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Acelity KCI
Bard Peripheral Vascular
Bolton Medical
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Bristol Meyers Squibb
Cryolife, Inc.
Endologix
Getinge Group
LifeNet Health
Penumbra, Inc.
Pfizer
Spectranetics
Vascular Insights
Vascular Quality Initiative
2017 Annual Meeting

November 2–3, 2017
Portland, Oregon
The Nines Hotel

CONTACT INFORMATION

Pacific Northwest Vascular Society
1411 5th Street
Anacortes, WA 98221

(T) 360-420-6906
(F) 360-261-6077

pnwvascular@gmail.com
www.pacificnwvascular.org
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# 2017 PNWVS Executive Officers and Councilors

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<tr>
<td>Brian Matteson, MD</td>
<td>President</td>
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<tr>
<td>Erica Leith Mitchell, MD, Med SE</td>
<td>Immediate Past-President</td>
</tr>
<tr>
<td>Niten Singh, MD</td>
<td>President-Elect</td>
</tr>
<tr>
<td>Brian Ferris, MD</td>
<td>Secretary Treasurer, Senior Councilor</td>
</tr>
<tr>
<td>Nam Tran, MD</td>
<td>Program Chairman, Senior Councilor</td>
</tr>
<tr>
<td>Keith Baxter, MD</td>
<td>Middle Councilor</td>
</tr>
<tr>
<td>Glen Roseborough, MD</td>
<td>Middle Councilor</td>
</tr>
<tr>
<td>Christian Hamlat, MD</td>
<td>Junior Councilor</td>
</tr>
<tr>
<td>Matthew Sweet, MD</td>
<td>Junior Councilor</td>
</tr>
<tr>
<td>Jeffrey Pasenau, MD</td>
<td>Junior Councilor</td>
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MEETING AT A GLANCE

Thursday, November 2

3:00 – 8:00 pm  Registration Open
4:00 – 5:30 pm  Executive Council Meeting
6:00 – 7:00 pm  Business Meeting (Members Only)
7:00 – 7:30 pm  Digital ePoster Session
7:00 – 9:00 pm  Welcome Reception with Industry
7:30 – 8:00 pm  Sponsor Highlight Session

Friday, November 2

7:00 am – 5:00 pm  Registration Open
7:00 – 8:00 am  Breakfast Buffet with Educational Exhibitors
7:00 am – 5:00 pm  Exhibits Open
7:45 – 8:00 am  Presidential Welcome — Brian Matteson, MD
8:00 – 9:15 am  Scientific Session I: Management of Aortic Pathologies
9:15 – 10:00 am  Expert Panel Discussion: Management of Acute Type B Aortic Dissection in a Tertiary Referral Center Versus the Community
10:00 – 10:30 am  Coffee Break with Educational Exhibitors
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<th>Time</th>
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<tr>
<td>10:30 - 11:30 am</td>
<td>Scientific Session II: Peripheral Vascular Disease</td>
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<td>11:15 - 11:45 am</td>
<td>Expert Panel Discussion: Perspectives in the Management of Aortic Dissection</td>
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<tr>
<td>11:30 - 12:00 pm</td>
<td>Invited Lecturer — Charles Acher, MD</td>
</tr>
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<td>12:00 - 1:00 pm</td>
<td>Buffet Lunch with Educational Exhibitors</td>
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<tr>
<td>1:00 – 2:00 pm</td>
<td>Scientific Session III: Surgical Techniques and Practice Management</td>
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<td>2:00 – 2:45 pm</td>
<td>Expert Panel Discussion: Perspectives in the Management of CLI</td>
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<td>2:45 – 3:15 pm</td>
<td>Coffee Break with Educational Exhibitors</td>
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<td>3:15 – 4:00 pm</td>
<td>Practice Management Lectures</td>
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<td>4:00 – 5:00 pm</td>
<td>Scientific Session IV: Non Invasive Vascular Imaging</td>
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<td>5:15 – 6:15 pm</td>
<td>Reception and Awards at the Portland Wine Bar</td>
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NEW MEMBERS
2017
Amani Politano, MD
Elena Rienhardt, MD
Johnathon Rollo, MD

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
Portland, OR  2014
Seattle, WA  2015
Vancouver, BC  2016
PAST OFFICERS

Toshio Inahara, MD, President    1983
Kaj H. Johansen, MD, Secretary-Treasurer
Kaj H. Johansen, MD, Program

Toshio Inahara, MD, President    1984
Kaj H. Johansen, MD, Secretary-Treasurer
George A. Berni, MD, Program

Toshio Inahara, MD, President    1985
Kaj H. Johansen, MD, Secretary-Treasurer
John W. Kenagy, MD, Program

Richard N. Kleaveland, MD, President    1986
Leland J. Harris, MD, Secretary-Treasurer
Kenton C. Bodily, MD, Program

Henry K. Litherland, MD, President    1987
Leland J. Harris, MD, Secretary-Treasurer
Henry D. Hildebrand, MD, Program

John W. Kenagy, MD, President    1988
Leland J. Harris, MD, Secretary-Treasurer
Charles A. Anderson, MD, Program

Henry D. Hildebrand, MD, President    1989
Kenton C. Bodily, MD, Secretary-Treasurer
R. Eugene Zierler, MD, Program

Lloyd Taylor, MD, President    1990
Kenton C Bodily, MD, Secretary-Treasurer
Gregory L. Moneta, MD, Program

D. Eugene Strandness, MD, President    1991
Kenton C. Bodily, MD, Secretary-Treasurer
Henry K. Litherland, MD, Program
PAST OFFICERS

George A. Berni, MD, President 1992
Milton H. Brinton, MD, Secretary-Treasurer
Charles A. Anderson, MD, Program

John M. Porter, MD, President 1993
Milton H. Brinton, MD, Secretary-Treasurer
Gregory L. Moneta, MD, Program

Joseph G. Sladen, MD, President 1994
Milton H. Brinton, MD, Secretary-Treasurer
R. Eugene Zierler, MD, Program

Kaj H. Johansen, MD, President 1995
Terence M. Quigley, MD, Secretary-Treasurer
Gregory L. Moneta, MD, Program

Gregory L. Moneta, MD, President 1996
Terence M. Quigley, MD, Secretary-Treasurer
Ted R. Kohler, MD, Program

Charles A. Anderson, MD, President 1997
Terence M. Quigley, MD, Secretary-Treasurer
David C. Taylor, MD, Program

Milton H. Brinton, MD, President 1998
David C. Taylor, MD, Secretary-Treasurer
James M. Cook, MD, Program

Eugene Zierler, MD, President 1999
David C. Taylor, MD, Secretary-Treasurer
York N. Hsiang, MD, Program

Terence M. Quigley, MD, President 2000
David C. Taylor, MD, Secretary-Treasurer
Mark H. Meissner, MD, Program

