: None; R.P. Ellis: Grant # R01 HS026485-01; A. Farber: None; S.P. Roddy: None; S.R. Levin: None; J. Srinivasan: Grant # R01 HS026485-01

2:14 pm

8 Effects of Dual Antiplatelet Therapy on Graft Patency after Lower Extremity Bypass

Nathan Belkin, Jordan Stockecker, Benjamin M. Jackson, Scott M. Darmaur, Julia D. Glaser, Venkata Kalapati, Grace J. Wang - Hospital of the University of Pennsylvania, Philadelphia, PA

INTRODUCTION AND OBJECTIVES: The objective of this study was to explore prescribing patterns of single versus dual antiplatelet therapy (DAPT) after lower extremity bypass surgery, and to investigate the effects of antiplatelet therapy on bypass graft patency.

METHODS: A retrospective review of non-emergent infrapopliteal lower extremity bypass operations entered in the national Vascular Quality Initiative (2003-2018) was performed. Patients discharged on aspirin monotherapy or DAPT were identified. Multivariable Cox regression investigated predictors of primary, primary-assisted, and secondary patency.

RESULTS: Of the 13,020 patients investigated, 52.2% were discharged on aspirin monotherapy, and 47.8% on DAPT. The proportion of patients discharged on DAPT increased from 10.6% in 2003 to 80.6% in 2018 (P<0.001). The DAPT cohort was younger, had higher rates of medical (HTN, diabetes, CHF, COPD) and atherosclerotic (CAD, prior CABG, prior lower extremity intervention)
comorbidities, and had higher risk bypass procedures (more distal targets, prior inflow bypass procedure, prosthetic conduit utilization). Multivariable cox regression analysis did not show any difference between the DAPT and aspirin cohorts in primary patency (HR 0.98, 95% CI 0.88-1.10, P=0.78), primary assisted patency (HR 0.93, 95% CI 0.80-1.07, P=0.30) or secondary patency (HR 0.88, 95% CI 0.74-1.06, P=0.18). On subgroup analysis delineated by bypass conduit, DAPT was found to have a protective effect on patency only in the prosthetic bypass cohort: primary patency (HR 0.81, 95% CI 0.66-1.00, P=0.01), and secondary patency (HR 0.60, 95% CI 0.44-0.82, P<.001). No patency differences were observed on adjusted subgroup analysis for the other conduits. (Figure)

CONCLUSIONS: A significant and increasing proportion of patients are discharged on dual antiplatelet therapy after lower extremity bypass revascularization. These patients represent a higher risk cohort with more medical comorbidities and higher risk bypass features. After controlling for these differences, DAPT therapy had no beneficial effect on overall bypass graft patency or major adverse limb events. However, on subgroup analysis, DAPT was associated with improved bypass graft patency in patients receiving prosthetic bypass conduits.

Figure. Multivariable Cox Regression: DAPT Compared to SAPT, Hazard Ratios and 95% CI

DISCLOSURES: N. Belkin: None; J. Stoecker: None; B.M. Jackson: None; S.M. Damrauer: None; J.D. Glaser: None; V. Kalapatapu: None; G.J. Wang: None

The Role of Transfemoral Carotid Artery Stenting with Proximal Balloon Occlusion Embolic Protection in the Contemporary Endovascular Management of Carotid Artery Stenosis

Patric Liang1, Peter Soden1, Mark C. Wyers1, Mahmoud B. Malas2, Brian W. Nolan3, Grace J. Wang4, Richard J. Powell5, Mark L. Scherrmierhorn1, Beth Israel Deaconess Medical Center, Boston, MA; University of California San Diego, La Jolla, CA; Maine Medical Center, Portland, ME; University of Pennsylvania, Philadelphia, PA; Dartmouth-Hitchcock Medical Center, Lebanon, NH

INTRODUCTION AND OBJECTIVES: Transcarotid artery revascularization (TCAR) with flow reversal provides a superior method of embolic protection compared with transfemoral carotid artery stenting (tfCAS) with distal embolic protection. Flow reversal or flow arrest systems with proximal endovascular balloon occlusion can also be utilized via the transfemoral approach; however, their outcomes compared with TCAR with flow reversal and tfCAS with distal embolic protection are poorly described.

METHODS: We performed a retrospective review of all patients undergoing tfCAS with proximal balloon occlusion, tfCAS with distal embolic protection, and TCAR with flow reversal in the SVS-VQI from March 2005 to May 2019. We assessed in-hospital outcomes using propensity-score-matched cohorts of patients, utilizing tfCAS with proximal balloon occlusion as the comparison cohort. The primary outcome was stroke or death.

RESULTS: Of the 24,232 patients undergoing CAS, 561 (2.3%) were performed via tfCAS with proximal balloon occlusion, 18,126 (74%) via tfCAS with distal embolic protection, and 5,545 (22.9%) via TCAR with flow reversal. After matching, 464 pairs of patients undergoing tfCAS with proximal balloon occlusion and tfCAS with distal embolic protection were identified. There were no differences in stroke or death (proximal balloon 3.2% vs distal embolic protection 3.7%, RR 0.88 [95%CI 0.45-1.73]; P = .73), stroke (2.4% vs 2.6%, RR 0.92 [95%CI 0.42-2.00]; P = .83), or death (1.1% vs 1.6%, RR 0.71 [95% CI 0.41-1.35]; P = .80). However, after matching 357 pairs of patients undergoing tfCAS with proximal balloon occlusion and TCAR with flow reversal, tfCAS with proximal balloon occlusion was associated with higher rates of stroke or death (3.1% vs 0.8%, RR 3.67 [95%CI 1.02-13.14]; P = .03), and a trend towards higher rates of stroke (2.5% vs 0.8%, RR 3.00 [95%CI 0.81-11.08]; P = .08) and death (0.8% vs 0.0%, P = .08) (Table).

CONCLUSIONS: TFCAS with proximal balloon occlusion does not offer the same degree of embolic protection compared with TCAR with flow reversal given the significantly higher risk of perioperative stroke or death.
Table. In-Hospital Perioperative Outcomes for Patients Undergoing Transfemoral Carotid Artery Stenting with Proximal Balloon Occlusion versus Transcarotid Artery Revascularization with Flow Reversal in a Propensity Score-Matched Study Population

<table>
<thead>
<tr>
<th></th>
<th>TCAR w/ flow reversal (n=357)</th>
<th>tCAS w/ Proximal Balloon Occlusion (n=357)</th>
<th>Relative Risk (95% CI)</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Primary Outcome</strong></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Stroke or Death</td>
<td>3 (0.8%)</td>
<td>11 (3.1%)</td>
<td>3.67 (1.02-13.14)</td>
<td>.03</td>
</tr>
<tr>
<td><strong>Secondary Outcomes</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stroke</td>
<td>3 (0.8%)</td>
<td>9 (2.5%)</td>
<td>3.00 (0.81-11.08)</td>
<td>.08</td>
</tr>
<tr>
<td>Transient Ischemic Attack</td>
<td>3 (0.8%)</td>
<td>3 (0.8%)</td>
<td>1.00 (0.20-4.95)</td>
<td>&gt;.99</td>
</tr>
<tr>
<td>Death</td>
<td>0 (0.0%)</td>
<td>3 (0.8%)</td>
<td>---</td>
<td>.08</td>
</tr>
<tr>
<td>Myocardial Infarction</td>
<td>1 (0.3%)</td>
<td>2 (0.6%)</td>
<td>2.00 (0.18-22.06)</td>
<td>.56</td>
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<td><strong>Exploratory Outcomes</strong></td>
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<tr>
<td>Congestive Heart Failure</td>
<td>1 (0.3%)</td>
<td>3 (0.8%)</td>
<td>3.00 (0.31-28.84)</td>
<td>.32</td>
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<tr>
<td>Hemodynamic Instability</td>
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<tr>
<td>Hypotensive</td>
<td>48 (15.0%)</td>
<td>55 (17.2%)</td>
<td>1.11 (0.77-1.61)</td>
<td>.57</td>
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<tr>
<td>Hypertensive</td>
<td>42 (13.3%)</td>
<td>40 (13.1%)</td>
<td>1.00 (0.65-1.54)</td>
<td>&gt;.99</td>
</tr>
<tr>
<td>Reperfusion Syndrome</td>
<td>1 (0.3%)</td>
<td>1 (0.3%)</td>
<td>1.00 (0.06-15.99)</td>
<td>&gt;.99</td>
</tr>
<tr>
<td>Procedure Time, mean (SD)</td>
<td>75.2 (36.1)</td>
<td>77.9 (39.6)</td>
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<td>.71</td>
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<td>Fluoroscopy Time, mean (SD)</td>
<td>6.0 (6.0)</td>
<td>15.0 (26.7)</td>
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<td>Contrast volume, mean (SD)</td>
<td>36.6 (22.8)</td>
<td>73.4 (58.5)</td>
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<td>Length of Stay, median (IQR)</td>
<td>1 (1, 1)</td>
<td>1 (1, 2)</td>
<td>---</td>
<td>.19</td>
</tr>
<tr>
<td>Failed CMS discharge criteria</td>
<td>51 (14.3%)</td>
<td>68 (19.0%)</td>
<td>1.33 (0.96-1.85)</td>
<td>.08</td>
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<tr>
<td>Length of Stay &gt;2 Days</td>
<td>46 (12.9%)</td>
<td>60 (16.8%)</td>
<td>1.30 (0.92-1.86)</td>
<td>.14</td>
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<tr>
<td>Failed Discharge Home</td>
<td>16 (4.5%)</td>
<td>33 (9.2%)</td>
<td>2.06 (1.15-3.70)</td>
<td>.01</td>
</tr>
</tbody>
</table>

Values are No. (%) unless otherwise specified. CI, confidence interval; TCAR, transcarotid artery revascularization; tCAS, transfemoral carotid artery stenting; IQR, interquartile range; SD, standard deviation.

