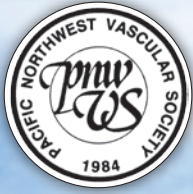


PACIFIC NORTHWEST
VASCULAR SOCIETY



2014 ANNUAL MEETING

October 16-17, 2014

Portland, OR *The Benson Hotel, A Coast Hotel*



FINAL PROGRAM

www.vascularweb.org/pnvs

CORPORATE PARTNERS – SPECIAL THANKS

Pacific Northwest Vascular Society thanks the following corporate partners for the financial support of the meeting:

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Restore Flow Allografts
Surgical & Vascular Imaging
Trivascular



32nd Annual Meeting

October 16-17, 2014

Portland, OR

The Benson Hotel, A Coast Hotel

TABLE OF CONTENTS

2	Special Thanks
3	Meeting Information
4	Table of Contents
5	Executive Officers and Councilors
6	PNWVS Contact Information
7	Meeting at a Glance
8	New Members
10	Past Meetings
11	Past Officers
15	Guest Lecturer - Donald Trunkey, MD
16	Past Guest Lecturers
17	Intended Audience
17	Program Learning Objectives
20	Accreditation Statement
21	Scientific Program
31	Abstracts
59	Poster Abstracts
69	Constitution & Bylaws
81	2014 Membership Listing
98	Notes
101	2015 Annual Meeting Save the Date

2014 PNWVS EXECUTIVE OFFICERS AND COUNCILORS

James Watson, MD.	President & Vascular Surgeon
Jerry Chen, MD.	Immediate Past-President & Vascular Surgeon
Benjamin Starnes, MD.	President-Elect & Vascular Surgeon
Erica Mitchell, MD.	Secretary-Treasurer & Vascular Surgeon
Timothy Liem, MD.	Senior Councilor & Vascular Surgeon
Niten Singh, MD.	Senior Councilor & Vascular Surgeon
Brian Ferris, MD.	Middle Councilor & Vascular Surgeon
Nam Tran, MD.	Middle Councilor & Vascular Surgeon
Keith Baxter, MD.	Junior Councilor & Vascular Surgeon
Glen Rosenborough, MD.	Junior Councilor & Vascular Surgeon



CONTACT INFORMATION

The Executive Council reminds its membership that the new contact information for the Pacific Northwest Vascular Society is:

Pacific Northwest Vascular Society Headquarters

Heather Roderick, Society Administrator
1411 5th St.
Anacortes, WA 98221

Telephone: 360-420-6906
Fax: 360-261-6077
Email: pnwvascular@gmail.com
Web: www.vascularweb.org/pnvs

MEETING AT A GLANCE

Thursday, October 16th

- 3:00pm – 8:00pm **Registration Open** – Mayfair Foyer
- 5:30pm – 6:00pm **Executive Council Meeting** – The Wine Room
- 6:00pm – 7:00pm **Business Meeting** – Kent Room
- 7:00pm – 9:00pm **Welcome Reception & Poster Session** – Mayfair Room
Gore and Associates

Friday, October 17th

- 6:00am – 12:30pm **Registration Open** – Mayfair Foyer
- 7:00am – 8:00am **Breakfast Buffet with Exhibits** – Mayfair Room
- 7:00am – 4:00pm **Exhibits Open** – Mayfair Room
- 7:45am **Presidential Welcome by James Watson, MD and
Toshio Inahara, MD Founder of PNWVS**
- 8:00am – 9:00am **Scientific Session I** – Kent Room
- 9:00am – 9:30am **Resident Debate: Renal Artery Stenting for Treatment of
Renovascular Hypertension is Dead or Should Be!**
For the motion (Swedish) vs. Against the motion (OHSU)
- 9:30am – 10:00am **Coffee Break & Exhibits** – Mayfair Room
- 10:00am – 11:00am **Scientific Session II**
- 11:00am – 11:30am **Resident Debate: Branched Aortic Endografts are
Ready for Prime Time**
For the motion (UW) vs. Against the motion (UBC)
- 11:30am – 12Noon **Invited Lecture: “Emergency Vascular Trauma Injuries
Head to Toe”**
Donald Trunkey, MD., Oregon Health & Science University

MEETING AT A GLANCE

12Noon – 1:00pm	Buffet Lunch & Visit Exhibits – Mayfair Room
1:00pm – 2:00pm	Scientific Session III
2:00pm – 2:30pm	Resident Debate: The Endovascular Literature with Respect to Critical Limb Ischemia Can Be Trusted <i>For the motion (UW) vs. Against the motion (OHSU)</i>
2:30pm – 3:00pm	Coffee Break with Exhibits – Mayfair Room
3:00pm – 4:00pm	Scientific Session IV
4:00pm – 4:30pm	Resident Debate: Surveillance and Prophylactic Repair of Dialysis Access is Appropriate and Cost Effective <i>For the motion (VM) vs. Against the motion (Madigan)</i>
4:30pm – 5:30pm	Rapid Fire, Case Presentations & Technical Tips
5:30pm – 7:00pm	Closing Reception and Resident Awards – Fireplace Lobby
7:00pm – 9:00pm	Tour of the Legendary Portland Food Carts Hosted by OHSU



NEW MEMBERS 2014

Amir Azarbal, MD.

Beejay Felicano, MD.

Christian Hamlat, MD.

Benjamin Lerner, MD.

Peter Krieshman, MD.

Damon Pierce, MD.

Sherene Shalhub, MD.

[Learn more and apply for membership here.](#)

PAST MEETINGS

Seattle, WA	1984
Portland, OR	1985
Tacoma, WA	1986
Vancouver, BC	1987
Coeur D'Alene, ID	1988
Victoria, BC	1989
Seattle, WA	1990
Portland, OR	1991
Tacoma, WA	1992
Vancouver, BC	1993
Coeur D'Alene, ID	1994
Victoria, BC	1995
Seattle, WA	1996
Portland, OR	1997
Tacoma, WA	1998
Vancouver, BC	1999
Coeur D'Alene	2000
Victoria, BC	2001
Seattle, WA	2002
Portland, OR	2003
Tacoma, WA	2004
Vancouver, BC	2005
Spokane, WA	2006
Victoria, BC	2007
Portland, OR	2008
Seattle, WA	2009
Kelowna, BC	2010
Seattle, WA	2011
Vancouver, BC	2012
Coeur D'Alene, ID	2013

PAST OFFICERS

Toshio Inahara, MD, President Kaj H. Johansen, MD, Secretary-Treasurer Kaj H. Johansen, MD, Program	1983
Toshio Inahara, MD, President Kaj H. Johansen, MD, Secretary-Treasurer George A. Berni, MD, Program	1984
Toshio Inahara, MD, President Kaj H. Johansen, MD, Secretary-Treasurer John W. Kenagy, MD, Program	1985
Richard N. Kleaveland, MD, President Leland J. Harris, MD, Secretary-Treasurer Kenton C. Bodily, MD, Program	1986
Henry K. Litherland, MD, President Leland J. Harris, MD, Secretary-Treasurer Henry D. Hildebrand, MD, Program	1987
John W. Kenagy, MD, President Leland J. Harris, MD, Secretary-Treasurer Charles A. Anderson, MD, Program	1988
Henry D. Hildebrand, MD, President Kenton C. Bodily, MD, Secretary-Treasurer R. Eugene Zierler, MD, Program	1989
Lloyd Taylor, MD, President Kenton C Bodily, MD, Secretary-Treasurer Gregory L. Moneta, MD, Program	1990

PAST OFFICERS

D. Eugene Strandness, MD, President Kenton C. Bodily, MD, Secretary-Treasurer Henry K. Litherland, MD, Program	1991
George A. Berni, MD, President Milton H. Brinton, MD, Secretary-Treasurer Charles A. Anderson, MD, Program John M. Porter, MD, President Milton H. Brinton, MD, Secretary-Treasurer Gregory L. Moneta, MD, Program	1992 1993
Joseph G. Sladen, MD, President Milton H. Brinton, MD, Secretary-Treasurer R. Eugene Zierler, MD, Program	1994
Kaj H. Johansen, MD, President Terence M. Quigley, MD, Secretary-Treasurer Gregory L. Moneta, MD, Program	1995
Gregory L. Moneta, MD, President Terence M. Quigley, MD, Secretary-Treasurer Ted R. Kohler, MD, Program	1996
Charles A. Anderson, MD, President Terence M. Quigley, MD, Secretary-Treasurer David C. Taylor, MD, Program	1997
Milton H. Brinton, MD, President David C. Taylor, MD, Secretary-Treasurer James M. Cook, MD, Program	1998
Eugene Zierler, MD, President David C. Taylor, MD, Secretary-Treasurer York N. Hsiang, MD, Program	1999

PAST OFFICERS

Terence M. Quigley, MD, President David C. Taylor, MD, Secretary-Treasurer Mark H. Meissner, MD, Program	2000
Edmond J. Raker, MD, President James M. Cook, MD, Secretary-Treasurer Jerry Chen, MD, Program	2001
David Taylor, MD, President James M. Cook, MD Secretary-Treasurer Stephen Murray, MD, Program	2002
Gary Matsumoto, President James M. Cook, Secretary-Treasurer James Watson, Program	2003
York N. Hsiang, President Mark H. Meissner, Secretary-Treasurer Mark H. Meissner, Program	2004
Jay Cook, MD, President Mark H. Meissner, MD, Secretary-Treasurer Jeff Gilbertson, MD, Program	2005
James Peck, MD, President Mark H. Meissner, MD, Secretary-Treasurer Gregory J. Landry, MD, Program	2006
Mark Meissner, President Gregory J. Landry, MD, Secretary-Treasurer Gerrit Winkelaar, MD, Program	2007
Stephen Murray, MD, President Gregory J. Landry, MD, Secretary-Treasurer Benjamin Starnes, MD, Program	2008

PAST OFFICERS

Gerrit Winkelaar, MD, President Gregory J. Landry, MD, Secretary-Treasurer Erica Mitchell, MD, Program	2009
Jeffrey Gilbertson, MD, President Benjamin Starnes, MD, Secretary-Treasurer Benjamin Starnes, MD, Program	2010
Gregory J. Landry, MD, President Benjamin Starnes, MD, Secretary-Treasurer Benjamin Starnes, Program	2011
Daniel Pepper, MD, President Benjamin Starnes, MD, Secretary-Treasurer Benjamin Starnes, MD, Program	2012
Jerry Chen, MD President James C. Watson, President Elect Erica Mitchell, MD, Secretary Treasurer	2013

SAVE THE DATE



2015 ANNUAL MEETING

October 1-2, 2015
Seattle, WA *Renaissance Seattle Hotel*

INVITED LECTURER



Emergency Vascular Trauma Injuries Head to Toe

**Donald Trunkey, MD.
Oregon Health & Science University**

11:30am - 12:00pm

Trauma surgeons thrive on a certain level of chaos; part of the job is providing care for patients with complex, critical injuries. In his experience as an active combat military surgeon, Donald Trunkey, MD, Professor Emeritus and former Chair, Department of Surgery OHSU, has seen them all.

Donald Trunkey, MD is a co-author of *Current Therapy of Trauma and Surgical Critical Care*. Dr. Trunkey received his medical degree from the University of Washington and completed his residency in general surgery at the University of California, San Francisco. Dr. Trunkey has previously served as Chief of Surgery at San Francisco General Hospital, Professor and Chairman of the Department of Surgery at Oregon Health Sciences University, and President of the American Association for the Surgery of Trauma. He has also held several positions with the American Board of Surgery, the American Burn Association, the American College of Surgeons, the American Medical Association, the American Surgical Association, the American Trauma Society, National Aeronautics and Space Administration, and the International Society of Surgery, among many others. Dr. Trunkey has served on the editorial boards of several prestigious professional publications and is the author of 174 journal articles, 203 book chapters, and 25 books, and is the recipient of numerous awards.

PAST GUEST LECTURERS

Robert Barnes, MD, University of Arkansas	1986
K. Wayne Johnston, MD, University of Toronto	1987
Richard Kempczinski, MD, University of Cincinnati	1988
Brian L. Thiele, MD, Pennsylvania State University	1989
Jonathan B. Towne, MD, Medical College of Wisconsin	1990
Paul M. Walker, MD, University of Toronto	1991
Dennis F. Bandyk, MD, University of South Florida	1992
Robert L. Kistner, MD, Straub Clinic, Honolulu	1993
Allan R. Downs, MD, University of Manitoba	1994
Ralph B. Dilley, MD, Scripps Clinic, La Jolla	1995
Peter Gloviczki, MD, Mayo Clinic, Rochester	1996
Frank Veith, MD, Montefiore Medical Center, Bronx	1997
Kenneth Cherry, MD, Mayo Clinic, Rochester	1998
Robert Zwolak, MD, Dartmouth-Hitchcock, Lebanon	1999
Jerry Goldstone, MD, Case Western Reserve, Cleveland	2000
Carlos Donayre, Harbor UCLA, Torrance	2001
Ronald Dalman, MD, Stanford University	2002
Dennis Bandyk, MD, University of South Florida	2003
Thomas Lindsay, MD, University of Toronto	2004
Joseph L. Mills, MD, University of Arizona	2005
Wesley Moore, MD, UCLA School of Medicine	2006
David Gillespie, MD, Walter Reed Medical Center, Bethesda	2007
David Cossman, MD, Cedar-Sinai Medical Center, Los Angeles	2008
Cherrie Z. Abraham, MD, McGill University, Montreal	2009
Mark Fillinger, MD, Dartmouth-Hitchcock Medical Center, Hanover	2010
Joseph L. Mills, MD, University of Arizona	2011
Daniel F. Bandyk, MD, University of California - San Diego School of Medicine	2012
Thomas L. Forbes, MD Professor of Surgery, Western University, Chief of Vascular Surgery, London Health Sciences Centre	2013

INTENDED AUDIENCE

The PNWVS meeting is designed for:

- Vascular surgeons
- Fellows/residents in vascular surgery and general surgery programs
- Physicians in related specialties
- Interventional radiologists working in the vascular imaging and intervention field
- Physician assistants and nurses involved in the care of vascular surgical patients
- Vascular technologists and vascular lab administrators
- Medical students interested in vascular surgery or vascular surgery related research
- Researchers, administrators, practice managers and allied health professionals with an interest in the science and treatment of vascular disease

PROGRAM LEARNING OBJECTIVES

At the end of this program, participants should be able to:

Cerebrovascular Disease

- Describe the clinical and technical management principles for asymptomatic carotid artery disease
- Describe the clinical and technical management principles for symptomatic carotid artery disease
- Describe current management principles for carotid and vertebral artery dissection
- Identify new methodologies for the diagnosis and treatment of vascular disease as it relates to cerebrovascular disease

PROGRAM LEARNING OBJECTIVES

Open Surgical and Endovascular Techniques of the Aorta and Aortic Branches

- Describe the clinical and technical management principles for thoracic aortic aneurysms and great branch vessels
- Describe the clinical and technical management principles for abdominal aortic aneurysms and visceral vessels
- Describe the clinical and technical management principles for aortic and branch vessel dissection
- Identify key features in the clinical and technical management of complications related to repair of thoracic and abdominal aortic aneurysms
- Explain the surgical approaches for both occlusive and aneurysmal visceral artery disease
- Identify new methodologies for the diagnosis and treatment of vascular disease as it relates to aortic aneurysm disease
- Analyze opportunities for system improvement in managing patients with acute and chronic aortic syndromes

Peripheral Vascular Disease

- Describe the clinical and technical management principles for patients with Peripheral Artery Disease and claudication
- Describe the clinical and technical management principles for patients with critical limb ischemia
- Identify useful adjunctive treatment modalities to assist in wound healing chronic wounds associated with Peripheral Artery Disease
- Analyze opportunities for system improvement in managing patients with vascular disease and chronic wounds to improve limb preservation

PROGRAM LEARNING OBJECTIVES

Acute and Chronic Venous Disease Treatment

- Apply techniques of venous recanalization to their current practice
- Evaluate various quality of life measures and calculate what is most meaningful for their practice
- Describe the current therapy for acute VTE and evaluate which treatment is most appropriate for a given clinical setting
- Assess the current state of IVC filter use/retrieval and surveillance strategies
- Identify new methodologies for the diagnosis and treatment of vascular disease as it relates to acute and chronic venous disease

Hemodialysis Access

- Apply techniques of fistula creation to their current practice
- Describe factors influencing surgical and endovascular outcomes after fistula creation
- Identify new methodologies for the diagnosis and treatment of vascular disease as it relates to end-stage renal disease
- Describe new technologies for dialysis access
- Analyze opportunities for system improvement in managing patients with dialysis access needs

Non-atherosclerotic Vascular Disease

- Identify clinical presentation, risk factors and clinical and technical management principles for vascular graft infections
- Describe management strategies and techniques for exposing and repairing traumatic vasculature injuries

ACCREDITATION STATEMENT

This program has been reviewed and approved under Section 1 (Accredited Group Learning Activities) of the Framework of CPD Options of the Maintenance of Certification program for a total of **7.25** hours.