Edmond J. Raker, MD, President 2001
James M. Cook, MD, Secretary-Treasurer
Jerry Chen, MD, Program
PAST OFFICERS

David Taylor, MD, President     2002
James M. Cook, MD, Secretary-Treasurer
Stephen Murray, MD, Program

Gary Matsumoto, MD, President     2003
James M. Cook, MD, Secretary-Treasurer
James Watson, MD, Program

York N. Hsiang, MD, President     2004
Mark H. Meissner, MD, Secretary-Treasurer
Mark H. Meissner, MD, Program

Jay Cook, MD, President     2005
Mark H. Meissner, MD, Secretary-Treasurer
Jeff Gilbertson, MD, Program

James Peck, MD, President     2006
Mark H. Meissner, MD, Secretary-Treasurer
Gregory J. Landry, MD, Program

Mark Meissner, MD, President     2007
Gregory J. Landry, MD, Secretary-Treasurer
Gerrit Winkelaar, MD, Program

Stephen Murray, MD, President     2008
Gregory J. Landry, MD, Secretary-Treasurer
Benjamin Starnes, MD, Program

Gerrit Winkelaar, MD, President     2009
Gregory J. Landry, MD, Secretary-Treasurer
Erica Mitchell, MD, Program

Jeffrey Gilbertson, MD, President     2010
Benjamin Starnes, MD, Secretary-Treasurer
Benjamin Starnes, MD, Program

Gregory J. Landry, MD, President     2011
Benjamin Starnes, MD, Secretary-Treasurer
Benjamin Starnes, MD, Program
PAST OFFICERS

Daniel Pepper, MD, President 2012
Benjamin Starnes, MD, Secretary-Treasurer
Benjamin Starnes, MD, Program

Jerry Chen, MD, President 2013
James C. Watson, MD, President Elect
Erica Mitchell, MD, Secretary-Treasurer

James Watson, MD, President 2014
Erica Mitchell, MD, Secretary-Treasurer
Niten Singh, MD, Program

Benjamin Starnes, MD, President 2015
Erica Mitchell, MD, Secretary-Treasurer
Nam Tran, MD, Program

Erica Mitchell, MD, President 2016
Brian Ferris, MD, Secretary Treasurer
Nam Tran, MD, Program
The Evolution of Treatment of Complex Aortic Disease

Dr. Charles W. Acher
University of Wisconsin

We welcome Dr. Charles W. Acher from University of Wisconsin to be the 2017 Presidential Guest Lecturer. His clinical interests include prevention of ischemic spinal cord injury in the repair of thoraco-abdominal aneurysms (TAA), renal and visceral arterial occlusive disease, minimally invasive endovascular surgery, treatment of cerebral vascular occlusive disease for stroke prevention (carotid and subclavian revascularization), and limb salvage in severe vascular disease.
FORMER 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, MD, 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
Donald Trunkey, MD, Oregon Health and Science University 2014
Bruce Gewertz, MD, Cedars Sinai Health System 2015
Bruce Perler, MD, MBA, Johns Hopkins, Baltimore, MD 2016
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

PROGRAM LEARNING OBJECTIVES

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

Managements of Aortic Pathologies

• Describe the natural history and outcome of aortic pathology in the State of Washington
• 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
• 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 ruptured abdominal aortic aneurysm

Peripheral Vascular Disease

• Describe the natural history and functional status after major lower extremity amputation for critical limb ischemia
• Describe techniques and outcomes of endoscopic vein harvest
• Describe outcomes of eversion endarectomy for combined iliofemoral arterial occlusive disease
• Describe venous arterialization for end-staged arterial occlusive disease

Surgical Techniques

• Describe techniques and options for retrieval of IVC filters
• Describe the clinical presentation and management of aortitis
• Identify features, benefits, and challenges of an outpatient endovascular procedure center
• Analyze opportunities for system improvement in managing patients with vascular disease and chronic wounds to improve limb preservation

The Vascular Laboratory

• Describe the ICAVL process of vascular laboratory credentialing
• Understanding the requirements of a vascular laboratory in term of physical space, equipment acquisition, quality assurance process, and personal qualifications
• Describe possible pitfalls in the management of a vascular laboratory

Non-Invasive Vascular Imaging

• Describe duplex criteria for the diagnosis of iliac artery stenosis
• Understand features of type B aortic dissection seen in echocardiography
• Describe natural history and duplex features of carotid artery stenosis
Non-atherosclerotic Vascular Disease

• Describe the natural history and outcome of aortic pathology in the State of Washington
• Understand surgical treatment options for infected carotid pseudoaneurysm
• Understand molecular effects on the thoracic and abdominal aorta

DISCLOSURE INFORMATION

In accordance with the ACCME Accreditation Criteria, the American College of Surgeons, as the accredited provider of this activity, must ensure that anyone in a position to control the content of the educational activity has disclosed all relevant financial relationships with any commercial interest. Therefore, it is mandatory that both the program planning committee and speakers complete disclosure forms. Members of the program committee were required to disclose all financial relationships and speakers were required to disclose any financial relationship as it pertains to the content of the presentations. The ACCME defines a ‘commercial interest’ as “any entity producing, marketing, re-selling, or distributing health care goods or services consumed by, or used on, patients”. It does not consider providers of clinical service directly to patients to be commercial interests. The ACCME considers “relevant” financial relationships as financial transactions (in any amount) that may create a conflict of interest and occur within the 12 months preceding the time that the individual is being asked to assume a role controlling content of the educational activity.

ACS is also required, through our joint providership partners, to manage any reported conflict and eliminate the potential for bias during the activity. All program committee members and speakers were contacted and the conflicts listed below have been managed to our satisfaction. However, if you perceive a bias during a session, please report the circumstances on the session evaluation form.
ACCREDITATION STATEMENT

CONTINUING MEDICAL EDUCATION CREDIT INFORMATION

Accreditation
This activity has been planned and implemented in accordance with the Essential Areas and Policies of the Accreditation Council for Continuing Medical Education (ACCME) through the joint providership of the American College of Surgeons and Pacific Northwest Vascular Society. The American College of Surgeons is accredited by the ACCME to provide continuing medical education for physicians.

AMA PRA Category 1 Credits™
The American College of Surgeons designates this live activity for a maximum of 7.00 AMA PRA Category 1 Credits™. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

Of the AMA PRA Category 1 Credits™ listed above, a maximum of 4.25 credits meet the requirements for Self-Assessment.