DISCLOSURES: P. Liang: None; P. Soden: None; M.C. Wyers: None; M.B. Malas: Principal investigator for the CREST-2 and ROADSTERI and ROADSTERII trials, Proctor for TCAR; B.W. Nolan: None; G.J. Wang: None; R.J. Powell: None; M.L. Schermerhorn: Silk Road Medical, Abbott, Cook, Endologix, Medtronic, Philips

BACKGROUND: Tandem carotid artery lesions that involve simultaneous internal carotid artery (ICA) and common carotid artery (CCA) stenoses present a complex clinical problem. The addition of a retrograde proximal intervention to treat a CCA lesion during a carotid endarterectomy (CEA) increases the risk of stroke and death. However, the stroke and death risk associated with totally endovascular treatment of tandem lesions is unknown and is the subject of this study.

METHODS: VSGNE data for the years 2005-2020 were queried for carotid stenting procedures (CAS). Emergent and bilateral procedures, procedures for indications other than atherosclerosis, patients with prior ipsilateral CAS, ICA lesions with stenosis=50%, and transcarotid procedures were excluded. The cohort was divided into tandem and isolated lesion groups. The primary outcome was the composite of any perioperative neurologic events (stroke and transient ischemic attack) and death. Predictors of stroke/death were determined with multivariable logistic regression.

RESULTS: There were 2,016 carotid arteries stented in 1,950 patients; 1,881(96%) with isolated lesions, 135(4%) with tandem lesions. Mean age was 69.6±9.0. Tandem lesions were more likely to be present in women (50.4% vs. 33.0%; p<0.001). Other covariates were similar between the groups. Symptomatic lesions were present in 42.3% of cases (isolated: 42.2% vs tandem: 43.0%; p=0.86). More tandem group arteries had a prior CEA (45.9% vs 35.4%; p=0.014). Arteries in the tandem group more often required multiple stents to treat the ICA lesion (9.6% vs 5.2%; p=0.027). Neuroprotection had similar outcomes in both groups (Tandem; Success 94.1%, Failure 3.7%; Isolated: Success 96.3%, Failure 1.8%; p=0.29). The tandem group experienced a higher 30-day mortality (2.2% vs 0.6%;p=0.039), higher perioperative neurologic events (8.1% vs 2.0%; p<0.001), and higher incidence of the composite primary outcome (8.9% vs 2.4%;p<0.001). Predictors of the primary outcome in the multivariable model included treatment of tandem lesions (OR: 3.2:95%CI:1.96-7.43;p=0.001), symptomatic lesions (OR:2.55:95%CI:1.48-4.40;p=0.001), use of multiple stents for the ICA lesions (OR:2.29:95%CI:1.03-5.10;p=0.043), history of coronary artery disease (OR:1.91:95%CI:1.11-3.29;p=0.020), and increasing age (OR:1.03 per year:95%CI:1.00-1.07;p=0.041).
INTRODUCTION AND OBJECTIVES: Abdominal aortic aneurysms often occur concomitantly with aneurysmal iliac arteries requiring treatment via flared endograft limb, branch device, or hypogastric embolization with external iliac extension during endovascular repair. The long-term natural history of a flared limb in an aneurysmal iliac artery remains unclear. The purpose of this study is to determine the adequacy of flared limb usage in aneurysmal iliac arteries.

METHODS: A retrospective review of a prospectively collected database for one large vascular group was queried for large iliac limb use. A large limb was defined at a limb larger than 18 mm diameter. Demographics, operative details, and ancillary procedures were tabulated and compared using standard statistics etc.

RESULTS: 346 limbs with an iliac device limb greater than 18 mm in diameter (LRG) and 1646 limbs with devices less than 18 mm (REG) were implanted between 1/1/13 and 1/1/18 and followed for a median of 5.9 months (range 1-52). Demographics were similar between LRG and REG respectively: age (72.0 years, range 48-94 vs 72.7 years, range 33-100), male sex (89.8% vs 71.2%), coronary disease (19% vs 20%), hypertension (46% vs 46%), cholesterol (41% vs 37%) COPD (9.4 vs. 13.4), renal (2% vs 3%), diabetes (8.9% vs 10.3%), and tobacco (20% vs 18%). Operative mortality was similar between LRG and REG (1.63% vs 1.46%, P > .849). The devices for the LRG group: 205 Gore, 11 Medtronic, 18 Endologix and 3 Ovation. The devices for the REG group: 567 Gore, 203 Medtronic, 21 Endologix and 14 Cook. Post operatively 2 patients in the LRG group had acute limb occlusion versus 13 acute events in the REG group. Long term outcomes regarding revisions such as extensions and coiling were not significant (24, 9.8% LRG vs 107, 13% REG, P=.173).

CONCLUSIONS: Aneurysmal iliac arteries are frequently associated with abdominal aortic aneurysms and the natural history of an aneurysmal iliac artery treated with a large stent graft has been defined. This large series demonstrates the safety and long-term durability of flared limb use in large iliac arteries.

DISCLOSURES: R. Darling: None; A. Kryszuk: None; N. Russo: None; J. Hnath: None

2:50 pm 11 •
Long-Term Outcomes of Flared Limbs in Aneurysmal Iliac Arteries
R. Clement Darling, III, Alexander Kryszuk, Nicholas Russo, Jeffrey Hnath - Albany Medical College, Albany, NY

CONCLUSION: The addition of endovascular treatment of tandem CCA lesions with CAS is associated with a four-fold increase in perioperative neurological events and death and should be avoided if possible.

DISCLOSURES: C. DeCarlo: None; A. Tanious: None; L.T. Boitano: None; J. Mohebali: None; D.H. Stone: None; W. Clouse: None; M.F. Conrad: None

OBJECTIVE: The Ovation Abdominal Stent Graft Platform contains a polymer-filled proximal sealing ring that conforms to the patient’s neck anatomy and is designed to improve proximal seal. We compared mid-term outcomes for patients with and without hostile neck anatomy undergoing infrarenal EVAR with the Ovation device.

METHODS: We used the ENCORE registry, identifying elective infrarenal EVAR patients from six clinical trials and the European Post-Market Registry (2009-2017). Hostile neck anatomy was defined by presence of at least one of the following features: neck length <10mm, reverse neck taper >10%, angulation >45°, and large diameter >34mm. We compared hostile vs. non-hostile neck anatomy as well as individual hostile characteristics vs. non-hostile anatomy. Primary outcome was five-year rate of type IA endoleak, secondary outcomes were type VII endoleak, AAA-related re-interventions, and overall survival. The five-year rates were calculated using Kaplan-Meier estimates, and log-rank tests and Cox proportional hazards models were used to test univariate and risk-adjusted differences.

RESULTS: Of the 1,296 EVAR patients, 555 (44%) had hostile neck anatomy. The rate of type IA endoleak was similar at five-years between hostile vs. non-hostile neck anatomy (3.8% vs. 4.2%, P=0.47). Furthermore, no differences were seen in five-year rates of type VII endoleaks (5.5% vs 6.1%; P=0.59) and AAA-related re-intervention (7.7% vs 7.3%; P=0.62). Five-year survival estimates were similar between hostile vs. non-hostile neck anatomy (70% vs. 81%; P=0.20) (Figure 1-4). While large neck diameter demonstrated a trend towards higher rates of five-year type IA endoleaks (5.4%; P=.08), none of the individual neck characteristics demonstrated a statistically significant difference in type IA endoleak rates. Risk-adjusted analysis demonstrated no association between hostile neck anatomy and five-year type IA endoleak (HR: 1.17; 95%CI:0.58-2.36; P=.68).

CONCLUSION: Hostile neck anatomy is associated with similar five-year outcomes for patients treated with the Ovation stent graft platform compared to non-hostile anatomy. Therefore, we believe that the Ovation’s sealing technique using polymer-filled sealing rings may mitigate the worse outcomes historically observed in patients with hostile neck anatomy.

DISCLOSURES: R. Darling: None; A. Kryszuk: None; N. Russo: None; J. Hnath: None

3:05 pm
Similar Five-Year Outcomes between Patients with and without Hostile Proximal Neck Anatomy Following Abdominal Aortic Aneurysm Repair with the Ovation Stent Graft Platform
Rens R.B. Varkevisser1,2, Priya B. Patel1, Nicholas J. Swerdlow1, Chun Li1,2, Hence J.M. Verhagen1, Sean P. Lyden1, Marc. L. Schermerhorn1 – 1Beth Israel Deaconess Medical Center, Boston, MA; 2University Medical Center Rotterdam, The Netherlands; 3Cleveland Clinic, Cleveland, OH
The patient is a 77-year-old male referred to our clinic for persistent right leg swelling. Past medical history was significant for Grade 1 laryngeal cancer, previously treated with chemoradiation, and right lower extremity DVT in the common femoral vein on anticoagulation for three months. Hematologic workup was positive for persistent anti-cardiolipin antibody. Physical exam was consistent with non-pitting edema of the entire right lower extremity with palpable pedal pulses, as well as new-onset numbness in the sensory distribution of the genitofemoral nerve. Duplex at time of consultation showed a partially compressible common femoral vein with minimal proximal respiratory variation.