This event is an Accredited Group Learning Activity (Section 1) as defined by the Maintenance of Certification program of The Royal College of Physicians and Surgeons of Canada.

This activity has been approved by the Canadian Society for Vascular Surgery.

Through an agreement between the Royal College of Physicians and Surgeons of Canada and the American Medical Association, physicians may convert Royal College MOC credits to *AMA PRA Category 1 Credits™*. Information on the process to convert Royal College MOC credit to AMA credit can be found at www.ama-assn.org/go/internationalcme.





Scientific Program

WELCOME SESSION

7:45 – 8:00am

Presidential Welcome

James C. Watson, MD

Toshio Inahara, MD, 1983 PNWVS President & PNWVS Founder

8:00am

SCIENTIFIC SESSION I: Cerebrovascular Disease

MODERATOR: James C. Watson, MD, Pacific Northwest Vascular Society President, Clinical Instructor UW Medicine & Surgeon Swedish Heart & Vascular Institute

1) 8:00 – 8:15am

Hybrid Repair of the Aortic Arch

C Burke MD, MP Sweet MD, BW Starnes MD, GS Aldea MD, JD Pal MD

Presenter: Matthew Sweet, MD

University of Washington

2) 8:15 – 8:30am

Carotid Duplex Peak Systolic Velocity Does Not Predict Intraplaque Hemorrhage

AL Rodriguez MD, TS Hatsukami MD, E Eugenio, GL Tang MD

Presenter: April L. Rodriguez, MD

University of Washington

3) 8:30 – 8:45am

Natural History of Indeterminate Blunt Cerebral Vascular Injury

JD Crawford MD, KM Allan BS, K Patel AF Azarbal MD, TK Liem MD,

EL Mitchell MD, GL Moneta MD, GJ Landry MD

Presenter: Kevin M. Allan, BS, Medical Student, Department of Vascular Surgery Oregon Health and Sciences University

4) 8:45 – 8:50am

Case: A Hybrid Approach to the Treatment of a Head and Neck Venous Malformation

AL Rodriguez MD, MH Meissner MD

Presenter: April L. Rodriguez, MD

University of Washington

5) 8:50 – 8:55am

Case: Extensive Large Vessel Calcification in the Setting of Presumptive Takayasu Arteritis

BT Garland MD, N Singh MD, BW Starnes MD

Presenter: BT Garland, MD

University of Washington

8:55 – 9:00am

Case Q&A

9:00 – 9:30am

Resident Debate: Renal Artery Stenting for Treatment of Renovascular Hypertension Is Dead or Should Be!

For the motion: David Brown, MD, Swedish Medical Center vs.

Against the motion: Khanh Nguyen, MD, Oregon Health & Sciences University

9:30 – 10:00am

Coffee Break and Exhibits

10:00am

SCIENTIFIC SESSION II: Open Surgical and Endovascular Techniques of the Aorta and Aortic Branches

MODERATOR: Benjamin W. Starnes, Pacific Northwest Vascular Society
President-Elect, Professor of Surgery and Chief of Vascular Surgery, UW Medicine

6) 10:00 – 10:15am

Influence of Gender on Abdominal Aortic Aneurysm Repair In The Community*

D Nevidomskyte MD, S Shalhub MD MPH, N Singh MD, E Farokhi MD, N Tran MD,
MH Meissner MD

Presenter: Davia Nevidomskyte, MD
University of Washington

7) 10:15 – 10:30am

Preoperative Risk Score for the Prediction Of Mortality Following Repair of Ruptured Abdominal Aortic Aneurysms*

BT Garland MD, P Danaher PhD, NT Tran MD, E Quiroga MD, N Singh MD,
BW Starnes MD

Presenter: BT Garland, MD
University of Washington

8) 10:30 – 10:45am

The Incidence of Ischemic Colitis After Repair of Ruptured Abdominal Aneurysms is Decreasing in the Endovascular Era

SK Desikan MD, N Singh MD, SR Steele, N Tran MD, E Quiroga MD,
BT Garland MD, BW Starnes MD.

Presenter: SK Desikan MD
University of Washington

9) 10:45 – 11:00am

Blunt Abdominal Aortic Injury: A Multicenter Study

S Shalhub MD MPH, BW Starnes MD, ML Brenner MD MS, WL Biffi MD, A Azizzadeh MD, K Inaba MD, D Skiada MD, B Zarzaur MD MPH, C Nawaf MD, EA Eriksson MD, SM Fakhry MD, JS Paul MD, KL Kaups MD MSc, DJ Ciesla MD, SR Todd MD, MJ Seamon MD, LM Capano-Wehrle MPH, GJ Jurkovich MD, RA Kozar MD

Presenter: Sherene Shalhub, MD

University of Washington

11:00 – 11:30am

Resident Debate: Branched Aortic Endografts are Ready for Prime Time

For the motion: Ty Garland, MD, University of Washington vs.

Against the motion: Steven Johnson, MD, University of British Columbia

11:30 – 12Noon

Invited Lecture: “Emergency Vascular Trauma Injuries Head to Toe”

Donald Trunkey, MD, Oregon Health & Science University

12Noon – 1:00pm

Lunch

1:00pm

SCIENTIFIC SESSION III: Peripheral Vascular Disease

MODERATOR: Niten Singh, MD, Pacific Northwest Vascular Society, Senior Councilor & Associate Professor Surgery UW Medicine

10) 1:00 – 1:15am

Determining the Toe-Brachial Index in Young Healthy Adults

RY Yu BSc, WL Quong BSc, A Fung Bsc, YN Hsiang MD

Presenter: Rollin Yu, MD

University of British Columbia

11) 1:15 - 1:30pm

Increased Rates of Lower Extremity Revascularization May Not Lower Amputation Rates

AF Azarbal MD, S Harris MD, EL Mitchell MD, TK Liem MD, GJ Landry MD, R McLafferty MD, GL Moneta, MD

Presenter: Sheena Harris, MD

Portland VA Medical Center and Oregon Health and Science University

12) 1:30 - 1:45pm

Aortobifemoral Graft Infection: Is Unilateral Limb Excision Definitive?

JD Crawford MD, AF Azarbal MD, TK Liem MD, GJ Landry MD, GL Moneta MD, EL Mitchell MD

Presenter: Matt Roos, MD

Oregon Health and Sciences University

13) 1:45 - 2:00pm

Alternative Strategies To Manage Groin Lymphoceles

Presenter: EJ Raker, MD

Virginia Mason Medical Center

2:00 - 2:30pm

Resident Debate: The Endovascular Literature with Respect to Critical Limb Ischemia Can Be Trusted

For the motion: Daiva Nevidomskyte MD, University of Washington vs.

Against the motion: Matt Roos, MD, Oregon Health and Sciences University

2:30 - 3:00pm

Coffee Break-Exhibits

3:00pm

SCIENTIFIC SESSION IV: Acute and Chronic Venous Disease Treatment, Hemodialysis Access, & Non-atherosclerotic Vascular Diseases

MODERATOR: Timothy K. Liem, MD, Pacific Northwest Vascular Society, Senior Councilor & Associate Professor Surgery, OHSU

14) 3:00 - 3:15pm

Spontaneous Pneumothorax Precedes Vascular and Colon Abnormalities in Vascular Ehlers-Danlos Syndrome

D Sanchez BS, S Shalhub MD MPH, AC Cecchi MS, JH Black III MD, NB McDonnell MD Ph, DM Milewicz MD PhD

Presenter: Desiree Sanchez, BS
University of Washington

15) 3:15 - 3:30pm

Outcomes in the Management of Renal-Pelvic Congestion Syndrome

DP Nathan MD, MH Meissner MD

Presenter: Derek Nathan, MD
University of Washington

16) 3:30 - 3:45pm

Surgical Revision for Non-maturing Arteriovenous Fistulas

TK Liem MD, FM Hacker BS, AA Price, AF Azarbal MD, GJ Landry MD, EL Mitchell MD, GL Moneta MD

Presenter: Timothy Liem, MD
Oregon Health & Science University

17) 3:45 - 4:00pm

Neurogenic Thoracic Outlet Syndrome: A Misnomer!

Presenter: Kaj Johansen, MD, PhD, FACS
Swedish Medical Center

4:00 – 4:30pm

Resident Debate: Surveillance and Prophylactic Repair Of Dialysis Access is Appropriate and Cost Effective

For the motion: Owen Young, MD, Virginia Mason Medical Center vs.
Against the motion: Josh Smith, MD, Madigan Army Medical Center

4:30pm

Rapid Fire, Case Presentations & Technical Tips

MODERATORS: Nam T. Tran, MD, Middle Councilor, Associate Professor Surgery
UW Medicine & Brian Ferris, MD, Middle Councilor, Vascular Surgeon Lake
Washington Vascular

18) 4:30 – 4:35pm

EVAR: The Gift That Keeps on Giving

Presenter: James C. Watson, MD, Clinical Instructor
Pacific Northwest Vascular Society President
UW Medicine & Surgeon Swedish Heart & Vascular Institute

19) 4:35 – 4:40pm

Transthoracic Hybrid Repair of a Complex Sacular Thoracic Arch Aneurysm by Vessel Reconstruction and Tevar

D Pierce MD, D Neuzil MD, M Cecchini MD, G Lisse MD MPH
Presenter: Damon Pierce, MD
Virginia Mason Medical Center

20) 4:40 – 4:45pm

Hybrid Treatment Of Mycotic Aortic Arch Aneurysm, A Case Report

H Hajari, MD
Presenter: Homayon Hajari, MD
Northwest Permanente PC Vascular and Endovascular Surgery
Kaiser Sunnyside Medical Center

21) 4:45 - 4:50pm

Endovascular Therapy For AneuRx Graft Migration

Presenter: SL Tan MD PhD

Swedish Medical Center, Vascular & Surgical Care Northwest

22) 4:50 - 4:55pm

Giant Symptomatic Right Subclavian Artery Aneurysm

GA Wallace MD, NT Tran MD

Presenter: Gabriel Wallace, MD

Harborview Medical Center, University of Washington

23) 4:55 - 5:00pm

Endovascular Repair of Bilateral Iliac Artery Aneurysms with a Trifurcated Endograft

KR Kniery MD, FG Vladimir MD

Presenter: Kevin Kniery, MD

Madigan Army Medical Center

24) 5:00 - 5:05pm

Laparoscopic Management of Median Arcuate Ligament Syndrome: Case Report

V Gunn MD, K Baxter BSc MSc MD FRCSC

Presenter: Virginia Gunn, MD, MHSc

University of British Columbia

25) 5:05 - 5:10pm

Compression of the Superior Mesenteric Artery by the Median Arcuate Ligament: A Unique Cause of Chronic Mesenteric Ischemia

P Kreishman MD, Q Hatch MD, C Andersen MD

Presenter: Peter Kreishman, MD

Madigan Army Medical Center

26) 5:10 – 5:15pm

Greater Saphenous Vein Aneurysms: A Rare Cause of Groin Swelling and Pulmonary Embolism*

JD Crawford MD, JP Jundt MD, MI Foley MD, CC Huang MD, MF Barnatan MD, AD Nicoloff MD

Presenter: Judah Gold-Markel, PA-C
Legacy Health System

27) 5:15 – 5:20pm

Cystic Adventitial Disease of the Common Femoral Vein with Profunda Femoris Vein Reconstruction*

E Nearing MD, D Neuzil MD, D Pierce MD, E Raker MD

Presenter: Emmanuel E. Nearing, II, MD
Virginia Mason Medical Center

5:20 – 5:40pm

Panel Discussion

5:45 – 7:30pm

Closing Reception



Abstracts

#1. HYBRID REPAIR OF THE AORTIC ARCH

C Burke MD, MP Sweet MD, BW Starnes MD, GS Aldea MD, JD Pal MD

Presenter: Matthew Sweet, MD

University of Washington
Seattle, Washington

BACKGROUND: The surgical treatment of aortic arch pathology remains a formidable challenge. Mortality rates of traditional open repair have been reported as high as 10% in some series. Endovascular treatment of abdominal and descending thoracic aortic pathology is well described, with results equaling, and exceeding in some cases, open repair. This has led some to attempt to translate these endovascular technologies to the aortic arch. These techniques range from “hybrid” repairs to total endovascular treatment.

OBJECTIVES: We reviewed our series of patients that have been treated for aortic arch pathology with a hybrid repair, namely an open debranching procedure followed by endovascular stenting in the arch with Zone 1 or Zone 0 landing zones. From May 2008 to June 2014, we treated a total of 10 patients in this fashion. All patients were deemed poor candidates for open repair, one was symptomatic and one was ruptured. Seven patients had primary aneurysms of the aortic arch and 3 patients had previously had an ascending aortic replacement for type A dissection and had developed aneurysmal degeneration of their arch.

RESULTS: Technical success was achieved in 9 out of 10 patients. Two patients had concomitant CABG procedures. Eight of 10 patients survived to hospital discharge. Two patients died in the peri-operative period. One patient with a ruptured aneurysm died on the OR table. One patient died on POD 1 due to MI. Five patients were discharged home following their procedure, with 3 patients requiring skilled nursing facility admission. One patient died 3 months post-operatively after a complicated and prolonged recovery. There was one stroke observed in the study period. One patient developed spinal cord ischemia and a transient neurologic deficit, but ultimately fully recovered. There were two myocardial infarctions noted in the study period, one of which was fatal. One patient developed a type 1A endoleak that is without option for re-intervention. His aneurysm has remained stable. One patient was lost to follow-up during the study period. Treatment success, defined as aneurysm exclusion and return to pre-op functional status, was achieved in 7 out of 10 patients.