Self-assessment question links will be emailed to you post meeting for completion. Meeting evaluations can be completed online using this link: www.pacificnwvascular.org
Scientific Session Agenda
THURSDAY, NOVEMBER 2, 2017

3:00 pm – 8:00 pm  Registration Open

4:00 pm – 5:30 pm  Executive Council Meeting

6:00 pm – 7:00 pm  Business Meeting

7:00 pm – 7:32 pm  ePoster Session

7:32 pm – 7:52 pm  Vendor Highlight Session

7:00 pm – 9:00 pm  Welcome Reception

FRIDAY, NOVEMBER 3, 2017

7:00 am - 5:00 pm  Registration Open

7:00 am - 7:45 am  Breakfast

7:00 am – 5:00 pm  Registration Open

8:00 am – 5:00 pm  Scientific Sessions

5:10 pm – 6:15 pm  Closing Reception and Awards

Portland Wine Bar
THURSDAY, NOVEMBER 2, 2017

7:00 – 7:32 pm

**ePOSTER SESSION**

(5 minutes talk & 3 minutes for discussion)
Session moderated by Nam Tran, MD, Program Chair & Associate Professor of Surgery University of Washington

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

- Describe the natural history and outcome of aortic pathology in the State of Washington
- Understand surgical treatment options for infected carotid pseudoaneurysm
- Understand molecular effects on the thoracic and abdominal aorta

7:00 – 7:08 pm

**#1 IATROGENIC RETROGRADE TYPE B AORTIC DISSECTION DURING PERIGRAFT ACCESS FOR TYPE II ENDOLEAK EMBOLIZATION: CASE REPORT & LITERATURE REVIEW**
Presenter: Gautamn Sarwal, University of British Columbia**
Authors: G Sarwal MD, Y Shih MSc, L Machan MD, DC Taylor MD

7:08 – 7:16 pm

**#2 MANAGEMENT OF CAROTID PSEUDOANEURYSM(S): OUR ATTEMPTS TO DEFY NATURAL SELECTION**
Presenter: Emily Fan, University of Washington**
Authors: SK Desikan MD, E Fan BA, BW Starnes MD, N Tran MD

7:16 – 7:24 pm

**#3 EXTRACTING THE INEXTRICABLE: ADVANCED TECHNIQUES FOR REMOVING RETAINED IVC FILTERS**
Presenter: Kendall Vignarolli, Vascular and Surgical Care NW**
Authors: KA Vignaroli MA, SL Tan MD, PhD

•* Denotes ePoster entry
7:24 – 7:32 pm

#4 INFECTED THORACIC ENDOVASCULAR AORTIC GRAFT REPAIRED WITH FEMORAL VEIN CONDUIT

Presenter: A Mordhorst, University of British Columbia**
Authors: A Mordhorst, M Janusz, J Faulds, MD

** Denote Resident and ePoster competition
FRIDAY, NOVEMBER 3, 2017

7:45 – 8:00 am
Presidential Welcome
Brian Matteson, MD

8:00 – 9:15 am
Scientific Session I: Management of Aortic Pathologies
(10 minutes talk & 5 minutes for discussion)
Moderated by Brian Matteson, MD, PNWVS President, St Luke’s Cardiothoracic and Vascular Surgery, Boise, ID

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

- Describe the natural history and outcome of aortic pathology in the State of Washington
- 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
- 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 ruptured abdominal aortic aneurysm

8:00 – 8:15 am
#5 TRENDS IN WASHINGTON STATE AORTIC-RELATED DEATHS OVER A 21-YEAR PERIOD
Presenter: Matthew Bartek, University of Washington**
Authors: MA Bartek MD, JM Talbott BA, J Nguyen BA, L Kessler ScD, S Shalhub MD

** Denote Resident and ePoster competition
8:15 – 8:30 am
**#6 SECONDARY INTERVENTION AFTER FENESTRATED ANEURYSM REPAIR**
Presenter: Jason Hurd, University of Washington
Authors: BW Starnes MD, B Tatum, N Singh MD

8:30 – 8:45 am
**#7 THORACO-ABDOMINAL AORTIC ANEURYSMS: A SINGLE CENTER COHORT STUDY**
Presenter: Matthew Sweet, University of Washington
Author: MP Sweet MD

8:45 – 9:00 am
**#8 FIRST REPORT OF PROCEDURAL AND PERIOPERATIVE RESULTS IN PATIENTS TREATED WITH FENESTRATED EVAR PLANNED BY AUTOMATED SOFTWARE IN A PHYSICIAN SPONSORED CLINICAL TRIAL**
Presenter: Jason Hurd, University of Washington
Authors: BW Starnes, B Tatum, N Singh MD

9:00 – 9:15 am
**#9 EMERGENT INTER-HOSPITAL TRANSFER AND MANAGEMENT OF FREELY RUPTURED ABDOMINAL AORTIC ANEURYSM**
Presenter: Matthew Kronick, Oregon Health and Science University
Authors: TL Repella MD PhD, E Jung MD, TK Liem MD, AF Azarbal MD, C Abraham, GJ, Landry MD, GL Moneta MD, EL Mitchell MD

9:15 – 10:00 am
**Surgical Management Expert Panel Discussion #1 – Management of Acute Type B Aortic Dissection in A Tertiary Referral Center versus the Community**
Moderator: Nam T Tran, MD, PNWVS Program Chairman, Associate Professor of Surgery, University of Washington
Panel Members: Joe Davis, MD, Matthew Sweet, MD, Jason Faulds, MD, Patrick Phelan, MD
10:00 – 10:30 am
Coffee Break and Exhibits

10:30 – 11:30 am
Scientific Session II: Peripheral Vascular Disease
(10 minutes talk & 5 minutes for discussion)
Moderator: Glen Roseborough, MD, Middle Councilor, Advanced Vascular Therapy

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

- Describe the natural history and functional status after major lower extremity amputation for critical limb ischemia
- Describe techniques and outcomes of endoscopic vein harvest
- Describe outcomes of eversion endarectomy for combined iliofemoral arterial occlusive disease
- Describe venous arterialization for end-staged arterial occlusive disease

10:30 – 10:45 am
#10 A CONTEMPORARY REVIEW OF AMBULATION AND FUNCTIONAL OUTCOME AFTER MAJOR LOWER EXTREMITY AMPUTATION
Presenter: Atish Chopra, Oregon Health and Science University**
Authors: A Chopra MD, AF Azarbal MD, E Jung MD, CZ Abraham MD, TK Liem MD, GL Landry MD, GL Moneta MD, EL Mitchell MD

10:45 – 11:00 am
#11 TECHNIQUE AND COMPLICATIONS OF EXTENDED ILIOFEMORAL EVERSION ENDARECTOMY FOR SEVERE ILIOFEMORAL DISEASE
Presenter: Gautamn Sarwal, University of British Columbia**
Authors: G Sarwal MD MEd, J Misskey MD MEd, JDS Reid MD, R Sidhu MD MEd, PS MacDonald MD
11:00 – 11:15 am  
#12 EXPERIENCED OPERATORS ACHIEVE SUPERIOR PRIMARY PATENCY AND WOUND COMPLICATION RATES WITH ENDOSCOPIC GREATER SAPHENOUS VEIN HARVEST COMPARED TO OPEN HARVEST IN LOWER EXTREMITY BYPASSES  
Presenter: Helena Klein, Oregon Health and Sciences University**  
Authors: HS Klein, MS Davis, GL Moneta MD, TK Liem MD, E Jung MD, CZ Abraham MD, GJ Landry MD