CT abdomen/pelvis a large retroperitoneal mass compressing and potentially involving the distal IVC was identified. This was better characterized as a complex soft tissue mass measuring 6.8 x 7.3 cm on follow up MRI, with suspected origin from the IVC confluence. Patient was taken for curative R0 resection with venous reconstruction of the IVC and iliac vein confluence. Patient tolerated the procedure well, undergoing reconstruction of the IVC and bilateral iliac veins with 16 mm PTFE. Final pathology showed a primary IVC/iliac vein leiomyosarcoma, Grade III, with no violation of the capsule and negative margins. The patient had prolonged ileus post-operatively but was successfully discharged on anticoagulation on post-operative day 11. At three-month follow-up his reconstruction is widely patent and leg swelling and neuropathy have resolved. Radical en bloc resection remains the gold-standard treatment for retroperitoneal tumors. This case demonstrates the multidisciplinary care of rare soft tissue tumors involving the central veins, notably in this case arising from the inferior vena cava (IVC) confluence.
We present a case of oncologic resection of biopsy proven leiomyosarcoma arising from the inferior vena cava (IVC) confluence. We hope to elucidate the effectiveness of multidisciplinary approach as well as highlight the technical issues one encounters in resecting this rare yet challenging tumor involving vascular structures.

DISCLOSURES: E. Qaja: None; E. Gifford: None; O. Serrano: None

3:34 pm 14 • Transcarotid Artery Revascularization Versus Carotid Endarterectomy and Transfemoral Stenting in Octogenarians
Ambar Mehta1, Priya Patel2, Danielle Bajakian1, Richard Schutzer3, Nicholas Morrissey4, Karan Garg5, Mahmoud Malai6, Marc Schermerhorn5, Virandra I. Patel1 • 1Columbia University Irving Medical Center, New York, NY; 2Rutgers New Jersey Medical School, Newark, NJ; 3New York University School of Medicine, New York, NY; 4University of California San Diego Health, San Diego, CA; 5Beth Israel Deaconess Medical Center, Boston, MA

INTRODUCTION AND OBJECTIVES: Transfemoral carotid stenting (TFCAS) has higher combined stroke and death rates in elderly patients compared to carotid endarterectomy (CEA). However, transcatheter artery revascularization (TCAR) may have similar outcomes to CEA. This study (1) characterized annual trends in TCARs and 2) compared their outcomes with CEA and TFCAS, focusing on octogenarians.

METHODS: We included all patients with carotid artery stenosis, and no prior stenting or endarterectomy, who underwent either a TCAR, CEA, or TFCAS in the Vascular Quality Initiative from September 2016 (TCAR commercially available) to December 2019. We categorized patients into decades: 60s (60-69 years), 70s (70-79 years), and 80s (80-90 years). Outcomes included: in-hospital stroke, death within 30-days, a composite stroke/death outcome, and any postoperative neurological events (includes TIA). Multivariable logistic regressions compared each outcome within every decade category after adjusting for patient demographics, clinical factors, symptomatology, urgency, hospital CEA volume, and clustering.

RESULTS: We identified 55,828 patients with carotid artery stenosis (95% in their 60s, 44% in their 70s, and 21% in their 80s), where half (51%) were symptomatic and the majority of procedures (86%) performed electively. The number of TCARS quadrupled from 833 in 2017 to 3206 in 2019. Overall rates of outcomes were: stroke (1.4%), death (0.8%), stroke/death (2.0%), and postoperative neurologic events (2.0%). Among octogenarians, the adjusted odds of all four outcomes were similar for TCAR relative to CEA: stroke (aOR 1.10 [95%-CI 0.75-1.63]), death (aOR 1.19 [0.72-1.97]), stroke/death (aOR 1.11 [0.80-1.53]), and postoperative neurologic events (aOR 1.09 [0.80-1.49]). In contrast, TFCAS had higher adjusted odds of all four outcomes compared to CEA. These results remained similar among patients in their 60s and 70s (Table). CONCLUSIONS: In this nationwide study, TCARs had similar outcomes relative to CEA among octogenarians. TCAR may serve as a promising less-invasive treatment for carotid disease in older patients who are deemed high anatomic, surgical, or clinical risk for CEA.

Table. Multivariable Logistic Regression Comparing All Four Outcomes within Each Decade Category Between CEAs, TFCAS and TCARs.

<table>
<thead>
<tr>
<th></th>
<th>Stroke</th>
<th>Death</th>
<th>Stroke/Death</th>
<th>All Post-Op Neurologic Events</th>
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<tbody>
<tr>
<td><strong>60-69 years</strong></td>
<td>Reference</td>
<td>Reference</td>
<td>Reference</td>
<td>Reference</td>
</tr>
<tr>
<td>CEA</td>
<td>Reference</td>
<td>Reference</td>
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<tr>
<td>TFCAS</td>
<td>1.27 (0.88-1.63)</td>
<td>2.20 (1.40-3.48)</td>
<td>1.76 (1.31-2.36)</td>
<td>1.22 (0.87-1.71)</td>
</tr>
<tr>
<td>TCAR</td>
<td>1.44 (0.95-2.20)</td>
<td>0.62 (0.22-1.73)</td>
<td>1.30 (0.85-1.98)</td>
<td>1.38 (0.98-1.95)</td>
</tr>
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</table>

| **70-79 years**  | Reference | Reference | Reference | Reference |
| CEA              | Reference | Reference | Reference | Reference |
| TFCAS            | 1.44 (1.02-2.03) | 2.76 (1.92-3.97) | 1.89 (1.43-2.48) | 1.58 (1.17-2.12) |
| TCAR             | 1.45 (1.02-2.07) | 0.91 (0.48-1.75) | 1.26 (0.92-1.72) | 1.29 (0.95-1.76) |

| **80-90 years**  | Reference | Reference | Reference | Reference |
| CEA              | Reference | Reference | Reference | Reference |
| TFCAS            | 2.14 (1.41-3.27) | 2.20 (1.45-3.34) | 2.31 (1.66-3.21) | 2.06 (1.43-2.96) |
| TCAR             | 1.10 (0.75-1.63) | 1.19 (0.72-1.97) | 1.11 (0.80-1.53) | 1.09 (0.80-1.49) |

DISCLOSURES: A. Mehta: None; P. Patel: None; D. Bajakian: None; R. Schutzer: None; N. Morrissey: None; K. Garg: None; M. Malas: None; M. Schermerhorn: None; V.I. Patel: None

3:46 pm 15 • The Effect of Thoracoabdominal Aortic Aneurysm Extent on Outcomes in Patients Undergoing Fenestrated/Brachial Endovascular Aortic Repair

INTRODUCTION: Outcomes after open repair of thoracoabdominal aortic aneurysms (TAAA) have been definitively demonstrated to worsen as TAAA extent increases. However, the effect of TAAA extent on fenestrated/brachial endovascular aneurysm repair (F/BEVAR) outcomes is unclear. We sought to investigate differences in outcomes of F/BEVAR based on TAAA extent.

METHODS: We reviewed a single-institution, prospectively-maintained database of all F/BEVAR procedures performed in an IRB-approved registry and/or physician-sponsored FDA investigational device exemption trial. Patients were stratified into two groups; (1) extensive (Extent 1-3 TAAA); or (2) non-extensive (juxtarenal, pararenal, and Extent 4 TAAA). Perioperative outcomes were compared with chi-square. Kaplan-Meier analysis of 3-year survival, target artery

DISCLOSURES: A. Mehta: None; P. Patel: None; D. Bajakian: None; R. Schutzer: None; N. Morrissey: None; K. Garg: None; M. Malas: None; M. Schermerhorn: None; V.I. Patel: None

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patency, reintervention, type 1 or 3 endoleak, and branch instability (type \(1c\) or \(3\) endoleak, loss of branch patency, or target vessel stenosis >50%) were performed. Cox proportional hazards modeling was used to assess the independent effect of extensive TAAA on 1-year mortality.

RESULTS: Over the study period, 307 consecutive F/BEVAR procedures were performed for 90 (29%) extensive TAAA and 217 (71%) non-extensive TAAA. The majority of repairs utilized company-manufactured, custom-made devices (n=248, 81%). Between groups, no perioperative differences were observed in myocardial infarction, stroke, acute kidney injury, dialysis, target artery occlusion, access site complication, or type 1 or 3 endoleak (all \(p>0.05\)). Perioperative paraparesis was higher in the extensive TAAA group (7.8% vs. 0.5%, \(p=0.001\)), but paralys was equivalent (2.2% vs 0.5%, \(p=0.21\)). On Kaplan-Meier analysis, no differences in survival, target artery patency, or freedom from reintervention were observed at 3-years (all \(p>0.05\)). Freedom from type 1 or 3 endoleak (\(p=0.01\)) and branch instability (\(p<0.01\)) were significantly lower in the extensive TAAA group. Cox proportional hazards modeling demonstrated that TAAA extent was not independently associated with survival (HR 1.79, 95% CI 0.91-3.53, \(p=0.09\)).

CONCLUSIONS: Unlike open TAAA repair, F/BEVAR for extensive TAAAs is not associated with markedly inferior outcomes. Differences are likely accounted for by the increasing length of aortic coverage and number of target arteries involved. These findings suggest that high volume centers performing F/BEVAR for non-extensive TAAA should be able to maintain similar outcomes as an increasing number of extensive TAAA repairs are performed.

DISCLOSURES: K.R. Diamond: None; J.P. Simons: None; A.S. Crawford: None; E.J. Arous: None; D.R. Judelson: None; F.A. Aiello: None; D.W. Jones: None; L. Messina: None; A. Schanzer: Cook Medical

INTRODUCTION AND OBJECTIVES: Experience with fenestrated endovascular aortic endograft (FEVAR) in the treatment of post dissection aneurysms remains challenging. A 49-year-old male with a history of type A dissection repair (ascending tube graft) presented with a residual 6-cm expanding extent III thoracoabdominal aortic aneurysm (TAAA). Our objective was to perform a 3-vessel FEVAR with a custom-made endograft with preloaded wires for each fenestration. Serial deployment technique was utilized. This technique allowed us to cannulate each target artery from above while keeping the rest of the fenestrated endograft below each fenestration still in the sheath, by keeping the endograft constrained, creates space outside of the endograft which is key to facilitate catheter wire mobility and subsequent target artery cannulation.