CONCLUSION: Our results represent a “real world” single center experience using hybrid technologies to treat aortic arch pathology in patients deemed prohibitive risk for open repair. These data indicate that technical success can be achieved using these techniques. Intermediate-term data indicate these patients can survive several years with hybrid repair. However, there is still significant morbidity associated with these challenging patients. Devices and surgical techniques will continue to require refinement in order to optimize results in these difficult clinical scenarios.

#2. CAROTID DUPLEX PEAK SYSTOLIC VELOCITY DOES NOT PREDICT INTRAPLAQUE HEMORRHAGE

AL Rodriguez MD, TS Hatsukami MD, E Eugenio, GL Tang MD

Presenter: AL Rodriguez, MD

University of Washington

Seattle, Washington

BACKGROUND: Intraplaque hemorrhage (IPH) and fibrous cap rupture (FCR), as identified by carotid magnetic resonance imaging, are associated with an increased risk of ischemic neurologic events. However, obtaining an MRI on all patients is not cost effective. Flow modeling studies suggest that high peak systolic velocity (PSV) may be associated with the development of IPH and possibly cap thinning. Our objective was to determine if PSV measured on carotid duplex can identify patients who are high risk for IPH or FCR and would therefore benefit from further imaging with MRI.

METHODS: This was a retrospective study of 67 subjects who had a carotid duplex within 6 months of carotid MRI at our institution between 1995 and 2004. We collected data on PSV from the carotid duplex, as well as the NASCET degree of stenosis, minimum lumen area, presence of IPH or FCR from carotid MRI.

RESULTS: We found no correlation between PSV and the presence of either IPH or FCR. There was a statistically significant correlation between PSV and minimum lumen area ($p=0.013$, coefficient of variable -0.14) as well as between NASCET stenosis and minimum lumen area ($p=0.0004$, coefficient of variable -0.22).

CONCLUSION: This data suggest that carotid duplex velocities may not be a good screening tool to identify patients who would benefit from further imaging with MRI. It also confirms that PSV from carotid duplex and NASCET stenosis as measured by MRI correlate with minimum lumen area.

#3. NATURAL HISTORY OF INDETERMINATE BLUNT CEREBRAL VASCULAR INJURY

JD Crawford MD, KM Allan BS, K Patel, AF Azarbal MD, TK Liem MD, EL Mitchell MD, GL Moneta MD, GJ Landry MD

Presenter: Kevin Allen, BS, Medical Student
Oregon Health and Sciences University
Portland, Oregon

BACKGROUND: Blunt cerebrovascular injury (BCVI) is rare but potentially devastating with a stroke rate of 10-59% and disproportionately affects young adults. The severity of injury is well-defined by the Denver classification. However, despite a robust classification scheme there remains a large cohort of patients presenting with indeterminate findings on initial imaging of unknown significance. We reviewed our recent experience with indeterminate BCVIs (iBCVI) to study the outcomes of this patient cohort.

METHODS: A retrospective review using CPT and ICD-9 codes and a prospective trauma registry database were used to identify patients with BCVI at our institution between 2005-2014. Injuries secondary to penetrating trauma, iatrogenic injury or extension of aortic dissection were excluded. BCVIs with a distinct grade of injury on initial imaging as defined by the Denver criteria were also excluded. Any patient with iBCVI by initial imaging was included. Primary outcomes were freedom from stroke or transient ischemic attack (CVA/TIA), rate of resolution and overall survival.

RESULTS: We identified 67 patients with 98 BCVIs. Indeterminate imaging findings were present in 44 arteries in 36 patients. The carotid artery was involved in 47% and vertebral 53% of cases. Mean injury severity score (ISS) and Glasgow coma scale (GCS) for patients was 25.9 and 10.4. Initial imaging was by CTA in 93% of cases. Sixty-four percent of injuries were followed with subsequent imaging using CTA (41%), duplex (27%) and angiography (20%). On follow-up imaging 86% of iBCVI resolved or were unchanged and 14% worsened. Medical therapy with therapeutic anticoagulation or an antiplatelet was instituted in 77% of injuries. Twenty percent of patients received no medical therapy due to contraindications. One patient was treated with carotid artery coiling for worsening dissection. No open surgical interventions were performed. Overall rate of CVA/TAI events was 6.8% all occurring in patients with carotid injury. Overall survival was improved in patients with vertebral compared to carotid injuries (NS). There was no difference in overall survival in treatment with dual medical therapy compared to antiplatelet therapy alone. Overall and 30-day mortality was 20% and 11%, respectively. Median length of clinical follow-up was 99 days.

CONCLUSION: The Denver classification for BCVI is well-validated, however many patients fall outside of this scheme due to indeterminate imaging characteristics. This is the first study to evaluate outcomes and natural history of iBCVI, a common clinical conundrum. These findings demonstrate a majority of iBCVI will remain unchanged or resolve when followed and that the frequency of CVA/TIA is low but more common with carotid injuries. Lastly, treatment with dual medical therapy compared to antiplatelets alone has no apparent mortality or neurologic benefit.

#4. A HYBRID APPROACH TO THE TREATMENT OF A HEAD AND NECK VENOUS MALFORMATION

AL Rodriguez MD, MH Meissner MD

Presenter: April Rodriguez, MD

University of Washington

Seattle, Washington

BACKGROUND: Venous malformations are the most common of all vascular anomalies and treatment is variable depending on location and extent of the malformation. Endovascular treatment using coils, glue or sclerosants has been used as well as open surgical excision.

METHODS: To describe a hybrid approach to repair of a large head and neck venous malformation, for which endovascular access, glue embolization and surgical resection was utilized.

RESULTS: A 45-year-old female with an extensive head and neck venous malformation presented for repeat treatment. In the past she had undergone five rounds of ultrasound guided sclerotherapy due to discomfort from swelling with activity. During her last treatment she was found to have a communication between a venous channel and her left internal jugular vein. At that time the decision was made to undergo a hybrid procedure using glue embolization followed by excision. The patient underwent balloon occlusion of the left internal jugular vein followed by glue embolization of the venous malformation in her neck. The venous malformation was then excised surgically. There were no complications throughout the case and the patient went home the same day.

CONCLUSION: Venous malformations can be successfully treated using a hybrid approach in which endovascular techniques are utilized as well as open surgical resection. Depending on anatomy, location and symptoms this may be the preferred method to addressing certain venous anomalies.

#5. EXTENSIVE LARGE VESSEL CALCIFICATION IN THE SETTING OF PRESUMPTIVE TAKAYASU ARTERITIS

BT Garland MD, N Singh MD, BW Starnes MD

Presenter: BT Garland, MD

University of Washington

Seattle, Washington

BACKGROUND: Takayasu arteritis is a large vessel vasculitis that often results in pulselessness due to fibrotic stenoses. Calcification in the absence of renal failure or hyperparathyroidism is rare in this setting, but has been attributed to disorders in calcium trafficking in a chronic inflammatory state. We report an unusual case of rapidly progressive aortic calcification in the setting of presumptive Takayasu arteritis.

CASE REPORT: A twenty five year old woman presents with bilateral lower extremity claudication. After extensive medical work-up, she was managed expectantly for the clinical diagnosis of burned-out Takayasu arteritis with negative serum markers. Four years later she underwent angioplasty and bilateral iliac stenting for disabling claudication, but by the age of thirty-three her symptoms returned, now with renovascular hypertension. CT angiogram showed extensive coral-reef aortic calcification, and DEXA scan revealed severe osteopenia. Surprisingly, there was no evidence of primary hyperparathyroidism or renal dysfunction and all rheumatologic serologies were negative for active disease. She was treated with aspirin and lisinopril, but despite continued negative rheumatologic markers, her paravisceral aortic calcification progressed and she developed symptoms of mesenteric ischemia. Aortic pressure gradient across the paravisceral calcification was measured at greater than 100mmHg. As medical therapy had proven ineffective, she underwent multidisciplinary review and was offered surgical intervention due to her rapidly progressive disease. She underwent descending thoracic aorto-bi-iliac with SMA and bilateral renal artery bypass. Antegrade perfusion was maintained throughout the operation, shunting from the descending thoracic aorta to the visceral vessels. She tolerated the procedure well and recovered with ankle-brachial indices greater than one and no further symptoms.

CONCLUSIONS: Extensive calcification in the setting of large vessel vasculitis is rare and only described in single case reports. Progressive disease without evidence for active inflammation suggests other mechanisms, such as a disorder of calcium trafficking. While surgical bypass is an effective treatment for extensive aortic calcification, further research into mechanisms of mineral metabolism in the setting of chronic inflammation may lead to adjunctive medical therapy for this highly morbid and rapidly progressive disease.

#6. INFLUENCE OF GENDER ON ABDOMINAL AORTIC ANEURYSM REPAIR IN THE COMMUNITY

D Nevidomskyte MD, S Shalhub MD MPH, N Singh MD, E Farokhi MD, N Tran MD, MH Meissner MD

Presenter: D Nevidomskyte, MD

University of Washington

Seattle, Washington

BACKGROUND: Women have been shown to experience inferior outcomes following intact and ruptured abdominal aortic aneurysm (AAA) treatment in endovascular (EVAR) and open surgical repair (OSR) groups. The goal of our study was to compare gender-specific presentation, management and early outcomes after AAA repair using a statewide registry.

METHOD: We utilized the Washington State Surgical Care and Outcomes Assessment Program (VI-SCOAP) registry data collected in 19 hospitals from July 2010 to September 2013. Demographics, presentation, procedural data and outcomes between men and women undergoing elective and emergent AAA repair were analyzed. Comparisons were made using Pearson χ^2 test for categorical variables and Student t-test for continuous variables with P value $<.05$ considered to be statistically significant.

RESULTS: We identified 1231 patients (19.6% women) who underwent repair of an intact ($n = 1064$, 86.4%) or ruptured AAA ($n = 167$, 13.6%) over a 3-year period. 972 (79%) had EVAR and 259 (21%) had OSR. Men and women were of equivalent age (73.1 vs 73.4, $p = .59$) and there were no differences in comorbidities or AAA family history. Women had smaller aneurysm diameters (6.2 \pm 1.8 vs 5.8 \pm 1.1 cm, $p < .01$) at the time of presentation and men had slightly higher incidence of rupture at larger aneurysm size. Men were more likely to undergo EVAR, with the difference originating from elective treatment category (82.1% vs 74.1%, $p=.01$). Overall, women had higher 30-day mortality (6.6% vs 3.5%, $p=.03$) and significantly higher mortality rates in elective EVAR (3.1% vs 0.6%, $p=.01$), but not ruptured or elective OSR groups. Following elective EVAR women were less likely to be discharged to home after longer hospital stays (3 days vs 2 days, $p<.01$).

CONCLUSION: Despite presentation at a similar age, with a smaller aneurysm diameter, and lower incidence of rupture, women experience substantially worse hospital outcomes driven by elective endovascular procedures. In addition, utilization of endovascular techniques in women still remains lower compared to men. Improvement of elective outcomes in women will likely depend on technical advancements in repair techniques and management strategies that may differ between genders.

#7. PREOPERATIVE RISK SCORE FOR THE PREDICTION OF MORTALITY FOLLOWING REPAIR OF RUPTURED ABDOMINAL AORTIC ANEURYSMS

BT Garland MD, P Danaher PhD, NT Tran MD, E Quiroga MD, N Singh MD, BW Starnes MD

Presenter: BT Garland, MD

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BACKGROUND: Scoring systems for predicting mortality in patients with ruptured abdominal aortic aneurysms (rAAA) have been derived and validated only for open repair. Many of these scores include intraoperative variables such as use of a suprarenal aortic cross clamp which limits their utility in preoperative planning as well as patient and family counseling. The purpose of this study was to develop and validate a practical mortality risk score using preoperative variables for patients with rAAA for both open (rOR) and endovascular repair (rEVAR), and compare it to other previously published scoring criteria.

METHODS: Data on all patients with rAAA presenting to our institution between Jan 1, 2002 and Oct 31, 2013 were collected. Linear discriminate analysis was used to train and test multiple predictive algorithms consisting of preoperative patient variables. Integer points were derived from the odds ratio for mortality (OR) based on each independent predictor of mortality from which we derived the preoperative rAAA mortality risk score. Comparison was made to other predictive models by calculating the area under the receiver operating characteristic curves.

RESULTS: 303 patients presented during the study period. Fifteen patients died either in the ED, en route to surgery, or after choosing comfort care. Overall 30-day mortality for patients undergoing rOR was 54% and those undergoing rEVAR 22%. Preoperative variables most predictive of mortality were preoperative SBP <70mmHg (OR 2.7, p<.05), pH <7.2 (OR 2.6, p<.05), age <76 (OR 2.1, p<.05) and creatinine >2 (OR 3.7, p<.05). Patient stratification according to the preoperative rAAA mortality risk score (range, 0-4) accurately predicted mortality and identified those at low and high risk for death. While the VSGNE score, Glasgow aneurysm score and Edinburg score were validated in our contemporary dataset for both open and endovascular repair, our preoperative risk score was most predictive with AUC of 0.67.

CONCLUSIONS: Existing scoring systems predict mortality after rAAA repair in our cohort but rely on intraoperative variables. Our rAAA mortality risk score is based on four variables readily assessed preoperatively, allows accurate prediction of in-hospital mortality after repair of rAAAs in the EVAR-first era and does so more accurately than those previously described.

#8. THE INCIDENCE OF ISCHEMIC COLITIS AFTER REPAIR OF RUPTURED ABDOMINAL ANEURYSMS IS DECREASING IN THE ENDOVASCULAR ERA

SK Desikan MD, N Singh MD, SR Steele, N Tran MD, E Quiroga MD, BT Garland MD, BW Starnes MD

Presenter: SK Desikan, MD

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OBJECTIVE: Ischemic colitis (IC) is a well-described complication of ruptured abdominal aortic aneurysms (rAAA). The purpose of this study was to compare the incidence of IC in patients with rAAA undergoing open (OR) vs. endovascular aneurysm repair (EVAR) at a single institution. In addition, we analyzed incidence of ischemic colitis pre- and post-implementation of a formal rupture AAA protocol.

METHODS: A retrospective analysis of prospectively collected data on all patients presenting with rAAA to our institution between Jan 2002 and Oct 2013 was performed. Variables were analyzed for association with IC. Comparisons were made using Pearson's chi-squared test for categorical variables, Student t-test for continuous variables, and logistic regression for multivariate analysis. Significance was set at $p < 0.05$.

RESULTS: 303 patients with rAAA presented over the 10 year study period. 191 patients underwent open repair and 89 patients underwent endovascular repair. 23 patients died either in the emergency department, en route to the operating room, or after choosing comfort care. Predictive factors of IC included EBL, corresponding need for resuscitation, and duration of procedure. Of the patients undergoing open repair, the rate of ischemic colitis was 21% (40/191). This was significantly higher than patients who underwent EVAR, 6.7% (6/89), $p=0.000$. Type of intervention did not influence 30 day mortality in patients with IC. However, only 17% (1/6) of patients who had IC following EVAR required colectomy vs. 48% (19/40) of patients with IC following OR ($p=0.21$). Implementation of our formal REVAR protocol decreased the incidence of IC significantly from 37.1% (36/97) to 6.4% (10/157), $p=0.000$.