11:15 – 11:30 am  
#13 VENOUS ARTERIALIZATION FOR NONRECONSTRUCTIBLE LOWER EXTREMITY ARTERIAL DISEASE - A MULTI-CENTRE CASE SERIES  
Presenter: Kyle Arsenault, University of British Columbia**  
Authors: KA Arsenault MD, LW Tse MD, J Gagnon MD, D Kelton MD, K Baxter MD, J Chen MD, W Johnson MD, V Kapila MD

11:30 am – 12:00 pm  
Invited Lecture - The Evolution of Treatment of Complex Aortic Disease  
Dr. Charles Acher, MD, Professor of Surgery, University of Wisconsin in Madison, WI

12:00 – 1:00 pm  
Lunch

** Denote Resident and ePoster competition
Scientific Session III: Surgical Techniques and Practice Management
(10 minutes talk & 5 minutes for discussion)
Session moderated by Jeffrey Pasenau, BSc, MD, FRCSC, PNWVS Junior Councilor, Kelowna General Hospital

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

- Describe techniques and options for retrieval of IVC filters
- Describe the clinical presentation and management of aortitis
- Identify features, benefits, and challenges of an outpatient endovascular procedure center
- Analyze opportunities for system improvement in managing patients with vascular disease and chronic wounds to improve limb preservation

1:00 – 1:15 pm
New Member and Student Member Certificate Presentation
#14 CELLULAR EFFECTS OF TOBACCO SMOKE EXPOSURE IN THE THORACIC AND ABDOMINAL AORTA
Presenter: No presenter available
Authors: TL Repella MD PhD, E Manalo BS, G Landry MD, C Abraham MD, L Sakai PhD, G Moneta MD, AF Azarbal MD

1:15 – 1:30 pm
#15 HOMOGRRAFT AORTIC REPLACEMENT FOR CLOSTRIDIUM SEPTICUM AORTITIS
Presenter: Jason Hurd, University of Washington**
Authors: JR Hurd MD, N Singh MD, BW Starnes MD

1:30 – 1:45 pm
#16 EARLY EXPERIENCE WITH AN OFFICE BASED CATH LAB – MY FIRST 600 CASES
Presenter: Glen Roseborough, Advanced Vascular Therapy
Author: G Roseborough, MD
1:45 – 2:00 pm
#17 OPEN SURGICAL MANAGEMENT OF A PEDIATRIC PATIENT WITH MID AORTIC SYNDROME CAUSED BY NEUROFIBROMATOSIS TYPE I
Presenter: Simran Parmar, University of British Columbia**
Authors: A Salvian MD, J Culig MD

2:00 – 2:45 pm
Surgical Management Expert Panel #2 –
Management of Critical Limb Ischemia (CLI) in the Community and Tertiary Referral Center
Moderator: Greg Landry, MD, Past President PNWVS, Professor of Surgery, Oregon Health and Science University
Panel Members: Gale Tang, MD, Leo Daab, MD, John Rollo, MD, Jason Jundt, MD, Greg Landry, MD

2:45 – 3:15 pm
Coffee Break-Exhibits

3:15 – 4:00 pm
Practice Management Lectures
LECTURE #1: HOW TO SET UP AN ICAVL CERTIFIED VASCULAR LABORATORY - PRACTICAL CONSIDERATIONS, CREDENTIAL GUIDELINES, AND PITFALLS
Presenter: Eugene Zierler, MD, PNWVS Past President, Professor of Surgery, University of Washington

LECTURE #2: INTRAOPERATIVE DUPLEX IMAGING: THE ROLE OF THE VASCULAR TECHNOLOGIST IN THE OR
Presenter: Jill Sommerset, RVT, PeaceHealth Medical Group Thoracic and Vascular Surgery, Vancouver, WA
At the end of this session, participants should be able to:

- Describe the ICAVL process of vascular laboratory credentialing
- Understanding the requirements of a vascular laboratory in term of physical space, equipment acquisition, quality assurance process, and personal qualifications
- Describe possible pitfalls in the management of a vascular laboratory
- Describe the use of duplex ultrasonography in the assessment of intraoperative procedures

4:00 – 5:00 pm

**Scientific Session IV: Non-Invasive Vascular Imaging**

(10 minutes talk & 5 minutes for discussion). Session moderated by Christian Hamlat, MD, PNWVS Junior Councilor, St. Luke’s Cardiovascular and Vascular Associates

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

- Describe duplex criteria for the diagnosis of iliac artery stenosis
- Understand features of type B aortic dissection seen in echocardiography
- Describe natural history and duplex features of carotid artery stenosis

4:00 – 4:15 pm

**#18 CHARACTERIZATION OF EXTERNAL ARTERY STENOSIS DUPELEX CRITERIA**

Presenter: Shivam Swamy, Oregon Health and Science University**
Authors: SS Swamy, VK Brar, A Chopra MD, AF Azarbal MD, E Jung MD, CZ Abraham MD, EL Mitchell, TK Liem MD, GJ Landry MD, GL Moneta MD
4:15 – 4:30 pm
#19 RETROSPECTIVE ANALYSIS OF MODERATE TO SEVERE CAROTID ARTERY STENOSIS ON CAROTID DUPLEX FOR IDENTIFICATION OF SCREENING RISK FACTORS: THE SCREENING CAROTID ARTERY RISK FACTOR STUDY (SCARFS)
Presenter: Kenneth Hassler, Maricopa Integrated Health System**
Authors: KR Hassler DO, M Segal DO, R Eubanks DO, M Sivakumar MD

4:30 – 4:45 pm
#20 CARDIAC ABNORMALITIES DETECTED BY TRANSTHORACIC ECHOCARDIOGRAPHY IN PATIENTS WITH TYPE B AORTIC DISSECTION
Presenter: Alexander Taylor, University of Washington**
Authors: AP Taylor MD, RV Freeman MD, M Bartek MD, S Shalhub MD

4:45 – 5:00 pm
#21 URETERO-INTERNAL ILIAC ARTERY FISTULA PRESENTING AS LIFE THREATENING INTRAOPERATIVE HEMORRHAGE: DIAGNOSTIC CHALLENGE AND ENDOVASCULAR RESCUE
Presenter: Gautamn Sarwal, University of British Columbia**
Authors: G Sarwal MD, S Bidnur MD, ECP Chedgy MBBS MSc, AG Kavanagh, MD MPH

5:15 – 6:15 pm
Closing Reception, Resident ePoster and Paper Awards Portland Wine Bar
Abstracts
#1: IATROGENIC RETROGRADE TYPE B AORTIC DISSECTION DURING PERIGRAFT ACCESS FOR TYPE II ENDOLEAK EMBOLIZATION: CASE REPORT AND LITERATURE REVIEW

**Presenter:** Gautamn Sarwal, University of British Columbia**

**Authors:** G Sarwal MD, Y Shih MSc, L Machan MD, DC Taylor MD

**Objective:** We present the first case report of an iatrogenic, retrograde type B aortic dissection extending from the aortic bifurcation to the left subclavian artery during attempted type II endoleak embolization using perigraft access technique, treated with medical management.