METHODS: A custom-made fenestrated endovascular aortic endograft was designed on the basis of measurements obtained from high-resolution CTA images on a three-dimensional workstation using standard centerline flow orthogonal techniques (TeraRecon, Foster City, Calif). The graft design included fenestrations to the celiac artery, SMA, and right renal artery (RRA). The main body fenestrated graft was designed with a modified preloaded delivery system. We utilized IVUS to confirm true lumen presence and delivered main body fenestrated graft via groin using serial deployment technique. Balloon-expandable bridging stent grafts were deployed through the fenestrations to the celiac, SMA and RRA.

RESULTS: Completion angiography showed expansion of true lumen and patent visceral branches. The 1-month surveillance imaging demonstrated excellent stent graft architecture, no evidence of endoleak and favorable aortic remodeling.

CONCLUSIONS: FEVAR is a feasible option for patients with chronic type B aortic dissections with TAAAs. Serial deployment technique allows to keep the endograft constrained within the sheath below each fenestration creating space outside of the endograft which facilitates target artery cannulation in narrowed true lumen.

DISCLOSURES: M. Alqaim: None

3:58 pm 16 (Video) 3-Vessel Fenestrated Repair of 6cm Thoracoabdominal Aortic Aneurysm after a Chronic Type B Dissection

Mohammad Alqaim - UMass Memorial Medical Center, Worcester, MA

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DISCLOSURES: M. Alqaim: None
A Multicenter, Prospective Randomized Trial of Negative Pressure Wound Therapy for Infragastrual Revascularization Groin Incisions

Daniel Bertges, Lisa Smith, Rebecca Scully, Mark Wyers, Jens Eldrup-Jorgenson, Bjoern Suckow, C. Keith Ozaki, Louis Nguyen

University of Vermont Medical Center, Burlington, VT; Brigham and Women's Hospital, Boston, MA; Beth Israel Deaconess Medical Center, Boston, MA; Maine Medical Center, Portland, ME; Dartmouth Hitchcock Medical Center, Lebanon, NH

OBJECTIVE: To assess the impact of closed incision negative pressure therapy (ciNPT) on groin incision complications following infragastrual bypass and femoral endarterectomy.

METHODS: Patients (n=242) undergoing infragastrual bypass (n=114) or femoral endarterectomy (n=118) at five academic medical centers in New England from April 2015 to August 2019 were randomized to ciNPT (PREVENA™, KCI) (n= 118) or standard gauze (n= 124). The primary outcome measure was a composite of 30-day groin wound complications (surgical site infection (SSI), major non-infectious complications or graft infection). Secondary outcome measures included (1) 30-day SSI (2) 30-day non-infectious wound complications, (3) readmission for wound complications, (4) significant adverse events, and (5) health related (HR) by Euro Quality of Life (QoL) 5D-3L survey.

RESULTS: The ciNPT and control groups had similar demographics, comorbidities and operative characteristics. There was no difference in the 30-day primary composite outcome: ciNPT vs. control (31% vs 28%, \(P = 0.55\)). SSI at 30-days was similar; ciNPT vs. control (11% vs 12%, \(P = 0.58\)). Infectious (13.9% vs. 12.6%, \(P = 0.77\)) and non-infectious wound complications (20.9% vs. 17.6%, \(P = 0.53\)) were similar for ciNPT and control groups respectively. Wound complications requiring readmission were ciNPT vs. control groups (9% vs. 7%, \(P = 0.54\)). Significant adverse event rates were not different for ciNPT vs. control groups (13% vs. 16%, \(P = 0.53\)). The mean length of hospitalization was the same for ciNPT and control (5.2 vs. 5.7 days, \(P = 0.63\)). Overall HR QoL was similar at baseline and at 14 and 30-day postoperatively for the two groups. We found no difference among subgroups: gender, obesity diabetes, smoking, claudication vs. chronic limb threatening ischemia and bypass vs. endarterectomy. Multivariable analysis showed no difference in wound complications at 30 days for ciNPT vs gauze (Odds ratio 1.4, 95% CI 0.8-2.6, \(P = 0.234\)).

CONCLUSION: This multicenter trial of infragastrual revascularization found no difference in 30-day groin incision complications in patients treated with ciNPT vs. control. The SSI rate was lower in the control group than in other published studies, suggesting other practice patterns reduced baseline groin infections. Further study may identify subsets of higher risk patients that might benefit from ciNPT.

DISCLOSURES: D. Bertges: Acelity, KCI. L. Smith: None; R. Scully: None; M. Wyers: None; J. Eldrup-Jorgenson: None; B. Suckow: None; C. Ozaki: None; L. Nguyen: None

INTRODUCTION OF THE PRESIDENT
Palma Shaw, MD
SUNY Upstate Medical Center, Syracuse, NY

PRESIDENTIAL ADDRESS
Rise to the Challenge
Marc Schermerhorn, MD
Beth Israel Deaconess Medical Center, Boston, MA

ANNUAL MEMBER BUSINESS MEETING
• Society Updates
• Vote—Bylaw Amendments
• Vote—New Members
• Proposed Slate (2020-2021)
• Introduction of Incoming President

INDUSTRY SPONSORED SYMPOSIUM #3
Shockwave IVL for Calcified BTK, CFA and Iliac Disease
Paul Bloch, MD, Matthew Alef, MD & Nathan Aranson, MD
Presented by: Shockwave Medical
INTRODUCTION AND OBJECTIVES: Endovascular aneurysm repair (EVAR) is associated with worse outcomes in patients not meeting device instructions for use (IFU). However, whether open repair (OSR) and fenestrated EVAR (FEVAR) represent better options for these patients is unknown.

METHODS: We identified all patients without prior aortic surgery undergoing elective repair of juxtarenal and infrarenal aortic aneurysms at a single institution with EVAR, OSR and FEVAR. We applied device-specific aneurysm neck-related IFU to EVAR patients, and generic IFU to FEVAR and open patients. We calculated propensity scores and used inverse probability weighting, clustering by surgeon, to compare outcomes among EVAR patients by adherence to IFU, and by treatment modality in patients not meeting IFU.

RESULTS: Of 657 patients (477 EVAR, 35 FEVAR, 145 OSR), there were 271 (42%) treated whose measurements were outside of standard EVAR IFU. Perioperative mortality was 0.5% overall. For EVAR, treatment outside the IFU was associated with significantly lower adjusted rates of freedom from Type IA endoleak (83% at 5 years compared to 98%, HR 5.8[2.4-14.4], P<0.0001), and survival (82% and 45% at 5 and 10 years for IFU patients compared to 61% and 39% for non-IFU patients, HR 2.1 [1.3-3.4], P=0.003). There was no difference in reinterventions or open conversion. In patients not meeting IFU, adjusted survival was significantly higher for OSR (adjusted 5 year survival: 62% EVAR, 51% FEVAR, 82% OSR; EVAR as referent: OSR: HR 0.5[0.3-0.98], P=0.04, FEVAR: HR 1.4[0.6-3.3], P=0.4) (Figure). When only patients deemed fit for OSR were considered, survival was similar for EVAR and OSR, but mortality and reinterventions were significantly higher for FEVAR (mortality: HR 3.0 [1.3-7.0], P=0.01; reinterventions: HR 3.4[1.7-7.1], P=0.001).

CONCLUSIONS: Treatment outside device-specific IFU is associated with adverse long-term outcomes. Open surgical repair is associated with higher long-term survival in patients who fall outside of the EVAR IFU, and should be favored over EVAR in this cohort.

OBJECTIVES: Tunneled dialysis catheters (TDC) are used as temporary means to provide hemodialysis until permanent arteriovenous (AV) access is established. However, some patients may end up having TDC for long-term. Our objective was to evaluate patient characteristics, reasons for, and mortality associated with long-term TDC use.

METHODS: A retrospective single institution analysis was performed. Long-term TDC use was defined as >180 days without more than a 7-day temporary removal. Reasons for long-term TDC use and complications were recorded. Summary statistics were performed. Multivariable analysis was completed that compared mortality between patients with long-term TDC use to a comparison cohort who underwent AV access creation with subsequent TDC removal.

RESULTS: We identified 50 patients with long-term TDC use from 2013-2018. The average age was 63 years, 44% were male, and 76% were African American. Previous TDC use was found in 42%. Median TDC duration was 333 days (range 185-2029). The primary reasons for long-term TDC use were failure AV access (34%), non-maturing AV access (32%), delayed AV access placement (14%), no AV access options (10%), patient refusal for AV access placement (6%), and medically high-risk for AV access placement (4%). In 46% of patients, TDC complications occurred including central venous stenosis (33.4%), TDC-related infections (29.6%), TDC displacement (27.8%), and thrombosis (7.9%). Overall, 47.6% required a catheter exchange. The majority (76.4%) had their catheter removed during
follow-up. The long-term TDC group, in relation to the comparator group (n=201), had fewer males (44% vs. 61.2%, P=.028) and higher proportion of congestive heart failure (66% vs. 40.3%, P=.001). Kaplan-Meier analysis showed no significant difference in survival at 24 months for the long-term TDC to the comparator group (93.6% vs. 92.7%, P=.28). In multivariable analysis, long-term TDC use was not associated with mortality (HR 0.72, 95% CI .29-1.8, P=.48).