CONCLUSIONS: Incidence of ischemic colitis has decreased significantly in the endovascular era, but continues to portend a poor prognosis. Implementation of a formal, multidisciplinary REVAR protocol decreases the incidence of IC.

#9. BLUNT ABDOMINAL AORTIC INJURY: A MULTICENTER STUDY

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Presenter: Sherene Shalhub, MD
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BACKGROUND: Blunt Abdominal Aortic Injury (BAAI) is a rare injury. The objective of the current study was to examine the presentation and management of BAAI at a multi-intuitional level.

METHODS: The Western Trauma Association Multi-Center Trials conducted a study of BAAI from 1996 to 2011. Data collected included demographics, injury mechanism, associated injuries, interventions, and complications.

RESULTS: Of 392,315 blunt trauma patients, 113 (0.03%) presented with BAAI at 12 major trauma centers (67% male, median age 38 years old, range 6-88, median ISS 34, range 16-75). The leading cause of injury was motor vehicle collisions (60%). Hypotension was documented in 47% of the cases. The most commonly associated injuries were spine fractures (44%), and pneumothorax/hemothorax (42%). Solid organ, small and large bowel injuries occurred in 38%, 35%, and 28% respectively. BAAI presented as free aortic rupture (32%), pseudoaneurysm (16%), and injuries without aortic external contour abnormality on computed tomography (CT) such as large intimal flaps (34%) or intimal tears (18%). Open and endovascular repairs were undertaken as first choice therapy in 43% and 15% of cases respectively. Choice of management varied by type of BAAI: 89% of intimal tears managed non-operatively and 96% of aortic ruptures treated with open repair. Overall mortality was 39%, the majority (68%) occurring in the first 24 hours due to hemorrhage or cardiac arrest. The highest mortality was associated with zone II aortic ruptures (92%). Follow up was documented in 38% live discharges.

CONCLUSION: This is the largest BAAI series reported to date. BAAI presents as a spectrum of injury ranging from minimal aortic injury to aortic rupture. Non-operative management is successful in uncomplicated cases without external aortic contour abnormality on CT. Highest mortality occurred in free aortic ruptures, suggesting that alternative measures of early non-compressible torso hemorrhage control are warranted. Level of Evidence and study type: Level IV, Multicenter retrospective review.

#10. DETERMINING THE TOE-BRACHIAL INDEX IN YOUNG HEALTHY ADULTS

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Presenter: Rollin Yu, MD

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BACKGROUND: Despite growing interest in utilizing the toe-brachial index (TBI) for clinical assessment of patients, there has not been any published study on the normal TBI in young, healthy individuals to determine a reference range. The purpose of this study was to determine the TBI in healthy young adults and compare the measured value with the currently accepted clinical value.

METHODS: Medical Students from the undergraduate class were prospectively recruited. Physical measurements (height, weight), health behaviors (physical activity quantity and type, smoking status, alcohol consumption), and medical history (medications, relevant diagnoses, family history) were collected. Bilateral brachial, toe and ankle blood pressures (using both dorsalis pedis and posterior tibial arteries) were measured. TBI was calculated as the mean toe blood pressure divided by the highest systolic brachial blood pressure.

RESULTS: 40 medical students with a mean age of 24.7 \pm 2.1 years without any comorbid conditions were studied. There were no current or past smokers. Participants maintained relatively healthy lifestyles (hours of activity per week: 5.1 \pm 3.3; BMI: 21.7 \pm 2.4). Caffeine and alcohol consumption was modest (10.6 \pm 8.5 and 1.8 \pm 2.7 drinks per week respectively). The mean systolic brachial blood pressure was 121 \pm 9 mmHg (right), and 116 \pm 9 mmHg (left). The TBI was 0.95 \pm 0.11 (right) and 0.97 \pm 0.13 (left) for males, and 0.86 \pm 0.13 (right) and 0.86 \pm 0.20 (left) for females.

CONCLUSION: The distribution of TBI in this healthy population differs significantly from the referenced normal range of 0.6-1.0. Our findings suggest that the accepted value of 0.6 for the low-normal limit is too low; this level may promote underdiagnosis of peripheral vascular disease, and represent foregone opportunities for early intervention. We recommend that the TBI reference range be modified to increase the clinical utility of this measurement.

#11. INCREASED RATES OF LOWER EXTREMITY REVASCLARIZATION MAY NOT LOWER AMPUTATION RATES

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R McLafferty MD, GL Moneta, MD

Presenter: Sheena Harris, MD

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INTRODUCTION: A recent Medicare database study of nearly 100,000 patients undergoing major lower extremity amputations (MLEA) for peripheral arterial disease (PAD) demonstrated that increased regional rates of lower extremity revascularization (LER) are associated with lower rates of MLEA. However, it is unclear whether this data represents underutilization of LER in certain regions or differences in patient factors that limit LER options.

METHODS: The medical records of all patients undergoing MLEA for PAD between 8/1/2011-11/1/2013 at our institution were reviewed. Patient demographic data, initial presentation, vascular supply, imaging, and subsequent surgical/endovascular interventions were assessed. The reason for limb-salvage failure was assessed in each case.

RESULTS: 82 patients underwent 95 MLEA over a 27 month period. 18 (19%) patients underwent surgical or endovascular LER without subsequent wound healing and progressed to amputation. 25 (26%) patients presented with non-salvageable infection or tissue loss, predominantly due to diabetic foot infections, and were not candidates for LER. 26 (27%) patients presented with critical limb ischemia (25 tissue loss, 1 rest pain) and did not have LER options, almost exclusively due to lack of a distal target vessel. 17 (18%) patients were non-ambulatory and underwent primary amputation. 4(4%) patients underwent amputation for non-healing wounds/minor amputations without angiographic evaluation of LER options and 5 (5%) patients chose primary amputation over LER.

CONCLUSION: At 19%, the rate of LER prior to MLEA at our institution is lower than most regions identified in a large Medicare database study. More aggressive revascularization would be unlikely to significantly lower the rates of MLEA in our population. Lower rates of LER prior to MLEA in our population reflect a high proportion of patients presenting with non-salvageable tissue loss and non-reconstructable PAD, for whom LER is not an option.

#12. AORTOBIFEMORAL GRAFT INFECTION: IS UNILATERAL LIMB EXCISION DEFINITIVE?

J Crawford MD, AF Azarbal MD, TK Liem MD, GJ Landry MD, GL Moneta MD, EL Mitchell MD

Presenter: Jeffrey D. Crawford, MD
Oregon Health and Sciences University
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BACKGROUND: Aortic graft infections are rare occurring in 0.2-5% of open aortic reconstructive cases and even less frequently in endovascular aortic interventions. Graft infections can result in thrombosis, pseudoaneurysm, rupture, aortoenteric fistula or sepsis. An infected aortobifemoral (ABF) graft often presents with only one infected limb. Consequently, unilateral excision of the infected limb may be performed leaving the aortic body and contralateral limb prosthetic in place. There is no consensus regarding the appropriate management of patients with a single infected ABF limb. This study aims to study outcomes of a modern cohort of patients undergoing unilateral limb excision for infected ABF.

METHODS: A retrospective review using CPT and ICD-9 codes was used to identify patients treated at our institution with unilateral limb excision for infected ABF from 2001-July 2014. Patients with endovascular grafts were excluded. Primary outcomes were freedom from contralateral ABF limb excision and overall survival. Secondary outcomes were length of stay and post-operative complications.

RESULTS: We identified 15 patients treated for infected ABF with unilateral graft excision. Indications for ABF were aortoiliac occlusive disease in 11 and aneurysm in 4 patients. The original operation was performed at an outside facility in 9 patients. Median time from ABF to infected ABF limb was 71.6 months. Excision of the infected limb and revascularization was performed in all cases (femoral-femoral bypass in 10, interposition graft in 3 and axillary-femoral bypass 2 patients). Reconstruction involved femoral vein in 8 patients, cryopreserved femoral vein in 1, reversed saphenous vein in 1, PTFE in 3 and Gore-Tex in 2 patients. Seven patients had a myofascial flap groin closure. Staphylococcus was the predominate causative organism by intraoperative culture. All patients were discharged on extended antibiotic therapy. Six patients (40%) returned with contralateral limb infection with median time to presentation of 20.2 months. Patients requiring contralateral limb excision had a 30-day mortality of 13% compared to 0% for patients with only unilateral limb infection. Overall mortality for the series was 40% with median length of follow-up of 23.8 months.

CONCLUSION: This is the first study to evaluate outcomes of unilateral limb excision for infected ABF. We demonstrate that unilateral limb infection develops late, unilateral excision is associated with high rate of contralateral limb infection (40%) requiring complete graft excision and associated high mortality. We therefore recommend 1) close surveillance following unilateral limb excision for infected ABF to detect signs of contralateral limb infection 2) consideration of early complete excision of the infected aortic prosthesis in select patients and 3) revascularization with autogenous conduit for the treatment of infected, unilateral ABF.

#13. ALTERNATIVE STRATEGIES TO MANAGE GROIN LYMPHOCELES

EJ Raker MD

Presenter: EJ Raker, MD

Virginia Mason Medical Center

Seattle, Washington

BACKGROUND: Groin lymphoceles remain a vexing problem in open vascular surgery.

METHOD: Retrospective review.

RESULTS: Several methods are available to deal with groin lymphoceles. We describe a talc-based method as well as a method based on myofascial flap.

CONCLUSION: Early intervention provides the best strategy in preventing groin lymphoceles from developing infection, an issue that is especially important when dealing with prosthetic grafts.

#14. SPONTANEOUS PNEUMOTHORAX PRECEDES VASCULAR AND COLON ABNORMALITIES IN VASCULAR EHLERS-DANLOS SYNDROME

D Sanchez BS, S Shalhub MD MPH, AC Cecchi MS, JH Black III MD, NB McDonnell MD PhD, DM Milewicz MD PhD

Presenter: Desiree Sanchez, BS

ABSTRACT: Introduction Vascular Ehlers-Danlos syndrome (vEDS) is a connective tissue disorder that leads to arterial dissection and rupture, and colon and uterine perforation. Spontaneous pneumothorax (PTX) is a minor diagnostic criteria of the syndrome. The aim is to describe the prevalence and temporal relationship of spontaneous pneumothorax (PTX) and/or hemothorax (HTX) in vEDS patients in relation to the presentation of arterial pathology manifestation and colon perforation.

METHODS: Patients with confirmed molecular diagnosis of vEDS were enrolled in a longitudinal multi institutional observational natural history study from 2000 to 2012. Data collected included demographics, clinical and family histories, pulmonary, gastrointestinal and arterial pathology, morbidity, and mortality.

Results: A total of 96 cases (39% males, median age 39 years, range 8-79) were enrolled. PTX/HTX was documented in 16 (16.6%) cases. The PTX/HTX preceded the vascular pathology manifestation and colon perforation in 12 cases (75%) by a mean of 7 years (range 0-26). In the majority of cases the PTX/HTX preceded the diagnosis of vEDS (81%) which was then delayed until arterial pathology or colon perforation occurred (63%).

CONCLUSION: The prevalence of PTX/HTX in the vEDS population is substantially higher than that reported in the general population and in the majority of cases occurs prior to the arterial or colon manifestations of vEDS or diagnosis.. A spontaneous PTX/HTX in a young patient should prompt suspicion for an undiagnosed connective tissue disorder, including vEDS. Early diagnosis of vEDS could potentially lead to improved survival.

#15. OUTCOMES IN THE MANAGEMENT OF RENAL- PELVIC CONGESTION SYNDROME

DP Nathan MD, MH Meissner, MD

Presenter: Derek Nathan, MD

University of Washington

Seattle, Washington

BACKGROUND: Identifying patients with renal-pelvic congestion syndrome who will benefit from surgical or endovascular therapy is difficult.

METHODS: A retrospective study of patients evaluated for renal-pelvic congestion syndrome at a single institution between November 2009 and January 2014 was performed. Patients underwent operative or non-operative management at the discretion of the attending surgeon. Primary outcome was symptom resolution or improvement. Secondary outcomes included procedural morbidity and need for secondary intervention.

RESULTS: Nineteen patients with a mean age of 38.3 +/- 10.4 years were evaluated for renal-pelvic congestion syndrome. Eighteen patients were female with a mean number of 3.5 +/- 2.2 gestations. Four patients had previously undergone procedures for renal-pelvic congestion syndrome, including left common iliac vein stenting (n=2) and left ovarian vein embolization (n=2). Duplex ultrasonography and axial imaging were obtained in all cases. Diagnostic venography was performed in five patients. Four of the 19 patients underwent non-operative management: 3 had clinical symptoms but no radiologic findings, and 1 had no clinical symptoms but had radiologic findings of renal-pelvic congestion syndrome. The fifteen patients who underwent operative management all had left flank pain or chronic pelvic pain, and imaging demonstrating nutcracker syndrome, ovarian vein diameter greater than 6 mm, or pelvic varicosities. Treatment consisted primarily of left ovarian vein embolization and sclerotherapy (n=6), left renal vein transposition (n=4) left ovarian vein transposition (n=1), left common iliac vein stent (n=1), left renal vein stent (n=1), internal iliac vein branch embolization and sclerotherapy (n=1), and sclerotherapy of labial varicosities (n=1). One patient underwent an additional intervention, consisting of stenting of left renal vein transposition, and 4 patients had recurrent symptoms and were recommended further interventions, which are pending, including right ovarian vein embolization (n=2), embolization of pelvic varicosities (n=1), and sclerotherapy of lower extremity varicosities due to pelvic escape points (n=1). There were no procedure-related complications. Ten (66%) of the patients who underwent operative management had improvement or resolution of symptoms.

CONCLUSION: Renal-pelvic congestion syndrome can be a difficult condition to diagnose and treat. In patients with symptoms and imaging findings of renal-pelvic congestion syndrome, various surgical and endovascular therapies can be performed with safety and improvement in symptoms. A not insignificant percentage of patients undergo or will undergo secondary interventions in the management of this syndrome.

#16. SURGICAL REVISION FOR NON-MATURING ARTERIOVENOUS FISTULAS

TK Liem MD, FM Hacker BS, AA Price, AF Azarbal MD, GJ Landry MD, EL Mitchell MD, GL Moneta MD

Presenter: Timothy K. Liem, MD
Oregon Health & Science University
Portland, Oregon

ABSTRACT: Background: Arteriovenous fistulas (AVF) are the preferred access for patients who require hemodialysis. However, some AVFs require additional surgery to augment maturation. This study determined the effectiveness of AVF revision and the clinical characteristics of patients with poorly maturing fistulas.