**Case Report:** An 85-year-old male presented with an aneurysm sac expanded to 65mm secondary to a type II endoleak four years after endovascular repair of an abdominal aortic aneurysm. Attempted embolization of the endoleak was done via the perigraft route, gaining access to the aneurysm sac by advancing a guidewire and catheter between the iliac limb of the stent graft and arterial wall. Due to acute chest pain, the procedure was stopped. A computed tomography (CT) scan revealed a retrograde type B iatrogenic aortic dissection (IAD) extending from the aneurysm sac to the aortic arch secondary to catheter or guidewire manipulation. The true aortic lumen maintained perfusion to all splanchnic organs, including both kidneys, and the patient did not suffer any cardiorespiratory complications as a result of this extensive dissection. The dissection was treated medically with partial resolution in 48 hours and near complete resolution three months post procedure.

**Conclusion:** The serious complication of type B IAD should be recognized as a potential complication of the perigraft technique used for embolization of a type II endoleak. IADs pose a similar risk of mortality in comparison to spontaneous aortic dissections (SAD) but type B IAD, may exceed that of type B SAD. Given differences in mortality and clinical presentation of IADs versus SADs, patients with unexplained hemodynamic change or chest pain following an endovascular procedure should be investigated for an IAD.
#2: MANAGEMENT OF CAROTID PSEUDOANEURYSM(S): OUR ATTEMPTS TO DEFY NATURAL SELECTION

**Presenter:** Emily Fan, University of Washington

**Authors:** SK Desikan MD, E Fan BA, BW Starnes MD, N Tran MD

**Background:** Mycotic aneurysmal disease of the extracranial carotid artery is extremely rare, however, it is associated with high morbidity and mortality. Management consists of immediate antibiotic therapy and surgical resection of the infected segment with ligation vs. reconstruction of the carotid artery. The management of bilateral carotid pseudoaneurysms has not been reported previously in the literature. We report the case of a patient with a history of intravenous drug abuse who presented with a mycotic pseudoaneurysm of the left common carotid artery followed a few months later by a pseudoaneurysm of the right common carotid artery. We describe our management strategy and techniques employed to treat her pseudoaneurysms while preserving neurologic function.

**Methods:** A 24-year-old female with a history of intravenous drug abuse first presented with left neck pain associated with a pulsatile mass. Workup revealed a left common carotid artery mycotic pseudoaneurysm with culture-positive MSSA. Her Circle of Willis was intact on preoperative imaging. As such, she underwent ligation of the left common carotid artery with proximal balloon exclusion. 6-months later, she relapsed and presented with a right-sided, pulsatile neck mass. Imaging confirmed a right common carotid pseudoaneurysm and revealed reconstitution of her left common carotid at the carotid bulb. In attempts to minimize the risk of stroke, we elected to proceed with a two-stage repair. She first underwent a left subclavian to left common carotid artery bypass using a Dacron graft. Antegrade flow to the left middle cerebral artery was confirmed postoperatively with transcranial doppler. Next, she underwent ligation of the right common carotid artery with resection of the pseudoaneurysmal segment.

**Results:** The patient tolerated the above procedures well and remained neurologically intact postoperatively. She was counseled and discharged to Alaska. Interestingly, follow-up imaging 1-month later revealed occlusion of the left subclavian-carotid bypass. Her vertebral arteries remain patent and are the only inline source of inflow for cerebral perfusion. Despite this, she has remained neurologically intact without any deficits.

**Conclusion:** To the authors’ knowledge, this is the first reported case of sequential development of mycotic pseudoaneurysms to both common carotid arteries. Ligation of both common carotids was successfully performed with no neurologic sequelae. The 6-months between the two ligations, as well as the 1-month patency of the left subclavian-carotid bypass before thrombosis likely allowed interval collateralization. The patient continues to be fully functional with cerebral perfusion supplied by the vertebral arteries.
#3: EXTRACTING THE INEXTRICABLE: ADVANCED TECHNIQUES FOR REMOVING RETAINED IVC FILTERS

**Presenter:** Kendall Vignaroli, Vascular and Surgical Care NW**

**Authors:** KA Vignaroli MA, SL Tan MD, PhD

**Background:** IVC filters save lives but are associated with potential significant downside complications, including filter thrombosis or IVC wall perforation. Sometimes, due to distorted filter orientation or adherence to the vessel wall, IVC filters cannot be extracted by standard percutaneous means, occasionally obliging open surgery.

**Methods:** 3 patients with IVC filters, all (100%) of them demonstrating IVC wall perforation into lumbar spine, duodenum or aorta, had been resistant to removal by standard percutaneous approaches. Each underwent simultaneous transfemoral and transjugular approaches.

**Results:** Using transcatheter approaches to be demonstrated in brief videoangiograms, all “stuck” IVC filters were successfully extracted without having to resort to open surgical techniques.

**Conclusion:** Standard percutaneous angiographic techniques, often utilizing two-operator/two approach methods, can successfully be used to extract previously-recalcitrant IVC filters.
#4 INFECTED THORACIC ENDOVASCULAR AORTIC GRAFT REPAIRED WITH FEMORAL VEIN CONDUIT: A CASE REPORT

**Presenter:** A Mordhorst, University of British Columbia**

**Authors:** A Mordhorst, M Janusz, J Faulds, MD

**Intro:** Aortic graft infection is a rare, but fatal complication of aortic repair procedures. There are a variety of different approaches to managing infected aortic grafts. With various pros and cons of each method, often the best choice may not always be clear. We report our success in creating a large single conduit from bilateral femoral vein harvest, and compare this method to other available approaches to treating aortic graft infection in the medical literature.

**Case:** A 69-year-old female underwent emergent explantation of thoracic endovascular aortic repair (TEVAR) graft for post-operative complication of Salmonella bacteremia and abscess formation surrounding the original graft. Bilateral femoral veins were harvested and joined to execute in situ autologous aortic repair. At 6 months follow up, the vein graft exhibited no aneurysmal degeneration or signs of failure. Moreover, the patient remained stable and asymptomatic from her revision surgery.