CONCLUSIONS: As expected, patients with long-term TDCs experienced significant TDC-related morbidity, however long-term TDC use was not associated with increased mortality. While permanent access is preferable, some patients may require long-term TDC use due to difficulty establishing a permanent access, limited access options, and patient preference.

DISCLOSURES: V.K. Castro: None; A. Farber: None; Y. Zhang: None; Q. Dicken: None; L. Mendez: None; S.R. Levin: None; T.W. Cheng: None; R.B. Hasley: None; J.J. Siracuse: None

9:15 am 21 (RF) Comparative Analysis of Open Abdominal Aortic Aneurysm Repair Outcomes Across National Registries
Rebecca E. Scully, Gaurav Sharma, Andrew J. Soo Hoo, Jillian Walsh, Ginger Jin, Matthew T. Menard, Charles Keith Ozaki, Michael Belkin - Brigham and Women’s Hospital, Boston, MA

INTRODUCTION AND OBJECTIVES: Lower mortality after open abdominal aortic aneurysm repair (OAAAR) has been demonstrated in the Society for Vascular Surgery (SVS) Vascular Quality Initiative (VQI) database when compared to previously published reports of other national registries. Understanding these differences is essential as these datasets increasingly inform clinical guidelines and health policy.

METHODS: The VQI, American College of Surgeons (ACS) National Surgical Quality Improvement Program (NSQIP), and National Inpatient Sample (NIS) databases were queried for elective OAAAR between 2013 and 2016. Chi-square tests were used for frequencies, ANOVA for continuous variables. A multivariate analysis using logistic models for in-hospital and 30-day mortality adjusting for age, gender, race, comorbidities, and smoking status was also performed.

RESULTS: In total, data from 8775 patients were analyzed. Significant differences were seen across baseline characteristics (Table 1). Additionally, the availability of patient and procedural data varied widely across datasets (Table 1). LOS and discharge destination differed significantly, as did in-hospital mortality: NIS 5.5%, NSQIP 4.5%, VQI 3.3%; P<0.001 (Table 2). 30-day mortality was found to be 3.5% in VQI and 5% in NSQIP (P<0.001). These differences were again demonstrated in adjusted analyses for both in-hospital (NIS vs VQI: OR 1.52, 95%CI 1.18-1.95, P=0.001; NSQIP vs VQI: OR 1.79, 95%CI 1.33-2.40, P<0.001) and 30-day mortality (NSQIP vs VQI OR 1.62, 95%CI 1.19-2.20, P=0.002).

CONCLUSIONS: There are fundamental important differences in patient demographics, comorbidity profiles, and outcomes after OAAAR across widely used national registries. These may represent differences in outcomes between institutions that elect to participate in the VQI or NSQIP versus the broader results obtained from the NIS. In addition to avoiding direct comparison of information derived from these databases, it is critical that these differences are taken into account when making policy decisions and guidelines based on these data repositories.
<table>
<thead>
<tr>
<th>Variable</th>
<th>NSQIP (N=1667)</th>
<th>NIS (N=3196)</th>
<th>VQI (N=3912)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean age, years (SD)</td>
<td>70 (8.8)</td>
<td>69 (9.2)</td>
<td>69 (8.3)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Female sex (%)</td>
<td>432 (26)</td>
<td>916 (29)</td>
<td>1007 (26)</td>
<td>0.032</td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White (%)</td>
<td>1178 (71)</td>
<td>2576 (81)</td>
<td>3509 (90)</td>
<td></td>
</tr>
<tr>
<td>Black (%)</td>
<td>65 (3.9)</td>
<td>162 (5.1)</td>
<td>181 (4.6)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Other/Missing (%)</td>
<td>424 (25)</td>
<td>458 (14)</td>
<td>222 (5.7)</td>
<td></td>
</tr>
<tr>
<td>Obese (BMI &gt; 30, %)</td>
<td>476 (29)</td>
<td></td>
<td>1108 (28)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Primary insurer</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medicare (%)</td>
<td>2135 (67)</td>
<td>2097 (54)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medicaid (%)</td>
<td>133 (4.2)</td>
<td>130 (3.3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commercial (%)</td>
<td>773 (24)</td>
<td></td>
<td>1398 (36)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Military/VA (%)</td>
<td>53 (1.3)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other (%)</td>
<td>146 (4.6)</td>
<td></td>
<td>209 (5.3)</td>
<td></td>
</tr>
<tr>
<td>Comorbidities</td>
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<td></td>
<td></td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>HTN (%)</td>
<td>1324 (79)</td>
<td>2054 (64)</td>
<td>3324 (85)</td>
<td></td>
</tr>
<tr>
<td>DM (%)</td>
<td>205 (12)</td>
<td>518 (16)</td>
<td>679 (17)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>CAD (%)</td>
<td>234 (7.3)</td>
<td>1012 (26)</td>
<td></td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>CHF (%)</td>
<td>25 (1.5)</td>
<td>289 (9.0)</td>
<td>316 (8.1)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>COPD (%)</td>
<td>337 (20)</td>
<td>1130 (35)</td>
<td>1276 (33)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>CKD (%)</td>
<td>98 (5.9)</td>
<td>270 (8.5)</td>
<td>198 (5.1)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Current/prior smoker (%)</td>
<td>750 (45)</td>
<td>1065 (33)</td>
<td>3563 (91)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>AAA diameter, cm (SD)</td>
<td>5.9 (1.8)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Approach</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transperitoneal (%)</td>
<td>2848 (73)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Retropitoneal (%)</td>
<td>1042 (27)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean EBL, mL (SD)</td>
<td>1845 (1807)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Concomitant procedure (%)</td>
<td>501 (30)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total procedure time, min (SD)</td>
<td>251 (117)</td>
<td>256 (106)</td>
<td></td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>
## 2020 ANNUAL MEETING ABSTRACTS

Table 2. Unadjusted Outcomes in Patients Undergoing OAAAR by National Database

<table>
<thead>
<tr>
<th>Outcome</th>
<th>NSQIP (N=1667)</th>
<th>NIS (N=3196)</th>
<th>VQI (N=3912)</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mortality</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In-hospital mortality (%)</td>
<td>75 (4.5)</td>
<td>177 (5.5)</td>
<td>129 (3.3)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>30-Day mortality (%)</td>
<td>83 (5.0)</td>
<td>137 (3.5)</td>
<td></td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>90-Day mortality (%)</td>
<td>187 (4.8)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Length of stay</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean hospital LOS, days (SD)</td>
<td>10.3 (9.5)</td>
<td>9.5 (8.7)</td>
<td>9.4 (10.6)</td>
<td>0.003</td>
</tr>
<tr>
<td><strong>Disposition</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Home (%)</td>
<td>1213 (73)</td>
<td>2296 (73)</td>
<td>2987 (76)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Short-/Longterm Facility (%)</td>
<td>362 (22)</td>
<td>717 (22)</td>
<td>794 (20)</td>
<td></td>
</tr>
<tr>
<td>Died (%)</td>
<td>87 (5.2)</td>
<td>177 (5.5)</td>
<td>129 (3.3)</td>
<td></td>
</tr>
</tbody>
</table>

Disclosures: R.E. Scully: None; G. Sharma: None; A.J. Soo Hoo: None; J. Walsh: None; G. Jin: None; M.T. Menard: None; C.K. Ozaki: None; M. Belkin: None
INTRODUCTION: Currently, ALARA (as low as reasonably achievable) is the guiding principle in radiation (XR) safety, but there is a lack of standardization of XR protocols. Given the longitudinal effects of continued XR exposure on providers’ life-time risk of XR induced carcinoma and cataract formation, there is a need to establish an imaging standard that minimizes occupational risks without sacrificing image quality. We utilized an imaging protocol using a reduced frame rate (Fr) and Roentgen (R) to assess patient and occupational XR exposure in a hybrid fixed imaging suite for Endovascular Aneurysm Repair (EVAR) and Thoracic Endovascular Aneurysm Repair (TEVAR).

METHODS: Retrospective analysis of occupational XR dose of Operating Room (OR) personnel and patients before and after implementing a modified preset imaging protocol from 15Fr/5R to 7.5Fr/2.5R during 2018 to 2020. All OR staff wore XR dosimetry badges to record monthly dose equivalent levels: Lens (LDE), Shallow (SDE), and Deep (DDE). Patient XR dose was calculated by Air Kerma (AK) and Dose Area Product (DAP). Wilcoxon rank sum test demonstrated significance (p<0.05).

RESULTS: All OR personnel had significantly lower SDE(180mRem vs 55mRem, p=0.007), lower LDE(191mRem vs 59mRem, p=0.011) and a trend toward significance for a lower DDE(58.5mRem vs 21mRem, p=0.068) with the new imaging protocol (Figure 1). In TEVAR and EVAR procedures, there were significant reductions in patient radiation dose with lower AK and DAP(p<0.05) without increasing OR fluoroscopic time (Figure 2).

CONCLUSION: With the expansion of complex endovascular procedures, measures should be taken to minimize the harmful effects of lifelong XR. This study demonstrates a significant reduction in XR dose in both patients and OR staff for both TEVAR and EVAR procedures with the use of a 7.5Fr/2.5R imaging protocol in fixed imaging. We aim to establish a guideline to mitigate the longitudinal effects of XR for staff and patients.

DISCLOSURES: A.M. Lin: None; A.C. Methe: None; V.R. Narvaez: None; M. Kronick: None; V. Labinsky: None; M.A. Norris: None; A. Kravetz: None; A.Y. Ching: None; N.C. Hadro: None; M.E. Morris: None

INTRODUCTION AND OBJECTIVES: Splenectomies are often performed during open Thoracoabdominal Aortic Aneurysm (TAAA) Repair, as capsular tears are common and can be associated with significant bleeding. The effect of incidental splenectomy on outcomes after TAAA repair is unknown.