METHODS: All AVFs performed over a 5-year period (January 2006 - December 2011) were reviewed, classified as radial-cephalic (RC), brachial-cephalic (BC), brachial-basilic transposition (BVT), and brachial-brachial (BB). Technical factors and co-morbidities for AVFs that matured without assistance were compared with fistulas that required revision or were abandoned. Data were evaluated on a per-patient basis (Chi-square and t-test, P-value <.05)

RESULTS: 292 AVFs were created in 250 patients. 134/250 fistulas (53.6%) matured without assistance, within an average of 71 days. Patients with AVFs that matured without revision were more likely to be male (60.6% vs 42.1%, P<.01), have a lower BMI (26.9 vs 29.8, P<.01), and a larger preoperative vein diameter (3.83mm vs 3.42mm, P<.02). The most common cause for abandoning a fistula was thrombosis (62%). 54 of 116 non-matured AVFs were revised (70% RC, 26% BC, 4% BVT). The more common revisions were branch ligation (52%), superficial transposition (31%), and anastomotic revision (30%). 89% required one, 9% two, and 2% required three revisions to achieve maturation. Average time from index AVF creation to maturation in revised patients was 209 days, with 42/54 patients (79.2%) developing a usable fistula, increasing the overall maturation rate to 70.4%.

CONCLUSIONS: In selected patients with poorly maturing fistulas, surgical revision will result in a usable fistula in the majority. However, these interventions are associated with significant delays.

#17. NEUROGENIC THORACIC OUTLET SYNDROME: A MISNOMER!

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BACKGROUND: The term «neurogenic thoracic outlet syndrome» (NTOS) transmits the long-standing conviction that this condition arises as a consequence of dysfunction of the cervical nerve roots and the trunks, cords and branches of the brachial plexus. And the focus on treatment of this condition has historically been directed toward decompressing the nerves of the brachial plexus. I advance the alternative suggestion that, in the main, the upper extremity nerves are normal in patients with neurogenic thoracic outlet syndrome, and that the focus of treatment instead should be directed toward the abnormal scalene muscles which invest those nerves.

METHODS: Review of the results of 1200 primary operations for NTOS carried out over the past 18 years, the first 600 of which focused on first rib resection plus scalenotomy/scalenectomy, and the second 600 of which have focused on total scalenectomy and first rib preservation. In addition, the results of the use of intrascalene local anesthetic or botulinum toxin A, and the literature addressing the issue of whether or not first rib resection is required, are reviewed.

RESULTS: By followup clinical assessment and by QuickDASH score, no difference exists in outcome, patient satisfaction or return to work, whether or not the first rib was removed. Other authors (Chang and Stoney 1991, Sanders 1992) concur. Clearly more favorable outcomes result when the anterior, middle and minimus scalene muscles are removed completely rather than simply incised. Results of scalene muscle inactivation by EMG- or ultrasound-guided local anesthetic injection is a very highly sensitive and specific diagnostic test confirming that NTOS is present. Intrascalene Botox chemodenervation not uncommonly results in complete relief of prior symptoms of NTOS for a period of 3 months. The development of recurrent NTOS symptoms in patients who have previously undergone first rib resection underscores the inadequacy of rib removal alone as a treatment for NTOS. The fact that a positive scalene block with local anesthetic in such patients predicts a favorable outcome with reoperation and brachial plexus neurolysis (Ambrad-Chalela et al, 2004) underscores the primacy of scalene muscle pathology in NTOS.

CONCLUSIONS: Rather than the cause of NTOS, the first rib is actually better considered a victim of the condition. Its removal alone does not suffice as treatment for this condition. Diagnostically and therapeutically, the focus for the proper treatment of NTOS should be on the pathologic scalene muscles. Their complete removal, and appropriate protection of the brachial plexus from postoperative scarring, should suffice in the management of the vast majority of patients with NTOS. The condition could more appropriately be named «myogenic thoracic outlet syndrome».

#18. EVAR: THE GIFT THAT KEEPS ON GIVING

Presenter: James C. Watson, MD
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BACKGROUND: Elective Endovascular Aortic Repair (EVAR) has the advantage of lower perioperative morbidity and mortality when compared with open repair. However, this comes with the need for lifelong surveillance, the added risk of late complications and the frequent need for reintervention.

METHODS: We report the case of the fourth EVAR done at Stanford, in 1997, and the subsequent interventions required.

RESULTS: After the index procedure the patient required an early separate placement of a proximal cuff at Stanford as well as four subsequent interventions including open aneurysm repair and additional interventions for component separation and bleeding.

CONCLUSION: Endovascular aortic aneurysm repair has small early morbidity and mortality advantages compared with open repair but when complications occur these advantages can disappear. There is clearly still a role for open aortic aneurysm repair.

#19. TRANSTHORACIC HYBRID REPAIR OF A COMPLEX SACCULAR THORACIC ARCH ANEURYSM BY BRANCH VESSEL RECONSTRUCTION AND TEVAR

D Pierce MD, D Neuzil MD, M Cecchini MD, G Lisse MD MPH

Presenter: Greg Lisse, MD

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ABSTRACT: We performed a repair in a 67-year-old gentleman of a 6 centimeter aortic arch aneurysm using an antegrade TEVAR approach following transthoracic aortic branch vessel reconstruction. Prior to thoracic endografting, we performed a carotid subclavian bypass with ringed PTFE and innominate and left carotid artery bypass with bifurcated Dacron graft placed off of the ascending aorta. A thoracic endograft was then deployed via a 10mm Dacron conduit. Completion arteriogram demonstrated exclusion of the aneurysm and successful patency of our bypass grafts. This represents a unique transthoracic hybrid approach for repair of a complex ascending aortic arch aneurysm.

BACKGROUND: We performed a novel repair of a 6 centimeter ascending fusiform aortic aneurysm using an antegrade TEVAR approach following sternotomy and open debranching. The patient is a 67 year old man who was asymptomatic at presentation with a past medical history significant for hyperlipidemia and hypertension. We began his repair by performing a midline sternotomy with and pericardiotomy, then dissected the left subclavian and common carotid arteries. We then performed an end-to-end anastomosis of a 7mm ring PTFE graft to the subclavian artery followed by an anastomosis to the left common carotid. We then spatulated a 24x12 Dacron graft with a 10mm Dacron conduit. We then semi-cross clamped the ascending aorta and anastomosed our conduit to the left common carotid and innominate artery. We then cannulated the right femoral artery for deployment of a 36mm wide x 20cm long graft onto zone 0 of the thoracic aorta, just proximal to the innominate artery. We then placed a 38 x 15 graft inside of this and landed it right at the proximal innominate origin with the struts just past this but no cloth covering our graft. Completion angiogram demonstrated excellent flow into both vertebral arteries, common carotid arteries, and brain. To our knowledge, this is the first case report of such an operative approach, and importantly demonstrates the technical feasibility of antegrade TEVAR deployment in zone 0 through an intrathoracic graft repair.

#20. HYBRID TREATMENT OF MYCOTIC AORTIC ARCH ANEURYSM - A CASE

H Hajari MD

Presenter: Homayon Hajari, MD

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INTRODUCTION: Primary mycotic aneurysms are uncommon and account for 1-3 % of all thoracic aneurysms. Open surgery with debridement with insitu repair or extra anatomic bypass is considered as the first line therapy for most mycotic aneurysms of the aortic arch reserving Endovascular repair for (2) systemically unwell or unfit patients. In this case report, we describe the hybrid endovascular repair treatment of a primary mycotic aortic arch aneurysm.

CASE REPORT: 67 year old male with long standing chronic lymphocytic leukemia, hypogamaglobinemia and restrictive pericarditis and presented with fever, cough, hoarseness and recurrent bacteremia.

Three months earlier he has presented with a 6 weeks history of night sweats, weight loss, malaise, low back pain and new onset left hip pain. Given the history of malignancy a CT scan was obtained. The CT showed a distal abdominal aortic aneurysm with bilateral CIA aneurysm with fat stranding and peri-vessel inflammation. At that time, blood cultures were positive for strep pneumonia. He was initially treated with intravenous antibiotics and after control of sepsis, he underwent ligation of the infra renal aorta with excision of distal aorta and bilateral common iliac arteries and axillo bifemoral bypass graft. Intraoperative cultures confirmed strep pneumonia as the causative organism. He was then treated with 6 weeks of intravenous ceftriaxone and IVIG. At the time of his infrarenal aortic infection, CT scan demonstrated a small ulcer in the aortic arch, 2.3 cm X 2.1 cm. He then presented with fever, cough, hoarseness and malaise. Blood cultures grew a new bacteria (Moraxella) felt to be pulmonary in origin. CT showed expanding mycotic arch aneurysm 6 cm X 5.4 cm X 6.2 cm. He was deemed to be unfit for open surgery. He was treated with 6 weeks of Meropenem and Vancomycin. After 6 weeks a white cell nuclear scan showed no uptake surrounding the aorta. A repeat CT showed further expansion of the aneurysm 6.8 cm X 7.2 cm X 6.5 cm. He underwent hybrid repair, with arch debranching and endoluminal stent graft repair of the arch and proximal descending aorta. Post-operative course was complicated by multiple bilateral small cerebral infarcts on diffusion MRI. He was discharged on post-operative day 8. Postoperatively he completed 6 weeks of intravenous antibiotics and has continued on lifelong oral antibiotic to cover both organisms plus IVIG. Six months post-operatively, his hoarseness has resolved and he has mild memory loss and mild cognitive impairment with a follow up CT scan that shows near complete resolution of his aortic arch aneurysm.

DISCUSSION: Mycotic aneurysms of the aortic arch are rare and remain a life threatening condition. In patients unfit for open surgery, endovascular repair is reasonable if sepsis can be controlled. Similar anecdotal reports exist in the literature with similar successful medium term results.

#21. ENDOVASCULAR THERAPY FOR ANEURX GRAFT MIGRATION

Presenter: SL Tan, MD, PhD
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BACKGROUND: Migration of AneuRx aortic stent grafts has been well documented. The standard treatment for migration is surgical explantation. We report two cases where unique endovascular methods were used to reverse or prevent further migration in patients who were poor surgical candidates.

METHODS: CASE 1: An AneuRx stent graft migrated upward, partially occluding both renal arteries. The graft was repositioned downward by inserting a guidewire and catheter across the flow divider and gently applying tension. Further upward migration of the stent graft was prevented by placing renal stents into the renal arteries, but leaving the ends of the stents protruding into the aortic lumen.

CASE 2: An AneuRx stent graft migrated 3 cm downward, resulting in a Type I endoleak. Because the neck diameter was 40 mm, no abdominal aortic graft was available to exclude the aneurysm. Instead, a Cook TX2 graft was modified by cutting off the lowest stent segment. Aptus screws were used to affix one end of the TX2 graft to the aorta and the other to the AneuRx stent graft

RESULTS: In both cases, AneuRx migration was successfully treated without surgical explantation of the stent graft. Both patients were followed for at least eighteen months without further observed migration or complications from the procedures.

CONCLUSION: The emergence of new endovascular technologies present opportunities for treating migration of stent grafts while avoiding their explantation.

#22. GIANT SYMPTOMATIC RIGHT SUBCLAVIAN ARTERY ANEURYSM

GA Wallace MD, NT Tran MD
Presenter: Gabriel Wallace, MD
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University of Washington
Seattle, Washington

BACKGROUND: A 67 year old male presented to our institution with progressive right shoulder pain and right hand numbness. His history was notable only for a hypercoagulable disorder with remote DVT, PE, and mesenteric thrombosis for which he was therapeutically anticoagulated with warfarin. Physical examination showed normal perfusion of the right upper extremity with palpable right brachial and radial pulses. Chest xray revealed an asymmetric density in the right lung apex, which led to a CTA of the chest revealing a bilobar aneurysm of the right subclavian arterial aneurysm measuring 6.8 x 4.8 x 5.0cm with atherosclerotic calcifications and containing mural thrombus. Aneurysms of the left subclavian artery, descending aorta, and infrarenal aorta were also appreciated.

METHODS: The patient was evaluated and was not a candidate for endovascular repair due to location of the aneurysm as well as likely localized compression of his brachial plexus and carotid artery. Thus, he underwent open surgical repair with ligation of the aneurysm and arterial bypass using a bifurcated Dacron graft anastomosed to the proximal innominate artery, right common carotid artery, and right axillary artery via midline sternotomy with superolateral extension to the right neck and a separate right infraclavicular incision.

RESULTS: The operation was uncomplicated and the patient discharged to home on postoperative day 5. At 6 weeks post op, his presenting symptoms had resolved and Duplex ultrasonography revealed normal and symmetrical upper extremity segmental systolic pressures and a patent bypass graft with normal velocities in the graft and distal arteries. At 8 months out he continues to do well and remains symptom free.

CONCLUSION: Subclavian arterial aneurysm is a rarely encountered peripheral arterial aneurysm and should be repaired to prevent the complications of embolization, thrombosis and rupture. This can be safely and effectively accomplished with open surgical technique. Patients with peripheral arterial aneurysms should also be evaluated for the concurrent presence of other arterial aneurysms.

#23. ENDOVASCULAR REPAIR OF BILATERAL ILIAC ARTERY ANEURYSMS WITH A TRIFURCATED ENDOGRAFT

KR Kniery MD, FG Vladimir MD
Presenter: Kevin Kniery, MD
Madigan Army Medical Center
Tacoma, Washington

BACKGROUND: One of the foremost challenges with endovascular aortic repair (EVAR) of abdominal aortic aneurysms (AAA) has been unfavorable anatomy of the proximal and distal vessels. Approximately 40% of AAAs are associated with a unilateral iliac aneurysm, and 10% of AAAs have bilateral iliac aneurysms. Traditionally bilateral common iliac aneurysms preclude you from undergoing EVAR and necessitate an open repair. The difficulty arises when a patient has a AAA and bilateral iliac aneurysms and is not an operative candidate, what is the best treatment for them? Can you preserve internal iliac artery (IIA) flow with an endovascular repair? A few small studies have shown it is relatively safe to embolize the bilateral IIA, with a few and relatively minor complications such as buttocks claudication and impotence. Although there are the patients with severe coronary artery disease (CAD) and a poor ejection fraction that are thought to be at higher risk for severe complications such as ischemic colitis and pelvic devascularization. The current options to preserve IIA patency include; unilateral IIA embolization followed by an internal iliac branch graft device, unilateral IIA embolization with a trifurcated graft, relocation of the IIA origin, IIA bypass, bellbottom grafts, and external-to-internal iliac stent grafts with femoro-femoral cross-over.

METHOD: We report a case of a 79-year-old woman who presented with flank pain and hematuria and on CT scan was found to have large bilateral common iliac artery aneurysms (right 5.6cm, left 5.1 cm) along with a AAA (4.1cm). Her medical history was significant for morbid obesity; severe CAD with multiple prior myocardial infarctions with drug eluting stents in place, severe COPD, and a current smoker. She first underwent a right IIA embolization using coils Nester/Tornado four weeks prior. Then a modified Cook main body graft 22x82 was deployed in the left common iliac artery. This was followed by a Viabahn extension graft that was placed into the left internal iliac to preserve flow to the iliac arteries using two 13x50 grafts. A 24x82 Cook graft was then deployed at the level of the aortic aneurysm. A left limb iliac extension was placed using a 24x74 graft. A right limb iliac extension was placed using a 13x107 and 13x56 graft. The left common femoral artery was reconstructed using a bovine pericardium patch.