**Conclusion:** There are multiple methods to repair an infected aortic graft following explantation, including extra-anatomic grafts, various in situ synthetic materials, allografts, and in situ autologous options. The decision of which approach to utilize must be made with consideration of individual patient factors and severity of infection. In our case, the creation of a single new vessel was an effective solution. While there are additional pre-operative considerations as well as some increased intra-operative work, the post-operative stability and flexibility of this method is highly encouraging for its continued use.
ABSTRACTS

#5: TRENDS IN WASHINGTON STATE AORTIC-RELATED DEATHS OVER A 21-YEAR PERIOD, 1996-2016

Presenter: Matthew Bartek, University of Washington
Authors: MA Bartek MD, JM Talbott BA, J Nguyen BA, L Kessler ScD, S Shalhub MD

Background: The trends of deaths attributable to aortic pathology have been poorly characterized within the United States, especially at the state level. We aimed to evaluate aortic-related mortality trends in Washington State. We hypothesized that aortic-related death rates have decline over the last two decades given the considerable advances in aortic pathology management.

Methods: Death certificates from 1996 to 2016 were obtained from the Washington state Department of Health. Cases in which an aortic aneurysm and/or dissection were listed as a cause or a contributing cause of death were analyzed. Cause of death was classified by category based on the ninth and tenth revisions of the International Classification of Diseases. Age-standardized rates for death were calculated by year. Death rates were compared as stratified by sex, race, and county. Data are presented as mean (averaged over all years) and standard deviation.

Results: Of 1,014,039 deaths over 21 years, 9,255 were aortic-related (60% Male, 92% White, mean age 76.2+12.8 years). Half of these deaths were due to abdominal aortic aneurysms (50.2%). The mean death rate was 8.1+1.8 per 100,000 and demonstrated a steady decline over time with the most pronounced decline in deaths due to abdominal aortic ruptures (Figure 1). Comparison of death rates by sex demonstrated higher death rates in males than females (8.6/100,000 [6.5 -11.9] vs. 5.5/100,000 [3.6 -7.1] respectively, p < 0.001). Males died at a younger age compared to females (Table 1). By race, Native Hawaiians and Pacific Islanders died at a higher rate of aortic disease compared to whites (15+7.2/100,000 vs. 7.7+1.3/100,000 respectively, p < 0.001). Analysis by county demonstrated higher death rates in counties furthest from population centers (Figure 2).

Conclusions: Mortality from aortic disease in Washington State has declined over the last 21 years, predominantly due to a reduction in ruptured abdominal aortic aneurysms related-deaths. Males died at a higher rate and at a younger age than females. There is a clear variation in death rates by county. Further investigation is needed to understand geographic trends with the goal of decreasing variance across the state.
#6: SECONDARY INTERVENTIONS AFTER FENESTRATED ENDOVASCULAR ANEURYSM REPAIR  
**Presenter:** Jason Hurd, University of Washington**  
**Authors:** BW Starnes MD, B Tatum, N Singh MD

**Objectives:** Type 1a endoleak represents failure of the primary mode of therapy to treat abdominal aortic aneurysm (jAAA) with endovascular means. Fenestrated endovascular aneurysm repair (FEVAR) to treat short-neck juxtarenal AAA (jAAA) is associated with low rates of type 1a endoleak and low rates of re-intervention specifically regarding short-neck aortic aneurysms. In most modern series of standard EVAR, the rate of secondary intervention is between 4 and 37%* and up to two-thirds of these are due to endoleak (REF). Our objective in this study was to characterize the incidence and types of secondary interventions in a modern series of FEVAR.

**Methods:** Patients with jAAA who were not candidates for open repair were enrolled into an investigational device exemption clinical trial (#NCT01538056) and treated with FEVAR. Clinical outcome, secondary interventions and imaging data were collected out to 5 years.

**Results:** A total of 92 patients were treated with FEVAR over the reporting period. There were a total of 22 secondary interventions in 16 subjects (17.4%) over 4 years. Of these 22 interventions, 8 were access-related (36%), 7 were branch-related (32%) and 6 were related to endoleak (27%). One was both branch-related and due to endoleak. There were one type 2, one type 1b and four type 3 endoleaks that required intervention.treatment. The rate of type 1a endoleak requiring secondary intervention was zero (0%). The overall rate of endoleak requiring intervention was 6.5% and the incidence of branch vessel complication requiring intervention was 7 out of a total of 242 fenestrations (2.9%). All patients underwent an initial attempt at a completely percutaneous procedure (N=184 CFAs) and 20 access closure devices failed (10.9%) requiring immediate surgical conversion and CFA repair during the index operation. Of 184 femoral vessels accessed for the procedure 8 required secondary intervention (4.3%) after the index procedure. Following FEVAR, no patient in this series ruptured his or her AAA at any time with a mean of 22 months of follow up.

**Conclusions:** These data compare favorably with all other reported FEVAR series. Access-related complications are infrequent but still the most common after FEVAR. When FEVAR is performed for appropriate indications, type 1a endoleaks are rare if not or absent after FEVAR. It appears that secondary intervention for endoleak is much less common in FEVAR than in contemporary series of standard EVAR, suggesting an advantage of a longer proximal sealing zone. Branch vessel patency after FEVAR is excellent.  
*Nordon et al, Eur J Vasc Endovasc Surg (2010) 39, 547-554
**#7: THORACO-ABDOMINAL AORTIC ANEURYSMS: A SINGLE CENTER COHORT STUDY**

**Presenter:** Matthew Sweet, University of Washington  
**Authors:** MP Sweet MD

**Background:** Thoraco-abdominal aortic aneurysms (TAAA) are a life threatening end-stage vascular disease process. Treatment of TAAA is a high risk undertaking. Various surgical approaches are used, including open, endovascular, or hybrid techniques. Most reports describe case series utilizing a specific technical approach, and little is known about how these different techniques are used within a single center. The purpose of this study was to describe the utilization and outcomes of different surgical techniques to treat TAAA within a single center.

**Method:** Single center retrospective review of 82 consecutive patients treated for TAAA by a single surgeon from August 2011 to August 2017. Surgical approaches were categorized as open (direct repair or proximal thoracic stent graft with staged open distal repair under femoral bypass), hybrid (open visceral debranching with staged endovascular aneurysm exclusion), or endovascular (using a fenestrated-branched endograft). Patient demographics were reviewed from the medical record. Patients were separated into Extent 1, 2, 3, and 5 or Extent 4 TAAA for the outcome analysis. Outcome was classified as “Good” if the patient had successful aneurysm exclusion and return to pre-operative functional status without permanent loss of organ system function. Aortic reinterventions remote from the initial hospitalization were recorded.

**Results:** Baseline demographics are shown in Table 1. Over the course of the study, the proportion of endovascular and open repairs increased, and hybrid approach was used less frequently.