METHODS: All open type I-III TAAA repairs performed from 1987-2015 were evaluated using a single institutional database. Primary endpoints were in-hospital death, major adverse events (MAE) and long-term survival. Secondary endpoint was hospital length of stay (LOS). All repairs performed for rupture were excluded. Logistic and linear multivariable regression were used for the in-hospital endpoints and survival analyses were performed with Cox Proportional Hazards modelling and Kaplan-Meier techniques.
RESULTS: Six hundred forty-nine patients met study inclusion criteria. One hundred fifty (23%) of these patients had a concurrent splenectomy (CS) and six patients required an emergency splenectomy secondary to bleeding post-operatively, leaving 156 total splenectomies while in house. Full demographic and procedural differences between the groups can be found in Table 1. Mortality rate was 5.8% in the CS group (p=1.0) compared to 5.6% in the non-CS group (p=1.0). MAE were experienced by 48% of splenectomy patients compared to 34% of those without splenectomy (p=0.003). Multivariable analysis revealed splenectomy to not independently predict of perioperative death (AOR: 0.93, 95% CI 0.40, p=0.87). However, splenectomy was found to be independently predictive of any major adverse event (MAE) (AOR: 1.78 95% CI 1.19, 2.64, p=0.005). Splenectomy was also associated with a longer LOS (+5.55 days, 95% CI 2.01, 9.10, p=0.002). There was no survival difference between the cohorts in the total splenectomy cohort in the unadjusted (log-rank p=1.0) nor the adjusted analysis (splenectomy AHR: 0.99, CI: 0.75, 1.30, p=0.9).

CONCLUSIONS: Incidental splenectomy during open repair TAAA did not lead to increase perioperative mortality but did lead to significantly increased perioperative morbidity and longer hospital LOS. There was no difference in long-term survival outcomes when concurrent splenectomy was performed. Splenectomy during TAAA repair should be avoided when feasible.

Table 1. Demographics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Splenectomy Median [IQR] or n (%)</th>
<th>No Splenectomy Median [IQR] or n (%)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>150 (23.1)</td>
<td>499 (76.9)</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>70 [66, 76]</td>
<td>72 [66.77]</td>
<td>0.49</td>
</tr>
<tr>
<td>Female</td>
<td>83 (55.3)</td>
<td>225 (45.1)</td>
<td>0.03</td>
</tr>
<tr>
<td>Crawford Extent:</td>
<td></td>
<td></td>
<td>0.03</td>
</tr>
<tr>
<td>1</td>
<td>38 (25.3)</td>
<td>109 (21.8)</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>18 (12.0)</td>
<td>68 (13.6)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>60 (40.0)</td>
<td>152 (30.5)</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>34 (22.7)</td>
<td>170 (34.1)</td>
<td></td>
</tr>
<tr>
<td>DM</td>
<td>44 (8.8)</td>
<td>15 (10.0)</td>
<td>0.63</td>
</tr>
<tr>
<td>Smoking history</td>
<td>132 (88.0)</td>
<td>409 (82.0)</td>
<td>0.10</td>
</tr>
<tr>
<td>Symptomatic</td>
<td>16 (10.8)</td>
<td>50 (10.4)</td>
<td>0.88</td>
</tr>
<tr>
<td>Diameter (cm)</td>
<td>6.4 [6, 7]</td>
<td>6.1 [5.6, 7.1]</td>
<td>0.13</td>
</tr>
<tr>
<td>Hypertension</td>
<td>131 (87.3)</td>
<td>436 (87.4)</td>
<td>1.0</td>
</tr>
<tr>
<td>Coronary artery disease</td>
<td>54 (36.0)</td>
<td>215 (43.1)</td>
<td>0.13</td>
</tr>
<tr>
<td>COPD</td>
<td>44 (29.3)</td>
<td>108 (21.6)</td>
<td>0.06</td>
</tr>
<tr>
<td>History aortic aneurysm repair</td>
<td>49 (32.7)</td>
<td>145 (29.1)</td>
<td>0.42</td>
</tr>
<tr>
<td>Marfan’s syndrome</td>
<td>4 (2.7)</td>
<td>15 (3.0)</td>
<td>1.0</td>
</tr>
<tr>
<td>Inflamed/Infected</td>
<td>2 (1.6)</td>
<td>8 (1.6)</td>
<td>1.0</td>
</tr>
<tr>
<td>Admission Creatinine</td>
<td>1.1 [0.9, 1.4]</td>
<td>1.2 [0.9, 1.5]</td>
<td>0.11</td>
</tr>
<tr>
<td>Intraoperative Details:</td>
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<td></td>
<td></td>
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<tr>
<td>Left Heart Bypass/MEVP</td>
<td>66 (44.0)</td>
<td>110 (22.0)</td>
<td>&lt;0.00</td>
</tr>
<tr>
<td>Visceral bypass</td>
<td>50 (34.3)</td>
<td>74 (15.1)</td>
<td>&lt;0.00</td>
</tr>
<tr>
<td>Renal bypass</td>
<td>93 (62.4)</td>
<td>334 (67.6)</td>
<td>0.28</td>
</tr>
<tr>
<td>Visceral cross-clamp time (min)</td>
<td>40 [30, 55]</td>
<td>43 [31, 53]</td>
<td>0.34</td>
</tr>
<tr>
<td>Total cross-clamp time (min)</td>
<td>78 [62, 100]</td>
<td>78 [60, 97]</td>
<td>0.50</td>
</tr>
<tr>
<td>Total operative time (min)</td>
<td>313 [256, 397]</td>
<td>360 [305, 484]</td>
<td>&lt;0.00</td>
</tr>
</tbody>
</table>

DISCLOSURES: C.A. Latz: None; L.T. Boitano: None; C. DeCarlo: None; Z. Feldman: None; M. Prig: None; J. Mohebali: None; A. Dua: None; M.F. Conrad: None
OBJECTIVE: When the integrated vascular surgery training pathway was introduced, training was comprised of nearly equal amounts of core general surgery and vascular surgery experience. However, specific requirements for case numbers or types were not defined. Over time, the core general surgery requirements have been reduced, most recently in 2018, from 24 to 18 months. We sought to determine trends in general surgery case volume and type over the past 10 years for vascular surgery residents.

METHODS: We conducted a retrospective review of the Accreditation Council for Graduate Medical Education case log data for integrated vascular surgery graduates from 2012–2018. We evaluated trends in mean numbers of cases, categorized as general surgery open (GS-open), general surgery laparoscopic (GS-laparoscopic), vascular surgery open (VS-open), and vascular surgery endovascular (VS-endo). Cases were also categorized by anatomic region as head/neck, thoracic, or abdominal.

RESULTS: The mean number of cases logged by graduating integrated vascular surgery trainees was 263.5. This total, as well as the proportion of general surgery cases has remained constant over time (35–38%, p=0.99). The type of general surgery cases has changed significantly, with an upward trend in the mean number of GS-open cases and downward trend in mean GS-laparoscopic cases (GS-open p=0.006, GS-laparoscopic p=0.048). Among head/neck and thoracic subgroups, no significant changes were observed, while in the abdominal subgroup, there has been a significant increase in GS-open over time (p=0.005).

CONCLUSIONS: In the 10 years since the introduction of integrated vascular surgery programs, total case volume and proportion of general surgery cases have remained remarkably stable. The type of general surgery cases has shifted though, with a decrease in GS-laparoscopic cases, replaced primarily by open abdominal cases. These changes likely reflect integrated vascular residents actively seeking out these opportunities during their core rotations and a willingness by general surgery partners to provide these opportunities. At the program level, these data may help guide program directors’ choices about the specific core rotations they incorporate into their curriculum. At the national level, this information may contribute to future discussions regarding the optimal number of core general surgery rotation requirements.

DISCLOSURES: E. Fan: None; A. Crawford: None; E.J. Arous: None; D.R. Judelson: None; F. Aiello: None; A. Schanzer: None; J. Simons: None

INTRODUCTION: The current guidelines recommend elective AAA repair at 5.5cm in men and 5.0cm in women. However, rupture occurs in patients with aneurysm size below these thresholds. This study aims to investigate the proportion of small ruptured AAA (rAAA) below elective operative thresholds and compare outcomes of repair to larger aneurysms.

METHODS: The 2011-2018 ACS-NSQIP open and endovascular AAA repair databases were reviewed for all cases of rAAA. Patients were divided into two groups: “small rAAA” for those that present below size thresholds and “large rAAA” for the remainder. The proximal/distal extent of rAAA as well as the pre-operative characteristics and outcomes of infrarenal rAAA were compared.

RESULTS: Of the 1,612 ruptured AAA repairs, 167 (10.4%) were small rAAAs. The proportion of small rAAA did not significantly change during the study period (p=0.15) (Fig). Patients in the large rAAA group were more likely to have juxta/suprarenal aneurysms (27% vs 16%, P=.001). Patients in the small infrarenal rAAA group had significantly lower BMI, were more likely to be African American and have hypertension. Patients in the small AAA group were more likely to have ASA classification ≤ 3, and to undergo EVAR but less likely to have hypotension on presentation. Repair of small rAAA was associated with lower bleeding, mortality, mean operative time, and higher readmission. (Table) Multivariate analysis showed that rupture with hypotension, open repair, general anesthesia, age, and high ASA were associated with increased mortality, but aneurysm size was not.

CONCLUSION: Current guidelines for elective repair based solely on AAA sac diameter fail to identify 10% of patients presenting with rupture. Ruptured AAA carries significant mortality regardless of the size of the aneurysm. Further research into sac morphology and more sensitive imaging modalities may help identify small rAAA at high risk of rupture that would benefit from elective repair.