RESULTS: She did well postoperatively without any sequelae associated with bilateral iliac embolization. On postoperative imaging her aneurysms were excluded while maintaining IIA blood flow and no early evidence of an endoleak.

CONCLUSION: Common iliac aneurysms are classically repaired open, but in patients with severe comorbidities that preclude an open surgery there are safe ways to exclude the aneurysms while preserving the IIA blood flow with an endovascular repair.

#24. LAPROSCOPIC MANAGEMENT OF MEDIAN ARCUATE LIGAMENT SYNDROME: CASE REPORT

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BACKGROUND: Median arcuate ligament syndrome (MALS) describes the symptoms of postprandial pain, weight loss and abdominal bruit that result from compression of the celiac artery or celiac ganglion by the median arcuate ligament. This is a controversial diagnosis, as the pathophysiology, diagnosis and treatment of the syndrome remain unclear. Treatment options include celiac artery decompression, celiac artery revascularization and celiac ganglion resection.

CASE REPORT: We describe a case of successful surgical treatment of MALS in a 19-year-old female. This patient had a 4-year history of recurrent episodes of abdominal pain. Her workup included extensive gastroenterologic evaluation, in addition to genetic testing for cystic fibrosis. CT imaging demonstrated celiac artery compression by the median arcuate ligament. High velocities through her celiac artery was found by Doppler ultrasound, and a celiac artery stenosis with a 26 mm Hg pressure gradient was found on conventional angiogram. With the diagnosis of MALS, the patient underwent laparoscopic release of the median arcuate ligament and a celiac ganglionectomy. The patient had an uneventful recovery and was discharged home on post-operative day 3. She had immediate symptom relief, and continues to be asymptomatic 1 year later.

CONCLUSION: Although results from treatment of MALS are often inconsistent, this report describes a successful case of surgical decompression and serves to review the literature describing the diagnosis and management of MALS.

#25. COMPRESSION OF THE SUPERIOR MESENTERIC ARTERY BY THE MEDIAN ARCULATE LIGAMENT: A UNIQUE CAUSE OF CHRONIC MESENTERIC ISCHEMIA

P Kreishman MD, Q Hatch MD, C Andersen MD

Presenter: Peter Kreishman, MD, Madigan Army Medical Center
Tacoma, Washington

BACKGROUND: Chronic Mesenteric Ischemia is a significant and potentially morbid cause of post-prandial abdominal pain, weight loss, and malnutrition. Most commonly, Chronic Mesenteric Ischemia arises as a result of atherosclerotic disease of the visceral aortic segment and the orifice of the superior mesenteric artery (SMA). We present a unique case of Chronic Mesenteric Ischemia caused by compression of the SMA by the median arcuate ligament.

METHOD: Our patient is a 58-year-old male with hypertension, hyperlipidemia, and a history of smoking who presents with several years of mild postprandial abdominal pain with progression for 3 months prior to presentation. The pain was severe and periumbilical, occurring 30-60 minutes after meals. His symptoms progressed to food fear, and he had lost 8 pounds the month prior to presentation. After unremarkable upper and lower endoscopy, abdominal CT was performed showing occlusion of the celiac trunk, High-grade non-atherosclerotic stenosis of the SMA, and a prominent median arcuate ligament surrounding the celiac axis and compressing the proximal SMA. Mesenteric duplex ultrasound confirmed stenotic velocities in the SMA and celiac trunk with reversal of flow in the common hepatic artery. There was no atherosclerosis in the SMA or visceral aortic segment. The patient was diagnosed with Median Arcuate Ligament Syndrome with compression of the SMA and was taken for laparotomy and median arcuate ligament release. After exposure of the supraceliac aorta the lesser sac was entered through the gastrocolic ligament, and the body of the pancreas was mobilized inferiorly. The median arcuate ligament completely encased the celiac axis and was carefully divided, exposing the origins of the celiac artery and SMA. Intraoperative duplex ultrasound revealed complete decompression of the proximal SMA. The celiac trunk remained stenotic but celiac revascularization was not performed. The patient was discharged to home on postop day #5 after an uneventful hospital course.

RESULTS: The patient's post-prandial abdominal pain resolved completely. CT angiography revealed normal SMA anatomy and persistent high-grade stenosis of the celiac trunk. In the absence of symptoms, we did not pursue celiac stenting.

CONCLUSION: Median Arcuate Ligament Syndrome (MALS) involving the SMA is a rare cause of chronic mesenteric ischemia, causing symptoms more severe than typical MALS. Median arcuate ligament release with selective revascularization is an effective treatment strategy.

#26. GREATER SAPHENOUS VEIN ANEURYSMS: A RARE CASE OF GROIN SWELLING AND PULMONARY EMBOLISM

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Presenter: Jeffery D. Crawford, MD
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Greater saphenous vein aneurysms (GSVA) are a rare clinical entity often misdiagnosed as a lipoma, inguinal lymphadenopathy or inguinal hernia only to be correctly diagnosed at the time of operation. Rarely, an unrecognized GSVA may result in complications such as greater saphenous vein thrombosis, deep vein thrombosis (DVT), pulmonary embolism (PE), or death. We describe the case of a 38 year-old female who initially presented to a referring institution with bilateral groin swelling diagnosed as bilateral hernias. She was taken to the operating room for an elective left inguinal hernia repair with intraoperative diagnosis of greater saphenous vein aneurysm. No intervention was performed, the procedure was aborted and she was discharged home. Fourteen hours later the patient presented to the emergency room in extremis. The diagnosis of PE was made based on history and electrocardiogram findings. She was treated with immediate administration of tissue plasminogen activator, cardiopulmonary resuscitation, and extracorporeal membrane oxygenation (ECMO). Computed tomography angiogram of the chest demonstrated saddle embolus and venous duplex ultrasound diagnosed bilateral GSVA. She was continued on anticoagulation, weaned from ECMO and taken to the operating room for ligation of bilateral GSVA. The patient had a full recovery following the procedure and discharged to home 14 days after admission. This dramatic case presentation and literature review highlight several key concepts relevant to the management of GSVA: 1) GSVA are commonly misdiagnosed until operative exploration; 2) Venous aneurysms, including GSVA below the diaphragm are a significant risk factor for development of DVT and PE. Venous aneurysm should be considered in the differential diagnosis of groin masses and symptoms such as ease of compressibility, unusual location and presence of varicose veins. Duplex ultrasound is the preferred diagnostic modality and once the diagnosis is made we recommend ligation and removal of the saphenous vein aneurysm to minimize risk of DVT and PE.

#27. CYSTIC ADVENTITIAL DISEASE OF THE COMMON FEMORAL VEIN WITH PROFUNDA FEMORIS VEIN RECONSTRUCTION

E Nearing MD, D Neuzil MD, D Pierce MD, E Raker MD

Presenter: Emanuel Nearing II, MD

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Seattle, Washington

BACKGROUND: Cystic adventitial disease (CAD) is a rare and often misdiagnosed pathology of the venous system. There are many reports on arterial CAD: the external iliac, femoral, ulnar, and popliteal arteries among others. The true incidence of venous CAD is unknown due to its rare occurrence and the literature is sparse with only case reports. This commonly leads to misdiagnosis as deep venous thrombosis and misdirected therapies. Several management options have been suggested ranging from percutaneous aspiration to complete surgical resection of the cyst with reconstruction.

METHOD: We report on a case of a 49-year-old male with acute onset cyanosis and swelling of the left lower extremity secondary to a 3 cm cyst causing near complete obstruction of the common femoral vein.

RESULTS: He underwent resection of the common femoral vein cyst with reconstruction using the profunda femoris vein.

CONCLUSION: We believe that surgical resection with reconstruction, as necessary, is the preferred treatment for symptomatic venous CAD. This recommendation is supported by the high recurrence rates of incomplete resection and failure of conservative therapies.

POSTER #1

LOEYS-DIETZ SYNDROME, PREGNANCY AND AORTIC DEGENERATION

JD Crawford MD, MS Slater MD, TK Liem MD, GJ Landry MD, GL Moneta MD, EL Mitchell MD

Presenter: JD Crawford, MD

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ABSTRACT: Loeys-Dietz Syndrome (LDS) is a rare autosomal dominant connective tissue disorder (CTD) caused by heterozygous mutations in the genes encoding transforming growth factor beta receptors (TGFB β) 1 and 2. The syndrome, characterized by vascular, skeletal, craniofacial and cutaneous manifestations, predisposes patients to aggressive and widespread vascular disease including aortic root dilation and arterial dissection. Women with LDS are prone to aortic dissection and uterine rupture during pregnancy and the postpartum period. Additionally, aortic disease is believed more aggressive during pregnancy as a result of estrogen-induced changes in the aortic media. We describe the case of a 29 year-old G2P1 woman at 28 weeks gestation presenting with abdominal pain. Work-up revealed a 7cm ascending aortic aneurysm and a DeBakey type 1 aortic dissection extending to the aortic bifurcation. Surgical management included concomitant Cesarean-section delivery of a live born premature infant, tubal ligation, ascending aortic replacement with reconstruction of the arch vessels and aortic valve replacement. This is the first reported case of aortic dissection with visceral involvement occurring in a patient with both LDS and pregnancy. This case highlights key concepts regarding etiology and management of acute aortic pathology in the setting of pregnancy and/or LDS including: the effects of pregnancy on aortic pathology, management of aortic pathology during pregnancy, diagnostic criteria for LDS and management of aortic pathology in patients with LDS and CTD.

POSTER #2

LISTERIA MONOCYTOGENES INFECTION OF A POPLITEAL ARTERY STENT GRAFT

AS Walker MD, CA Andersen MD, LJ Daab MD

Presenter: Joshua Smith, MD

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ABSTRACT: *Listeria monocytogenes* is a pathogen associated with meningitis in the immunosuppressed patient. The pathogen is usually found in soft cheeses and raw milk. We present a case of an infected popliteal artery stent graft with *Listeria monocytogenes*. The report focuses on the diagnosis and treatment with surgical explantation and vascular reconstruction

POSTER#3

IMPACT OF ADJUNCT DISTAL REVASCULARIZATION DURING COMMON FEMORAL ENDARTERECTOMY

BA Eslahpazir MS BSME, AT Rahman, JD Crawford MD, EL Mitchell MD, AF Azarbal MD, TK Liem MD, GL Moneta MD, GJ Landry MD

Presenter: Benjamin A. Eslahpazir MS

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BACKGROUND: Treatment of peripheral arterial disease (PAD) with common femoral endarterectomy (CFE) in the presence of either inflow or outflow disease, is frequently encountered by the vascular surgeon. Concomitant CFE is often performed as an adjunct to revascularization during a distal bypass, an inflow procedure or as treatment alone. However, there is a paucity of long-term outcome or patency data of the CFE in these various situations. The aim of this study is to evaluate outcomes of the CFE when performed alone versus CFE with distal revascularization (DsR).

METHODS: A retrospective chart review using CPT codes identified 82 patients with 93 limbs treated with CFE alone or CFE+DsR at our institution between January 2005 and June 2014. Primary outcomes were freedom from revascularization, freedom from readmission and overall survival. Secondary outcomes were length of stay, post-operative complications, revisions of CFE segment and symptomatic improvement using the Rutherford-recommended 43 scale system. Categorical data were compared using Chi-Square analysis and continuous variables using one-way ANOVA. Survival analyses were computed using Kaplan-Meier and compared with Mantel-Cox Log Rank test.

RESULTS: Patients were divided into two groups: CFE alone (n=63) v CFE+DsR (n=30). Patients undergoing CFE+DsR had an overall higher Rutherford classification score compared to CFE alone (4.8340.98 v 3.6740.95) and were more likely to present with critical limb ischemia (86.7% v 42.9%). CFE without DsR was associated with superior symptomatic improvement (66.7%) compared to CFE+DsR (37.5%). Freedom from ipsilateral revascularization in the entire lower extremity was significantly improved for the CFE group compared to CFE+DsR (p=0.021). Freedom from readmission was also significantly improved for the CFE group (p=0.014). Length of stay was 7.4 days with CFE alone compared to 13.4 days with CFE+DsR (p<0.001). Similarly, the rate of post-operative complications was 25% in CFE alone versus 45% in CFE+DsR (p=0.028). However, there was no difference in need for revision of the CFE segment in the two groups (X²=0.389, p=0.53). Also, overall survival was not significantly different between the two groups (p=0.53).

CONCLUSION: This is the first study to directly evaluate the CFE segment during CFE alone v CFE+DsR. These findings confirm that patients with poor outflow requiring CFE+DsR have worse outcomes and less symptomatic improvement. However, the CFE segment is equally durable with or without implantation of a distal bypass graft.

POSTER #4

ENDOVASCULAR REPAIR OF CONCURRENT RUPTURED INFECTED THORACIC AND ABDOMINAL AORTIC ANEURYSMS: CASE REPORT

V Gunn MD, J Chen MD

Presenter: Virginia Gunn, MD

University of British Columbia

Vancouver, British Columbia

BACKGROUND: Infected aneurysms are rare, accounting for only 1-3% of all aortic aneurysms. Conventional surgical resection and debridement is associated with a high mortality rate, up to 43%. As such, endovascular management is an attractive alternative. We describe a case of endovascular repair of simultaneously ruptured infected thoracic and abdominal aortic aneurysms.

CASE: An 81-year old male with a 2-month history of recurrent abdominal and back pain was found to have a ruptured descending thoracic aneurysm ending 10 mm from the celiac axis, as well as a ruptured infrarenal abdominal aneurysm starting 13mm from the lowest renal artery. The infrarenal abdominal aneurysm was repaired by a combination of a PTFE-covered stent and aortic cuff endografts. The thoracic aortic aneurysm was treated with a thoracic endograft (30 x 80mm).

CONCLUSION: This case serves to review the literature and demonstrate that endovascular repair of infected aneurysms is a feasible alternative to open repair.

POSTER #5

SUCCESSFUL EMERGENT ENDOVASCULAR REPAIR OF A RUPTURED MYCOTIC THORACIC AORTIC ANEURYSM

RE Heneghan MD, N Singh MD, BW Starnes MD

Presenter: RE Heneghan, MD

University of Washington

Seattle, Washington

BACKGROUND: Surgical treatment of mycotic thoracic and abdominal aneurysms can be challenging and carries a high risk of morbidity and mortality. The surgical principle of debridement, drainage and bypass, either in situ or extra-anatomically have been well described. The complexity of the situation increases dramatically in the face of acute rupture. Endovascular treatment of mycotic aneurysms has been described in the literature and we describe a case of successful endovascular treatment of a ruptured mycotic thoracic aortic aneurysm.