<table>
<thead>
<tr>
<th>Table 1: Baseline Demographics</th>
<th>Endovascular (n=58)</th>
<th>Open (n=20)</th>
<th>Hybrid (n=5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (Mean)</td>
<td>74</td>
<td>55</td>
<td>53</td>
</tr>
<tr>
<td>Men (%)</td>
<td>84%</td>
<td>75%</td>
<td>80%</td>
</tr>
<tr>
<td>Prior aortic operation (%)</td>
<td>55%</td>
<td>5%</td>
<td>40%</td>
</tr>
<tr>
<td>Symptomatic</td>
<td>10%</td>
<td>30%</td>
<td>40%</td>
</tr>
<tr>
<td>Connective Tissue Disease</td>
<td>0</td>
<td>45%</td>
<td>20%</td>
</tr>
</tbody>
</table>
#7: THORACO-ABDOMINAL AORTIC ANEURYSMS: A SINGLE CENTER COHORT STUDY

**Presenter:** Matthew Sweet, University of Washington  
**Authors:** MP Sweet MD

<table>
<thead>
<tr>
<th>Table 2: Surgical outcomes for Extent 1, 2, 3, and 5 TAAA</th>
<th>Number treated</th>
<th>Reinterventions</th>
<th>Number with Good Outcome (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Endovascular</td>
<td>37</td>
<td>4 (11%)</td>
<td>28 (76%)</td>
</tr>
<tr>
<td>Open</td>
<td>12</td>
<td>0</td>
<td>9 (75%)</td>
</tr>
<tr>
<td>Hybrid</td>
<td>5</td>
<td>3 (60%)</td>
<td>4 (80%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 3: Surgical outcomes for Extent 4 TAAA</th>
<th>Number treated</th>
<th>Reinterventions</th>
<th>Number with Good Outcome (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Endovascular</td>
<td>21</td>
<td>2 (10%)</td>
<td>20 (95%)</td>
</tr>
<tr>
<td>Open</td>
<td>8</td>
<td>0</td>
<td>6 (75%)</td>
</tr>
<tr>
<td>Hybrid</td>
<td>0</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

**Conclusions:** Patients with TAAA vary in terms of their age, comorbidities and overall physiologic fitness. Open repair was selected for more women, patients of younger age with fewer comorbidities, connective tissue disease patients, and symptomatic patients. Endovascular repair was selected for older patients with more comorbidities and more patients with prior aortic surgery. Hybrid repair was reserved for at higher risk for open repair with anatomy unsuitable for endovascular repair. Similar outcomes were achieved regardless of which modality was selected. Regardless of which modality was chosen, the risk of surgery remains high. These data reflect one surgeon’s patient selection and demonstrate that similar results can be achieved across the spectrum of patients with TAAA using various treatment modalities.
ABSTRACTS

#8: FIRST REPORT OF PROCEDURAL AND PERIOPERATIVE RESULTS IN PATIENTS TREATED WITH FENESTRATED EVAR PLANNED BY AUTOMATED SOFTWARE IN A PHYSICIAN SPONSORED IDE CLINICAL TRIAL

Presenter: Jason Hurd, University of Washington**
Authors: BW Starnes, B Tatum, N Singh MD

Objectives: To validate the use of automated planning software to design fenestrated endografts and treat patients with complex abdominal aortic aneurysms. Type 1a endoleak (T1aE) represents failure of the primary mode of therapy to treat juxtarenal abdominal aortic aneurysm (jAAA) with endovascular means. Fenestrated EVAR (FEVAR) is associated with low rates of T1aE and low rates of re-intervention. Barriers to wide adoption of FEVAR include complexity in planning.

Methods: Patients with jAAA who were not candidates for open repair were enrolled into one arm of an investigational device exemption clinical trial (#NCT01538056) and treated with FEVAR. Fenestration size and location were determined by automated planning software using patient imaging data and algorithms that account for the interaction between the endograft delivery system and angulated aortic anatomy. Endografts from multiple manufacturers were modified by the physician based on the graft plans and typically included fenestrations for the SMA and both renal arteries.

Results: Twenty-three patients were consented and treated with FEVAR planned by automated software. Procedural and perioperative data are in Table 1. 100% of the modified grafts were implanted with preservation of >95% of branch vessels at the index procedure. 30-day mortality rate in these high risk jAAA patients was 8.7% (2/23) and both deaths were unrelated to the aneurysm. 30-day MAE rate was 21.7% (5/23). There were no type 1a or type 3 endoleaks. Results are comparable to those based on manual planning by an experienced surgeon.

Conclusions: Once validated, automated planning software that accurately identifies fenestration locations for vital branch arteries removes a barrier to FEVAR adoption and could bring the therapy to most patients harboring juxtarenal abdominal aortic aneurysms.
CONTINUED

#8: FIRST REPORT OF PROCEDURAL AND PERIOPERATIVE RESULTS IN PATIENTS TREATED WITH FENESTRATED EVAR PLANNED BY AUTOMATED SOFTWARE IN A PHYSICIAN SPONSORED IDE CLINICAL TRIAL

**Presenter:** Jason Hurd, University of Washington**

**Authors:** BW Starnes, B Tatum, N Singh MD

<table>
<thead>
<tr>
<th>Table 1. Procedural and Perioperative Data</th>
<th>Measurement</th>
<th>Automated Planning Arm (n=23)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modified Endografts Implanted (%)</td>
<td>100</td>
<td>(23/23)</td>
</tr>
<tr>
<td>Branch vessels preserved at index (%)</td>
<td>95.5</td>
<td>(63/66)</td>
</tr>
<tr>
<td>Maximum Aneurysm Diameter (mm)</td>
<td>59.3</td>
<td></td>
</tr>
<tr>
<td>Fenestrations / Patient</td>
<td>2.9</td>
<td></td>
</tr>
<tr>
<td>Infrarenal neck length to final circumferential seal zone length (mm)</td>
<td>6.5 to 41.5</td>
<td></td>
</tr>
<tr>
<td>Mean Operative Time (min)</td>
<td>158</td>
<td></td>
</tr>
<tr>
<td>Mean Fluoroscopy Time (min)</td>
<td>37</td>
<td></td>
</tr>
<tr>
<td>Mean Contrast Volume (ml)</td>
<td>105</td>
<td></td>
</tr>
<tr>
<td>Estimated Blood Loss (ml)</td>
<td>92</td>
<td></td>
</tr>
<tr>
<td>Perioperative</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ICU Length of Stay (days)</td>
<td>2.1</td>
<td></td>
</tr>
<tr>
<td>Hospital Length of Stay (days)</td>
<td>3.8</td>
<td></td>
</tr>
<tr>
<td>30-day Mortality (%)</td>
<td>8.7%</td>
<td>(2/23)</td>
</tr>
<tr>
<td>30-day MAEs (%)</td>
<td>21.7%</td>
<td>(5/23)</td>
</tr>
<tr>
<td>30-day Type 1a and 3 Endoleaks</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>
**ABSTRACTS**

#9: EMERGENT INTER-HOSPITAL TRANSFER AND MANAGEMENT OF FREELY RUPTURED ABDOMINAL AORTIC ANEURYSM

**Presenter:** Matthew Kronick, Oregon Health and Science University**

**Authors:** TL Repella MD PhD, E Jung MD, TK Liem MD, AF Azarbal MD, C Abraham, GJ Landry MD, GL Moneta MD, EL Mitchell MD

**Background:** 64-year-old hemodynamically stable male presented to the Veterans Administration Emergency Department on a weekend afternoon with right groin and abdominal pain. CTA revealed a 6.4 cm intact infrarenal abdominal aortic aneurysm (AAA). Within 30 minutes of vascular surgical consultation he became abruptly hypotensive and unresponsive.