Figure. Small AAA Ruptures as a Proportion of all AAA Ruptures Over Time, Showing No Significant Change in Rate (p=0.15)
<table>
<thead>
<tr>
<th></th>
<th>Small Infrarenal rAAA</th>
<th>Large Infrarenal rAAA</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total</strong></td>
<td>141 (100)</td>
<td>1051 (100)</td>
<td></td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;50</td>
<td>3 (2.1)</td>
<td>40 (3.8)</td>
<td></td>
</tr>
<tr>
<td>51-64</td>
<td>29 (20.5)</td>
<td>200 (19.0)</td>
<td></td>
</tr>
<tr>
<td>65-79</td>
<td>42 (29.7)</td>
<td>311 (29.5)</td>
<td></td>
</tr>
<tr>
<td>80+</td>
<td>56 (39.7)</td>
<td>371 (35.3)</td>
<td>0.86</td>
</tr>
<tr>
<td><strong>Mean (std. Dev.)</strong></td>
<td>71.8 (11.6)</td>
<td>70.8 (11.8)</td>
<td>0.38</td>
</tr>
<tr>
<td><strong>Male Sex</strong></td>
<td>105 (74.4)</td>
<td>817 (77.7)</td>
<td>0.38</td>
</tr>
<tr>
<td><strong>Functional Status</strong></td>
<td></td>
<td></td>
<td>0.16</td>
</tr>
<tr>
<td>Dependent</td>
<td>8 (5.6)</td>
<td>35 (3.3)</td>
<td></td>
</tr>
<tr>
<td><strong>BMI</strong></td>
<td></td>
<td></td>
<td>P&lt;0.01,0.02*</td>
</tr>
<tr>
<td>&lt;18</td>
<td>14 (9.9)</td>
<td>95 (9.0)</td>
<td></td>
</tr>
<tr>
<td>18-24</td>
<td>47 (33.3)</td>
<td>217 (20.6)</td>
<td></td>
</tr>
<tr>
<td>25-30</td>
<td>39 (27.6)</td>
<td>282 (26.8)</td>
<td></td>
</tr>
<tr>
<td>30-34</td>
<td>12 (8.5)</td>
<td>188 (17.8)</td>
<td></td>
</tr>
<tr>
<td>35+</td>
<td>16 (11.3)</td>
<td>134 (12.7)</td>
<td></td>
</tr>
<tr>
<td><strong>Mean BMI (SEM)</strong></td>
<td>26.1 (0.6)</td>
<td>27.8 (0.2)</td>
<td></td>
</tr>
<tr>
<td><strong>Mean Height (SEM)</strong></td>
<td>67.6 (0.3)</td>
<td>67.7 (0.1)</td>
<td>0.65</td>
</tr>
<tr>
<td><strong>Mean Weight, kg (SEM)</strong></td>
<td>80.3 (1.8)</td>
<td>86.8 (0.7)</td>
<td>p&lt;0.01*</td>
</tr>
<tr>
<td><strong>Race</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>102 (72.3)</td>
<td>790 (75.1)</td>
<td></td>
</tr>
<tr>
<td>African American</td>
<td>17 (12.1)</td>
<td>53 (5.0)</td>
<td>p&lt;0.01*</td>
</tr>
<tr>
<td>Other</td>
<td>22 (15.6)</td>
<td>208 (19.7)</td>
<td></td>
</tr>
<tr>
<td><strong>Comorbidities</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diabetes Mellitus</td>
<td>22 (15.6)</td>
<td>144 (13.7)</td>
<td>0.54</td>
</tr>
<tr>
<td>Current Smoker</td>
<td>52 (36.8)</td>
<td>401 (38.1)</td>
<td>0.76</td>
</tr>
<tr>
<td>COPD</td>
<td>26 (18.4)</td>
<td>162 (15.4)</td>
<td>0.35</td>
</tr>
<tr>
<td>CHF</td>
<td>3 (2.1)</td>
<td>32 (3.0)</td>
<td>0.54</td>
</tr>
<tr>
<td>HTN</td>
<td>106 (75.1)</td>
<td>692 (65.8)</td>
<td>0.02*</td>
</tr>
<tr>
<td>Current dialysis</td>
<td>3 (2.1)</td>
<td>16 (1.5)</td>
<td>0.59</td>
</tr>
</tbody>
</table>
## NEW ENGLAND SOCIETY FOR VASCULAR SURGERY

### 2020 ANNUAL MEETING ABSTRACTS

| Presentation                        | |                  |
|-------------------------------------|----------------------|
| AAA diameter (mean ± SEM)           | 4.4 (0.1)            | 8.0 (0.1)        | **p<0.01*** |
| Rupture with hypotension            | 47 (33.3)            | 521 (49.5)       | **p<0.01*** |

<table>
<thead>
<tr>
<th>Surgical Technique</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>EVAR</td>
<td>111 (78.7)</td>
</tr>
<tr>
<td>Open</td>
<td>30 (21.2)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Anesthesia Technique</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>GA</td>
<td>126 (89.3)</td>
</tr>
<tr>
<td>Other</td>
<td>15 (10.6)</td>
</tr>
</tbody>
</table>

| ASA ≥ 4                             | 99 (70.2)            | 862 (82.0)       | **p<0.01*** |

| Mean operating time (min ± SEM)     | 163.7 (8.9)          | 182.3 (8.9)      | **0.03***    |

<table>
<thead>
<tr>
<th>Complications</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Wound infection</td>
<td>5 (3.5)</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>10 (7.0)</td>
</tr>
<tr>
<td>Unplanned intubation</td>
<td>11 (7.8)</td>
</tr>
<tr>
<td>Failed vent weaning</td>
<td>24 (17.0)</td>
</tr>
<tr>
<td>Cardiac arrest</td>
<td>10 (7.0)</td>
</tr>
<tr>
<td>Myocardial Infarction</td>
<td>6 (4.2)</td>
</tr>
<tr>
<td>Stroke</td>
<td>2 (1.4)</td>
</tr>
</tbody>
</table>

| Bleeding                            | 77 (54.6)            | 713 (67.8)       | **p<0.01***  |

| DVT/thrombophlebitis                | 4 (2.8)              | 39 (3.7)         | **0.6**      |

| Sepsis                              | 11 (7.8)             | 108 (10.2)       | **0.35**     |

| Renal Failure                       | 1 (0.7)              | 11 (1.0)         | **0.7**      |

| Ischemic colitis                    | 8 (5.6)              | 81 (7.7)         | **0.38**     |
| Repeat rupture of aneurysm          | 7 (4.9)              | 61 (5.8)         | **0.68**     |

| Lower Extremity Ischemia            | 3 (2.1)              | 50 (4.7)         | **0.15**     |

| Any Morbidity                       | 92 (65.2)            | 776 (73.8)       | **p=0.03**   |

| Mortality                           | 24 (17.0)            | 260 (24.7)       | **0.04**     |

| Readmission                         | 19 (13.4)            | 60 (5.7)         | **p<0.01**   |

| Reoperation                         | 23 (16.3)            | 151 (14.3)       | **0.53**     |

| Hospital length of stay (SD)        | 9.78 (12.2)          | 9.71 (15.2)      | **0.84**     |

Abbreviations: BMI: Body Mass Index, COPD: Chronic Obstructive Pulmonary Disease, CHF: Congestive Heart Failure, HTN: Hypertension, EVAR: Endovascular Aneurysm Repair, GA: General Anesthesia, ASA: American Society of Anesthesiologists Score, DVT: Deep Venous Thrombosis
Six-Year Outcomes of the Endologix AFX1 Endovascular AAA System: A Single Center Experience

BACKGROUND: Prior publications have documented high rates of delayed endoleaks in the Endologix AFX1 (Strata) grafts. In a safety communication from October 2019, the FDA recommended “benefit-risk determination for each individual patient...to assess the need for additional procedures related to the risk of developing Type III endoleaks.” The goal of this study was to assess long-term outcomes of AFX1 grafts in order to develop more specific recommendations for the follow-up and management of patients with this device.

METHODS: A retrospective review was performed of a single tertiary center experience comparing AFX1 grafts (n=122) to a control cohort (Medtronic, Gore, Cook) (n=101) placed between December 2012 and April 2019. AFX1 was the favored graft in the early experience. The primary study endpoint was freedom from any AAA-related major complication. Secondary endpoints were 5-year survival, freedom from any endoleak, and freedom from any reintervention. Event rates were calculated by K-M and lifetable analysis.

RESULT: Patient demographics, average AAA diameter, and proportion of elective procedures were comparable between cohorts. Median follow-up was longer for the AFX1 compared to control cohort (4.6 years vs 1.8 years, p=0.001). Five-year survival was similar between AFX1 and control (79% vs 71%, p=0.61). The AFX1 cohort had significantly poorer 5-year graft related outcomes: freedom from any endoleak (62% vs 85%, p = 0.008), freedom from reintervention (83% vs 87%, p<0.001), and freedom from any AAA-related major complication (69% vs 95%, p=0.001). Most complications in the control group occurred within the first year of placement, while AFX1-related complications increased dramatically past three years and approached 50% at 6 years (Figure).

CONCLUSION: The long-term AAA-related complications are dramatically higher in patients treated with an AFX1 graft. The latency of complications highlights the need for life-long surveillance for all patients treated with EVAR. Additionally, patients treated with an AFX1 graft should be followed very closely and potentially considered for prophylactic relining or explantation. Outcomes of these reinterventions should be further analyzed.