CASE REPORT: We report the case of a 42 year old male intravenous drug user who presented with three weeks of chest pain, dyspnea, and hemoptysis, and on computed tomography (CT) scan was found to have a contained 4.1cm ruptured thoracic aortic arch mycotic appearing aneurysm. His past medical history was significant for hypertension and intravenous drug use. His exam was significant for left lung rhonchi and intact vascular exam. His labs were notable for a leukocytosis of 27,000/microliter, hyponatremia of 126mEq/L, estimated sedimentation rate (ESR) of 98mm/hr, and C-reactive protein level (CRP) of 273.1mg/L. Based on his symptoms, laboratory studies, and CT scan findings, emergent repair was recommended due to likelihood of further rupture and death. Thoracic endovascular aortic repair (TEVAR) was performed utilizing a rifampin-soaked stent-graft without complication via the right groin. The stent-graft was placed just distal to the left common carotid, covering the left subclavian artery to allow for an adequate proximal seal zone. Intravascular ultrasound confirmed complete apposition of the graft proximally and distally along with patency of the left common carotid artery. Intraoperative blood cultures were positive for methicillin resistant staph aureus (MRSA). Postoperatively the patient was noted to have a retained hemothorax and due to the high likelihood of empyema he underwent thoracoscopy with partial decortication for a loculated left hemothorax 2 days later, with pleural cultures also positive for MRSA. He recovered without complication and was discharged on postoperative day 12 on IV meropenem and vancomycin. He was transitioned to oral antibiotics on 6-week follow-up, to be continued indefinitely. At 2-year follow-up, the patient was asymptomatic and CT angiography demonstrated a well-positioned stent-graft without evidence of endoleak and excellent remodeling of the aorta around the stent-graft.

CONCLUSION: Thoracic endovascular aortic repair can be safely employed to treat a ruptured mycotic thoracic aneurysm and not only be a temporizing measure but perhaps a definitive one as well. When open repair is not possible due to patient comorbidity or complex rupture, TEVAR can be attempted to prolong life, especially when faced with imminent death. Long-term follow-up is necessary to survey for endoleak, recurrence or propagation of the aneurysm, and repeat bacterial infections.

POSTER #6

M.E.S.S. (MANGLED EXTREMITY SEVERITY SCORE): TIME FOR A REBOOT?

KH Johansen MD, PhD and ST Hansen Jr. MD

Presenter: Kaj Johansen MD, PhD

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BACKGROUND. In 1990 we published MESS (Mangled Extremity Severity Score), a clinical grading system designed to be determined early in the course of a trauma patient with a severely injured lower extremity. Based on 4 clinical criteria (extent and severity of bony/soft tissue injury, duration and severity of limb ischemia, presence and degree of shock, patient age), MESS was designed, and subsequently validated, to determine whether in such patients limb salvage should be attempted or alternatively that the patient should proceed to immediate primary amputation.

METHODS. Review of 72 papers published in the peer-reviewed medical, surgical or trauma literature (1991-2014) in which MESS is featured or referenced. These papers included trauma experiences in 12 different countries, in urban and rural settings and in both civilian and combat scenarios.

RESULTS. A large majority of papers using the MESS algorithm found it to be highly (or at least satisfactorily) predictive of the success of limb salvage efforts for a MESS value less than or equal to 7 -- as originally indicated in our 1990 J. Trauma paper. A small minority criticized the concept of MESS, the methodology utilized to develop its algorithm or suggested suboptimal outcomes in clinical decision making associated with its use.

Over the past 5 years, this review demonstrates a trend toward an increasing likelihood of successful limb salvage for MESS values >7.

CONCLUSIONS. In our original publication we emphasized that MESS was a clinical decision-making algorithm based on a «snapshot in time» based on urban trauma care in the late 1980s. Particularly in the context of several different theaters of war, trauma care has advanced remarkably in the quarter-century since MESS was published. It seems a certainty that some traumatized lower extremities which clearly needed primary amputation in 1990 warrant a robust effort at limb salvage 25 years later.

Accordingly, we call for a reassessment, through a rigorous prospective assessment, of current validated principles underscoring the decision to attempt limb salvage or alternatively to proceed with primary amputation in contemporary lower extremity, patients.

It's time for MESS 2.0!

POSTER #7

ENDOVASCULAR REPAIR OF A BLUNT, TRAUMATIC AORTIC INJURY IN A PEDIATRIC PATIENT

MS Lallemand MD, T Curry MD

Presenter: MS Lallemand, MD

Madigan Army Medical Center

Tacoma, Washington

BACKGROUND: In the modern era of CT Scanning, blunt traumatic injuries that do not lead to immediate exsanguination, are being detected with increasing frequency. The literature supporting the use of endovascular techniques to repair these injuries, especially in the setting of other intraabdominal injuries, is sparse. The literature of this approach in pediatric patients is almost non-existent.

METHOD: This case-report presents a 14-year-old male who sustained a crush injury to the abdomen after being pinned between two motor vehicles, resulting in a traumatic injury to the aorta, as well as injuries to his small bowel and colon. He presented with ABIs of 0.7 bilaterally. The patient was found to have a large, central, retroperitoneal hematoma, which was not explored operatively. He underwent angiography and a 12mm, adult, peripheral arterial stent was placed across the defect in order to repair the injury

RESULTS: The patient improved and subsequently recovered and is currently doing well. In this case, we found that the use of an endovascular approach to repair traumatic aortic injuries was safe and effective. This was complicated by the patient's young age and growth potential, and the fact that stents designed for this age group are virtually non-existent.

CONCLUSION: An Endovascular approach for repair of traumatic aortic injuries is, in the short-term, safe and feasible, even in the pediatric population. The long-term outcome of this patient, or other patients in this subset is not well understood, particularly as this patient continues to grow and mature. There will need to be further follow up and evaluation in order to determine if this placement effects the growth of his aorta, if there are long term sequelae, or if the stent will need to be retrieved and possibly up-sized as the patient continues to grow and mature.

POSTER #8

FATAL SALMONELLA AORTITIS IN A PATIENT WITH VASCULAR TYPE EHLERS-DANLOS SYNDROME

D Nevidomskyte MD, C Latimer MD, S Shalhub MD MPH, D Reichenback MD, CL Fligner MD, MH Meissner MD
Presenter: D Nevidomskyte, MD
University of Washington
Seattle, Washington

BACKGROUND: Salmonella is the most common cause of infectious aortitis with high mortality rate due to the mycotic aneurysm rupture. The majority of the cases involve sites of pre-existing atherosclerotic aortic disease. A high index of suspicion is necessary for prompt diagnosis.

METHOD: We describe a unique case of fatal Salmonella aortitis leading to acute mycotic aneurysm rupture in a 53-year-old man with vascular Ehlers-Danlos syndrome (vEDS).

RESULTS: The patient was first diagnosed with vascular type EDS at the age of 36 and was followed for multiple vascular complications in the past. Most recently he presented after a trip to India with acute onset abdominal pain and was diagnosed with a new Type B thoracic aortic dissection (TBAD), which was managed medically. Over the next month he developed intermittent low-grade fever, abdominal pain, malaise, and night sweats. Follow up imaging and blood cultures were unremarkable. Due to ongoing symptoms patient was being reevaluated in the emergency room, when he suffered a cardiopulmonary arrest with unsuccessful resuscitation. Post mortem examination revealed a TBAD with acute mycotic aneurysm rupture distal to the left subclavian artery causing massive left hemothorax. Histology demonstrated necrotizing aortitis and gram-negative rods within the aortic wall, and the thrombus of the false lumen. Salmonella Kentucky not endemic to the region was isolated from pericardial fluid. This patient most likely harbored asymptomatic transient Salmonella bacteremia after having a short-lived diarrheal illness while visiting India. Bacterial colonization at the poorly perfused and partially thrombosed proximal portion of the TBAD led to necrotizing inflammation, subsequent aortic wall degeneration and acute mycotic aneurysm rupture.

CONCLUSION: This case exemplifies the ominous combined nature of both vEDS and Salmonella aortitis. Although surgical intervention in cases of infectious aortitis has improved survival and is a treatment of choice, the mortality rate remains high. This patient's underlying vEDS would likely have made him a very high-risk surgical candidate. Endovascular repair is an emerging alternative and might be feasible in select patients.

POSTER #9

EVAR CANDIDACY IMPACTS THIRTY-DAY MORTALITY FOR REVAR BUT NOT FOR OPEN REPAIR OF RUPTURED ABDOMINAL AORTIC ANEURYSMS

BW Starnes MD, BT Garland MD, S Desikan MD, N Tran MD, E Quiroga MD, N Singh, MD

Presenter: Benjamin W. Starnes, MD

University of Washington

Seattle, Washington

OBJECTIVE: Few studies have looked at the impact of anatomic suitability for EVAR as it relates to overall mortality for ruptured AAA (rAAA). We reviewed our experience managing these patients with particular emphasis on imaging and endovascular candidacy as it relates to 30-day mortality.

METHODS: Data on all patients with rAAA presenting between January 1, 2002 and October 31, 2013 were collected. 95,751 images were reviewed by a single physician blinded to outcome or procedure with specific notation made on EVAR candidacy. Data were compared using Pearson Chi-Square Statistic with significance set at $p < 0.05$.

RESULTS: 303 patients with rAAA presented over the study period. Of these, 235 patients had a pre-operative CT scan (78%). 215 had scans that were considered "evaluatable". Fifteen patients died either in the ED, en route to surgery, or after choosing comfort care. Of all 215 patients, 156 (73%) were considered candidates for EVAR (Get Franks Paper here). Mean aneurysm diameter was 82.4mm (range 37-182mm). Mean aortic neck diameter was 26.7mm (range 15-65) and length 17.2 (range 0-105). Table 1 describes 30-day mortality of patients based on procedure and candidacy for EVAR. When comparing all patients who underwent EVAR, EVAR candidates versus non-candidates had a significant survival advantage (77.6% vs 0%), $p = 0.0001$. When comparing all patients who underwent open repair, there was no difference in mortality based on EVAR candidacy (49.2% vs 46.9%), $p = 0.82$.

CONCLUSIONS: Three fourths of patients with rAAA are candidates for EVAR using current devices. Patients with anatomy suitable for EVAR and subsequently undergoing EVAR have a significant survival advantage over those undergoing open repair and over those undergoing EVAR without suitable anatomy. Mortality for ANY open repair is high and does not differ based on EVAR candidacy. Those patients with anatomy unsuitable for EVAR should not undergo an attempt at endovascular repair with standard devices as the result is uniformly fatal at 30 days.

POSTER #10

OPERATING OUTSIDE OF THE COMFORT ZONE. A YOUNG WOMEN WITH A PROGRESSIVE, UNKNOWN COLLAGEN-VASCULAR DISORDER

BW VanderWel MD, SC Nicholls MD, TS Tan PhD

Presenter: Brandon VanderWel, MD

Swedish Medical Center

Seattle, Washington

ABSTRACT: We are presenting a patient who has required complex and unconventional vascular surgery management. Ms. D was a previously healthy female who presented at the age of 34 with a thoracic aortic aneurysm. Her family history is positive for her mother dying of aortic aneurysm rupture at 47 years old and a grandmother dying of sudden cause in her 4th decade. Exhaustive testing has only indicated that she has an unknown collagen-vascular disorder.

Age 34: Presented with an ascending aortic aneurysm requiring repair and suspension of aortic valve. Shortly after, the repair failed and she required a root replacement with porcine aortic valve replacement and reimplantation of coronary vessels.

Age 38: She underwent descending aortic repair from the upper descending thoracic aorta to the distal abdominal aorta with reimplantation of the celiac trunk, SMA, and renal arteries via Carrel patch. All the repairs were patent except the right renal artery. CTA at that time noted dissection of the great vessels and bilateral iliac arteries.

Age 44: Routine survey found the aorta to have grown to 5.6 cm, and underwent an arch replacement and elephant trunk procedure. She was lost to follow up before her thoracoabdominal aneurysm could be repaired.

Age 45: Presented one year later in renal failure and respiratory failure requiring intubation, and was found to have aneurysmal dilation of the Carrel patch obstructing the solitary left kidney. Ureteral stents were placed and her renal and respiratory failure resolved.

Age 47: Presented with abdominal pain and was found to have a colovaginal fistula secondary to diverticulitis and received a sigmoidectomy with colostomy. Three months later she again presented with abdominal pain and was found to have a 9.5 cm thoracic aortic aneurysm and a 6.0 cm abdominal aortic aneurysm at the Carrel patch. Her further management will be described in detail.



Constitution & Bylaws

Bylaws of Pacific Northwest Vascular Society

A Washington Nonprofit Corporation

(Revised 10/19/2012)

ARTICLE I

NAME OF CORPORATION

The name of the corporation shall be the "Pacific Northwest Vascular Society," and it may sometimes be referred to in these Bylaws as the "Corporation."

ARTICLE II

PURPOSES

The purposes for which the Corporation is formed are those set forth in its Articles of Incorporation.

ARTICLE III

PRINCIPAL OFFICE

The principal office of the Corporation shall be the office of the current secretary-treasurer. The Corporation may have such other offices as may, from time to time, be designated by its Board of Directors.

ARTICLE IV

MEMBERSHIP

- A. VOTING RIGHTS. Each active member in good standing shall be entitled to one vote on each matter submitted to a vote of the members.
- B. MEMBERSHIP. Membership shall be limited to physicians having an active practice in vascular disease. Members must meet one of the following requirements
1. Be certified by The American Board of Surgery.
 2. Be a Fellow of The American College of Surgeons, or of the Royal College of Surgeons of Canada.
 3. Hold a Certificate of Added Qualifications in Vascular and Interventional Radiology from the American Board of Radiology (or Canadian equivalent).
 4. Be a member of the Society of Interventional Radiology.

5. Hold a Subspecialty Certificate in Cardiovascular Disease from the American Board of Internal Medicine (or Canadian equivalent).
6. Be a Fellow of the American College of Cardiology or the Society for Vascular Medicine and Biology.

Additionally, members must meet the requirements of one of the four classes of membership set out below.

C. CLASSIFICATION OF MEMBERSHIP. The members of the Corporation shall be divided into the following classes and shall be selected for membership based upon the criteria set out in connection with each class.

1. ACTIVE MEMBERS. All active members shall be physicians fulfilling membership requirements residing in the States of Alaska, Idaho, Washington, Oregon, Hawaii, and Montana, or the provinces of Alberta, British Columbia, and Saskatchewan, Canada.

Active members must fulfill at least one of the following criteria:

- a. Hold a certificate of competence in general vascular surgery, vascular and interventional radiology, or cardiology as recognized in the United States or Canada;
 - b. Previous major contribution to the field of vascular disease;
 - c. Membership in the Society for Vascular Surgery, the International Society for Cardiovascular Surgery, the Society of Interventional Radiology, or the Society for Vascular Medicine and Biology;
 - d. Should a person desiring membership meet none of the above criteria, that person may submit a list a major vascular reconstructions or interventions which have been performed, and which should include, but need not be limited to, at least fifty (50) consecutive major vascular reconstructions or interventions, which list will be reviewed by the Membership Committee of the Corporation and if approved by the Membership Committee, the applicant's name shall be in turn approved by the Board of Directors of the Corporation and the membership, pursuant to Paragraph D. of this Article.
2. ASSOCIATE MEMBERS. Associate membership shall be available to those who do not qualify for active membership, but who have an interest in vascular diseases. Candidates for such membership shall be proposed in writing to the Membership Committee through the Secretary-Treasurer and shall be selected pursuant to Paragraph D. of this Article.

3. SENIOR MEMBERS. Senior membership status shall be granted to active members who have retired from the active practice of medicine who have requested transfer of their membership status to senior status by submission of such request in writing to the Board of Directors. Senior members shall be excused from paying corporate dues.
4. HONORARY MEMBERS. Honorary members shall consist of individuals who have made significant contributions to the discipline of vascular disease or to the Corporation. Candidates for honorary membership shall be proposed in writing to the Membership Committee of the Corporation through the Secretary-Treasurer and shall be approved by the Board of Directors and the general membership pursuant to Paragraph D. of this Article. Honorary members shall be excused from paying corporate dues and shall not be required to meet the minimum annual meeting attendance requirements.
5. FOUNDING MEMBERS. All members joining the Corporation in the 1983 and 1984, shall be additionally classified as founding members.

D. SELECTION OF MEMBERSHIP. Any physician meeting the general membership requirements for membership may submit an application for membership in the Corporation, which shall be available from the Secretary-Treasurer of the Corporation upon request of any member. Completed application forms signed by the individual requesting membership, one sponsor member and two endorser members shall be delivered to the Secretary-Treasurer of the Corporation at least four (4) months prior to the annual meeting, provided however, the signatures of a sponsor member and two endorser members shall not be required on founding members' applications. A non-refundable application fee determined by the Board of Directors shall be assessed each applicant. Applications received by the Secretary-Treasurer shall be reviewed by the Membership Committee of the Corporation which shall recommend acceptance or denial of the applicant's request for membership in the Corporation. The names of all individuals who are recommended for membership by the Membership Committee shall be submitted to a vote of the Board of Directors and, if approved by the Board of Directors, shall in turn be submitted to a vote of the membership at the Corporation's annual meeting, and shall be accepted as members upon receipt of a three-quarters (3/4) affirmative vote of the members present at the annual meeting.

E. CERTIFICATES OF MEMBERSHIP. Certificates or other evidence of membership in the Corporation may be issued. They shall exhibit the member's name, his class of membership, and shall be signed by the President and Secretary-Treasurer of the Board of Directors of the Corporation.

F. STATUS OF MEMBERSHIP. Membership in the Corporation shall be personal, shall not survive the death of any individual member, and may not be transferred by any means. A member may resign at any time by written notice to the Corporation.

A member may be expelled for unprofessional or unethical conduct under the following circumstances. Charges of unprofessional or unethical conduct against any member of the Corporation which challenge that physician's right to continued membership may be submitted by any member to the Board of Directors of the Corporation. Such charges must set forth specific grounds for such unprofessional or unethical conduct and must be in writing. The member whose conduct is being challenged shall be notified of the charge in writing and shall be provided with an opportunity to reply to the charge. Both the challenge and the member's response shall be submitted to a vote of the Board of Directors who may expel such member by the affirmative vote of two-thirds (2/3) or more of the Directors. The Board of Directors' vote shall be announced at the next annual meeting and may be overruled by a three-fourths (3/4) vote of those members present at the annual meeting.

In the event any active member's dues shall remain unpaid for a period of one (1) year, such member shall be dropped from membership after giving notification to that member at least three (3) months prior to the effective date of lapse of such member's membership.

G. ANNUAL MEETING. The annual meeting of the members shall be held at such time and at such place as shall be determined by the Board of Directors and shall be announced to the membership by written or printed notice stating the place, day and hour of any meeting, which shall be delivered either personally or by mail to the members not less than ten (10) nor more than thirty (30) days prior to the date of such meeting.

The deliberations of the Board of Directors shall be reported by the Secretary-Treasurer to the membership at the annual meeting. The reports of the Nominating Committee and Membership Committee as well as other committees shall also be presented to the membership during the annual meeting.

H. MEMBERSHIP ACTION WITHOUT MEETING. From time to time, other business may be transacted by ballot of the membership tabulated one month from date of mailing, subject to ratification by the full membership at the next annual meeting.

- I. SPECIAL MEETINGS. Special meetings of the membership may be held at such time and at such place as shall be determined by the Board of Directors and shall be announced to the membership by written or printed notice stating the place, day and hour of any meeting which shall be delivered either personally or by mail to the members not less than ten (10) nor more than thirty (30) days prior to the date of such meeting.
- J. QUORUM. The members present at a meeting shall constitute a quorum to transact the business of a meeting of the membership except as otherwise provided in the Articles of Incorporation or these Bylaws.
- K. DUES. Initiation fees, dues and assessments shall be levied by the Board of Directors and approved by the membership at the annual meeting of the Corporation provided, however, honorary members and senior members shall be exempt from the payment of dues.
- L. SCIENTIFIC SESSIONS. Corporation may, from time to time, sponsor scientific meetings, which may be attended by any physician, whether or not such physician is a member of the Corporation.

ARTICLE V

BOARD OF DIRECTORS

- A. GENERAL POWERS. The affairs of the Corporation and its business and property shall be managed by its Board of Directors.
- B. NUMBER AND QUALIFICATION OF BOARD OF DIRECTORS. The number of Board of Directors shall be not less than four (4) nor more than ten (10) and shall consist of the President, the President-Elect, the immediate Past President, the Secretary-Treasurer, and six (6) Directors who shall be elected at large from the membership.
- C. TERM OF OFFICE. The members of the Board of Directors who are members by virtue of their office in the Corporation shall serve a term coincident with their term of office. The members of the Board of Directors who are Directors-at-large shall be elected to three-year terms. Initially, three-at-large members of the Board of Directors shall be elected, one to serve a three-year-term, one to serve a two-year-term, and one to serve a one-year-term. Due consideration shall be given to regional representation in electing such Directors. :

CONSTITUTION & BYLAWS

- D. **REGULAR MEETINGS.** The Board of Directors shall hold an annual meeting at the annual meeting of the membership of the Corporation, which shall be held without any other notice than this Bylaw. The Board of Directors may provide, by resolution, the time and place for holding additional regular meetings without other notice than such resolution. Financial support will be provided for active duty members of American and Canadian Armed Forces. The amount of support will be determined by the Executive Committee.
- E. **SPECIAL MEETINGS.** Special meetings of the Board of Directors may be called at the discretion and pleasure of the President or upon written notice of any two (2) members of the Board of Directors. Such meetings shall be held at the principal office of the Corporation or at such other place as the director or directors calling the meeting of the Board of Directors shall be limited to the purpose or purposes stated in the notice of the meeting provided, however, if all members of the Board of Directors are present, other matters may be taken up by unanimous consent.
- F. **NOTICE.** Notice of all meetings of the Board of Directors, with the exception of the regular annual meeting, shall be given to the Board members and Advisory Board members at least two (2) days before the meeting by written notice delivered either personally or sent by mail or electronic communication to each director at his address as shown on the records of the Corporation. Any director may waive notice of any meeting. The attendance of a director at any meeting shall constitute a waiver of notice of such meeting, except where a director attends a meeting for the express purpose of objecting to the transaction of any business to be transacted at the meeting need not be specified in the notice or waiver of notice of such meeting unless specifically required by law or by the Bylaws.
- G. **QUORUM.** A minimum of one half (1/2) of the Board of Directors shall be required to constitute the quorum for transaction of business at any meeting of the Board of Directors. If less than this number of directors is present at any meeting, the majority of the directors present may adjourn the meeting from time to time without further notice.
- H. **BOARD DECISIONS.** The act of a majority of the directors present at a meeting at which a quorum is present shall be the act of the Board of Directors.
- I. **COMPENSATION.** Members of the Board of Directors shall not receive any stated salaries for their services. Nothing herein contained however shall be construed to preclude any director from serving the Corporation in any other capacity and receiving compensation therefor. By resolution of the Board of Directors, a fixed sum and expenses of attendance, if any, may be allowed for attendance at any regular or special meetings of the Board of Directors.

CONSTITUTION & BYLAWS

- J. MINUTES. Minutes of all proceedings of the Board of Directors shall be maintained by the Secretary of the Corporation.
- K. COMMITTEES. The President, upon the advice of the Board of Directors, may designate and appoint such committees as he may deem necessary, either as special or permanent committees, to assist him. The following committees shall be permanent committees: Membership Committee, Nominating Committee, Program Committee, Committee on Arrangements for the Annual Meeting, Auditing Committee and Bylaws Committee.

The Membership Committee shall consist of one (1) of the senior-at-large directors, who shall serve as chairman, and one (1) of the junior-at-large directors plus one (1) other member of the Corporation. The Secretary-Treasurer shall be an ex-officio member. The Committee shall recommend individuals to be proposed as members of the Corporation to the Board of Directors.

The Nominating Committee shall consist of the immediate Past President and the one (1) member of the Corporation appointed by the incoming President and shall nominate corporate officers to be submitted to a vote of the membership at the annual meeting. The Secretary-Treasurer shall be an ex-officio member.

The Program Committee, the Committee on Arrangements for the Annual Assembly, and the Auditing Committee shall be appointed annually by the incoming President with the advice of the Board of Directors, and shall serve a term which coincides with the term of the incoming President.

The Auditing Committee shall audit the books of the Corporation and present its report to the Corporation's membership during the business portion of each annual meeting.

The Bylaws Committee shall consist of one (1) of the senior-at-large directors who shall serve as chairman, and one (1) of the junior-at-large directors plus one (1) member of the Corporation. The Secretary-Treasurer shall be an ex-officio member.

All committees shall be chaired by a member appointed by the President with the advice of the Board of Directors.

Chairman of the Membership Committee and the Bylaws Committee shall be appointed by the President from those members of the Board of Directors required by the Bylaws to be members of the respective committee.

- I. GIFTS. The Board of Directors may accept, on behalf of the Corporation, any contributions, gift, bequest, or device for any purpose of the Corporation.

ARTICLE VI OFFICERS

- A. OFFICERS. The officers of the Corporation shall be a President, President-Elect, and Secretary-Treasurer. Such officers shall have the authority and perform the duties as prescribed from time to time by the Board of Directors.
- B. ELECTION AND TERM OF OFFICE. The Nominating Committee shall submit a slate of proposed officers to the membership at the annual meeting and nominations may also be made by active members from the floor of the annual meeting. The officers of the Corporation shall be elected by majority vote of the active members from the active members of the Corporation at the annual meeting of the membership provided a quorum is present. The President-Elect shall be elected for a one (1) year term, and thereafter shall fulfill the office of the President for a one (1) year term. The Secretary-Treasurer shall be elected for a three (3) year term. Each such officer shall hold office until his successor has been duly elected and qualified.
- C. POWERS AND DUTIES OF OFFICERS. The President shall supervise all activities of the Corporation, execute all instruments on its behalf, and preside at all meetings of the Corporation and the Board of Directors at which he may be present. He shall have such powers and shall perform such duties as may, from time to time, be specified in these Bylaws or in resolutions or other directives of the Board of Directors. He shall coordinate the work of the officers and committees of the Corporation in order that the purposes of the Corporation may be promoted and shall perform such duties as are usually inherent in such office. The President shall appoint the members of all standing and ad-hoc committees not otherwise appointed by those Bylaws, and shall serve as an ex-officio member of such committees. Successors to vacated offices of the Corporation shall be appointed by the President until the position is filled at the next annual meeting.

The President-Elect shall perform the duties of the President in the absence of the President, or in the case of the inability of the President to act, and shall perform such other duties as the President may designate. In the absence or incapacity of both the President and the President-Elect, the position shall be assumed by a President Pro-Term, elected by those members of the Board of Directors present at the meeting.

The Secretary-Treasurer shall keep the minutes of all meetings of the Corporation and of the Board of Directors and shall keep all other records of the Corporation. S/he shall be primarily

responsible for giving notice of all meetings held by the Corporation or the Board of Directors, shall conduct all correspondence of the Corporation, and shall issue written reports of the preceding year's transactions to all members which shall be read to the Board of Directors and to the membership at the annual meeting. The Secretary-Treasurer shall have custody of all funds of the Corporation and shall keep a full and accurate account of the receipts and expenditures of the Corporation; shall make disbursements in accordance with the approved budget as authorized by the Corporation, the Board of Directors, or any committee; shall maintain bank accounts in the name of the Corporation in depositories designated by the Board of Directors; and shall render periodic financial annual Treasurer's report for the membership and for audit by the Auditing Committee. The Secretary-Treasurer shall have such other powers and shall perform such other duties as may, from time to time, be specified in resolutions or other directives of the Board of Directors.

D. REMOVAL. Any officer may be removed by the Board of Directors whenever, in its judgment, the best interests of the Corporation would be served thereby.

E. VACANCIES. A vacancy in any office because of death, resignation, removal, disqualification, or other cause may be filled by the President of the Corporation for the unexpired portion of the term.

ARTICLE VII BOOKS AND RECORDS

The Corporation shall keep correct and complete books of all proceedings of its membership, Board of Directors and committees having and exercising any of the authority of the Board of Directors, and shall keep, at the principal office of the Corporation, a recording giving the names and addresses of the members of the Corporation entitled to vote.

ARTICLE VIII FISCAL YEAR

The fiscal year of the Corporation shall begin on the 1st day of January of each year and end at midnight on the 31st day of December of such year.

ARTICLE IX

SEAL

The Board of Directors shall provide a corporate seal which shall be a standard form with the name of the Corporation: "Pacific Northwest Vascular Society."

ARTICLE X

INDEMNIFICATION

The Corporation shall indemnify any present or former director, officer, employee, or agent of the Corporation for expenses and costs (including attorney's fees), actually and necessarily incurred by him in connection with the defense or settlement of any pending or threatened action, suit, or proceeding to which he is made a party by reason of his being or having been such official, except in relation to matters as to which he shall be finally judged to be liable for willful misconduct amounting to bad faith. Such indemnification shall not be deemed exclusive of any other right to which such indemnified person may be entitled under the Articles of Incorporation of Bylaws or under any agreement or vote of directors, insurance purchased by the Corporation, or other rights.

ARTICLE XI

CONSTRUCTION OF TERMS AND HEADINGS

Words used in these Bylaws shall be read as masculine or feminine gender and as the singular or plural, as the context requires. The captions or headings in these Bylaws are for convenience only and are not intended to limit or define the scope of effect of any provision of these Bylaws.

ARTICLE XII

WAIVER OF NOTICE

Whenever any notice is required to be given under the provisions of RCW Section 24.03 et seq., or under provisions of the Articles of Incorporation or the Bylaws of the Corporation, a waiver thereof in writing signed by the person or persons entitled to such notice, whether before or after the time stated therein, shall be deemed equivalent to the giving of such notice. All such waivers shall be filed with the corporate records or be made a part of the minutes of the relevant meeting.

ARTICLE XIII AMENDMENTS

The Bylaws and the Articles of Incorporation of the Corporation may be amended, altered, or repealed at the annual meeting of the Corporation by a two-thirds (2/3) affirmative vote of the members present, provided there is a quorum of the membership present at such meeting. For the purpose of amending, altering, or repealing the Bylaws, a quorum shall consist of one-third (1/3) of the Active members of the Corporation.

KNOW ALL MEN BY THESE PRESENTS: The undersigned Secretary of Pacific Northwest Vascular Society does hereby certify that the above and foregoing Bylaws of said Corporation were duly adopted by the Board of Directors as the Bylaws of the Pacific Northwest Vascular Society and that the same do now constitute the Bylaws of said Corporation.

Dated this 19th day of October, 2012

Benjamin W. Starnes, MD
Secretary-Treasurer



2014 Membership

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