DISCLOSURES: K. Bellamkonda: None; N. Nassiri: Terumo Aortic, Medtronic Aortic; M.M. Sadeghi: None; Y. Zhang: None; R. Guzman: None; C.I. Ochoa Chaar: None

9:40 am

Figure. Freedom from AAA Related Major Complications

Procedure-Associated Costs and Mid-Term Outcomes of Endovascular Zone 0 and Zone 1 Aortic Arch Repair
Jonathan Aaron Barnes, Zachary J. Wanken, Jesse A. Columbo, David P. Kuwayama, Mark F. Fillinger, Bjorn D. Suckow - Dartmouth-Hitchcock Medical Center, Lebanon, NH

INTRODUCTION: Thoracic endovascular aortic repair (TEVAR) of proximal aortic arch pathology provides a less-invasive treatment option for high-risk patients ineligible for open arch reconstruction. However, the fiscal impact of these techniques remains unclear. Therefore, our objective was to characterize the mid-term outcomes after Zone 0 and Zone 1 TEVAR and describe the associated technical costs, revenues, and net margins at a single tertiary medical center.

METHODS: We examined all patients who underwent TEVAR between April 2011 and August 2019 via retrospective chart review. Patients were categorized by proximal endograft extent to identify Zone 0 or Zone 1 repairs. Procedural characteristics and outcomes were described. Technical costs, revenues, and margins were obtained from the hospital finance department.

RESULTS: We identified 10 patients (6 Zone 0, 4 Zone 1) who were denied open arch reconstruction. Patients were predominantly female (n=8; 80%) and the mean age was 72.8±5.5 years. Repair was performed in 5 asymptomatic patients, urgently in 3 symptomatic patients, and emergently in 2 ruptured patients. Aortic pathology and procedural details are described in table 1. Great vessel debranching with chimney stent-grafting was performed in 4 patients, debranching with branched thoracic endografting in 1 patient (IDE clinical trial), and traditional surgical debranching alone in 4 patients. In-situ fenestration was performed in 1 patient. Within the 30-day postoperative period, 1 patient experienced stroke and 1 patient died. Bypass and branch vessel patency were 100% through the duration of follow-up (mean 19.3 months). Mean total technical cost associated with all procedures or repair stages was $105,164±$50,338 while mean net
technical margin was -$25,055±$18,746. The net technical margin was negative for 9 patients.

CONCLUSIONS: Endovascular repair of the proximal aortic arch is associated with good mid-term outcomes in patients considered too high-risk for open repair. However, reimbursement does not adequately cover treatment cost, with net technical margins being negative in nearly all cases. To remain financially sustainable, efforts should be made to both optimize aortic arch TEVAR delivery as well as advocate for reimbursement commensurate with associated costs.
### Table: Procedural Details, Outcome Measures and Associated Technical Costs and Net Technical Margins for Zone 0 (n=6) and Zone 1 (n=4) TEVAR

<table>
<thead>
<tr>
<th>Patient</th>
<th>Indication for Repair</th>
<th>Proximal Extent of Coverage</th>
<th>Great Vessel Reconstruction</th>
<th>Number of Procedures/Stages</th>
<th>Stroke or Death</th>
<th>Bypass/Branch Patency</th>
<th>Survival</th>
<th>Technical Cost (USD)</th>
<th>Net Technical Margin (USD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ruptured aneurysm</td>
<td>Zone 1</td>
<td>Carotid-carotid bypass, LSA embolization</td>
<td>1</td>
<td>No</td>
<td>100%</td>
<td>Alive at 31 months; follow-up ongoing</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>2</td>
<td>Asymptomatic aneurysm</td>
<td>Zone 0</td>
<td>Carotid-carotid bypass, LSA to L carotid transposition, Gore TSSB branched device to innominate artery</td>
<td>3</td>
<td>No</td>
<td>100%</td>
<td>Died of MI 15 months after repair</td>
<td>$141,688</td>
<td>-$29,549</td>
</tr>
<tr>
<td>3</td>
<td>Type IA endoleak after Zone 2 TEVAR for acute type B dissection</td>
<td>Zone 0</td>
<td>Carotid-carotid bypass, carotid-LSA transposition, innominate chimney</td>
<td>2</td>
<td>Death</td>
<td>---</td>
<td>Died in the hospital 4 days after TEVAR</td>
<td>$153,668</td>
<td>-$45,598</td>
</tr>
<tr>
<td>4</td>
<td>Asymptomatic aneurysm</td>
<td>Zone 1</td>
<td>LSA to carotid transposition, LCCA chimney</td>
<td>2</td>
<td>No</td>
<td>100%</td>
<td>Alive at 37 months; follow-up ongoing</td>
<td>$115,223</td>
<td>-$31,748</td>
</tr>
<tr>
<td>5</td>
<td>Symptomatic aneurysm</td>
<td>Zone 0</td>
<td>Carotid-carotid LSA bypass, innominate chimney, LSA embolization</td>
<td>2</td>
<td>Stroke</td>
<td>100%</td>
<td>Died 18 months after repair</td>
<td>$101,317</td>
<td>-$20,928</td>
</tr>
<tr>
<td>6</td>
<td>Ruptured dissection</td>
<td>Zone 0</td>
<td>Carotid-carotid bypass, chimney to innominate, snorkel to LSA</td>
<td>2</td>
<td>No</td>
<td>100%</td>
<td>Alive at 34 months; follow-up ongoing</td>
<td>$185,613</td>
<td>-$54622</td>
</tr>
<tr>
<td>7</td>
<td>Asymptomatic aneurysm</td>
<td>Zone 0</td>
<td>L carotid to R carotid transposition, L carotid to LSA bypass, LSA embolization</td>
<td>2</td>
<td>No</td>
<td>100%</td>
<td>Alive at 23 months; follow-up ongoing</td>
<td>$97,579</td>
<td>-$18,887</td>
</tr>
</tbody>
</table>
## 2020 ANNUAL MEETING ABSTRACTS

<table>
<thead>
<tr>
<th>Case</th>
<th>Clinical Description</th>
<th>Treatment</th>
<th>Developed</th>
<th>Mortality</th>
<th>Follow-up</th>
<th>Cost</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>Chronic type B dissection with asymptomatic aneurysm Zone 1 Carotid-carotid-LSA bypass</td>
<td>2</td>
<td>No</td>
<td>100%</td>
<td>Alive at 2 months; follow-up ongoing</td>
<td>$48,068</td>
<td>-$26,280</td>
</tr>
<tr>
<td>9</td>
<td>Penetrating aortic ulcer Zone 0 Carotid-carotid-LSA bypass at OSH (debranching at OSH)</td>
<td>2</td>
<td>No</td>
<td>100%</td>
<td>Died 6 months after repair of unknown causes</td>
<td>$42,813</td>
<td>$4,902</td>
</tr>
<tr>
<td>10</td>
<td>Chronic type B dissection with asymptomatic aneurysm Zone 1 Left carotid and LSA in situ branched fenestrations</td>
<td>1</td>
<td>No</td>
<td>100%</td>
<td>Alive at 8 months; follow-up ongoing</td>
<td>$60,505</td>
<td>-$2,784</td>
</tr>
</tbody>
</table>

USD, United States dollars; LSA, left subclavian artery; TSSB, thoracic single side branch; MI, myocardial infarction; CCA, common carotid artery; OSH, outside hospital

DISCLOSURES: J.A. Barnes: None; Z.J. Wanken: None; J.A. Columbo: None; D.P. Kuwayama: None; M.F. Fillinger: None; B.D. Suckow: None
INTRODUCTION AND OBJECTIVES: Active smoking among patients undergoing interventions for intermittent claudication (IC) is associated with poor outcomes. However, contemporary rates of active smoking in these patients are high. State-level tobacco control policies reduce smoking in the general U.S. population. We evaluated whether state cigarette taxes and 100% smoke-free workplace legislation impact active smoking among patients undergoing interventions for IC.

METHODS: We queried the Vascular Quality Initiative database for peripheral endovascular interventions, infrainguinal bypasses, and suprainguinal bypasses for IC. Active smoking was defined as smoking within one month of intervention. We used difference-in-differences, a causal inference technique that adjusts for secular time trends, to isolate changes in active smoking due to state cigarette taxes (adjusted for inflation) and implementation of smoke-free workplace legislation. Models controlled for age, gender, race/ethnicity, insurance type, chronic obstructive pulmonary disease, diabetes, state, and year. We tested interactions of taxes with age and insurance.

RESULTS: Data were available for 59,847 patients undergoing interventions for IC in 25 states from 2011-2019. Across the study period, active smoking decreased from 48% to 40%. Every $1.00 cigarette tax increase was associated with a 6-percentage point decrease in active smoking (95% CI -10 to -1 percentage points, P=.02), representing an 11% relative reduction from baseline in the proportion of patients actively smoking. There were significant interactions by age and insurance. Among patients aged 60-69 and 70-79 years, every $1.00 tax increase resulted in 14% and 21% relative reductions in active smoking compared to baseline subgroup prevalences of 53% and 29%, respectively (P<.05 for all); however, younger age groups were not affected by tax increases. Among insurance groups, only patients on Medicare exhibited a significant change in active smoking with every $1.00 tax increase (18% relative reduction compared to a 33% baseline prevalence, P=.01). States implementing smoke-free workplace legislation increased from 9 to 14 by 2019, but implementation of the policy was not associated with changes in active smoking prevalence.

CONCLUSIONS: Cigarette tax increases appear to be an effective strategy to reduce active smoking among patients undergoing interventions for IC. Older patients and Medicare recipients are most affected by tax increases.

DISCLOSURES: S.R. Levin: None; S.S. Hawkins: None; A. Farber: None; P.P. Goodney: None; N.H. Osborne: None; T. Tan: None; J.J. Siracuse: None