**Method:** After initiation of CPR, he was intubated and transferred directly to our tertiary hospital operating room (OR) for repair of a presumed ruptured AAA. Laparotomy revealed free intraperitoneal rupture of the infrarenal AAA through the right colonic mesentery. Time from initiation of CPR to supraceliac aortic cross-clamp measured <45 minutes. Post aortic repair (bifurcated graft) the colon appeared adequately perfused despite single patent hypogastric artery and inferior mesenteric artery ligation. An AbtheraTM device was placed with planned re-exploration within 24 hours, however, within 12 hours of the procedure the patient required increasing vasopressor support thus expediting earlier re-exploration. He was found to have hepatic flexure colonic necrosis necessitating partial colectomy. The colon was left in discontinuity. On POD #3 he returned to the OR and was noted to have full necrosis of the remaining colon/rectum (to anal canal) requiring proctocolectomy with ileostomy.

**Results:** After weaning off pressor support 4 days later the patient underwent abdominal wall closure (all small bowel was viable) and extubation. Post-operatively he was also noted to have bilateral lower extremity weakness with sensory deficits. MRI revealed T12-L1 spinal cord infarction. With continued normotension and anti-platelet therapy his lower extremity weakness improved, and he was subsequently discharged to a neuro-rehabilitation facility.

**Conclusion:** This patient survived free intraperitoneal rupture of an AAA because of a standard protocol for treatment of ruptured AAAs, rapid inter-hospital transfer, and effective, coordinated multidisciplinary care by nursing; emergency room physicians; anesthesiologists; and vascular, emergency general, intensive care and colorectal surgeons within a tertiary care center.
#10: A CONTEMPORARY REVIEW OF AMBULATION AND FUNCTIONAL OUTCOME AFTER MAJOR LOWER EXTREMITY AMPUTATION

Presenter: Atish Chopra, Oregon Health and Science University**
Authors: A Chopra MD, AF Azarbal MD, E Jung MD, CZ Abraham MD, TK Liem MD, GJ Landry MD, GL Moneta MD, EL Mitchell MD

Background: Major lower extremity (MLE) amputations remain a significant source of disability. It is unknown whether post-amputation functional outcomes and the ability to predict these outcomes has changed with an increasingly aging and obese patient population. Accordingly, we sought to evaluate contemporary trends.

Methods: A retrospective chart review was performed to identify patients undergoing MLE amputation using Current Procedural Terminology codes in a university hospital. Demographics, co-morbidities, peri-operative variables and outcomes were obtained. Descriptive statistics, t-tests, Chi-squared and multivariate logistic regression modeling were used where appropriate. Survival analyses were performed with the Kaplan-Meier method.

Results: From October 2005- November 2016, 206 patients (147 male; mean age 63 ± 13.5 years) underwent 256 MLE amputations (90.9% below-knee [BKA], 1.3% through-knee [TKA], 7.8% above-knee amputations [AKA]) related to critical limb ischemia, infection or other causes. Thirty-day operative mortality was 5%. Mean follow-up was 178.7 ± 266.9 days. Conversion from BKA to AKA was 3.5% percent. Estimated survival was 69% at 1 year and was 32% lower in nonambulatory patients (85 vs 53%, P = .04). Overall post-amputation ambulatory rate was 46.1% at 1 year. Nonambulatory patients had a higher body mass index ([BMI]; 30.9 ± 8.0 vs. 25.6 ± 5.4, P < .001), lower pre-operative hematocrit 31.0 ± 7.4 vs. 33.3 ± 8.1, P < .05), higher modified frailty index ([mFI) 8.4 ± 1.0 vs. 5.4 ± 1.2, P < .0001], higher chronic alcohol use (9% vs. 1%, P = .01), dependent preoperative functional status (29% vs. 2.1%, P < .01), lack of family support (66.3% vs. 17.9%, P < .01), were less likely to be married (83.2% vs. 35.8%, P < .01) and more likely to have an AKA (20.8% versus 52.6%, P = .004). There were no patients with dementia, on dialysis or with bilateral MLEs who were ambulatory post-amputation. Factors predictive of nonambulatory status after MLE with multivariate logistic regression analysis included increased BMI (Odds Ratio [OR] 0.88, 95% Confidence Interval [CI] 0.81-0.98; P .017) and an increased mFI (OR 0.23, 95% CI 0.16-0.34; P < .0001); a higher hemoglobin level was protective (OR 1.3, 95% CI 1.03-1.62; P = .019).

Conclusion: Patients should be counseled that less than 50% of patients receiving MLE amputation are ambulatory post-amputation. Efforts to reduce obesity and optimize anemia may further improve ambulatory status in these patients. Patients with an elevated mFI, dementia and those dialysis may be best served with AKAs.
#11 TECHNIQUE AND COMPLICATIONS OF EXTENDED ILIOFEMORAL EVERSION ENDARTERECTOMY FOR SEVERE ILIOFEMORAL DISEASE

Presenter: Gautamn Sarwal, University of British Columbia**
Authors: G Sarwal, MD MEd, J Misskey, MD MEd, JDS Reid, MD, R Sidhu, MD MEd, PS MacDonald, MD

Objective: To demonstrate our novel approach to managing severe iliofemoral disease, with a single incision, extended iliofemoral eversion endarterectomy (IFEE).

Methods: We performed a retrospective review of all patients undergoing IFEE from 2007 to 2015 at our institution. This included patients who underwent IFEE, with or without an additional procedure for inflow or outflow improvement.

Surgical Technique: The common femoral artery (CFA) and external iliac artery (EIA) are exposed via a vertical or oblique groin incision. All side branches are ligated and proximal control achieved with balloon occlusion. The CFA is then transected at its bifurcation and everted superiorly to the EIA. The endarterectomized segment is then re-anastamosed in an end-to-end fashion onto the CFA bifurcation or its branches, thus providing an autologous arterial reconstruction.

Results: 112 patients underwent IFEE with a total of 140 limbs over eight years. 59 limbs (42.1%) presented with critical limb ischemia and a mean ankle brachial index of 0.46±0.26. Mean age was 72.1 years and the American Society of Anaesthesiologists grade was three. A vertical incision was used in 93 cases. Post endarterectomy, the iliofemoral segment was re-anastamosed to the CFA bifurcation in 68 limbs (48.6%), PFA in 70 limbs (50%) and SFA in two limbs (1.4%). 49 procedures (35%) involved an additional profunda femoris or superficial femoral artery endarterectomy. 72 patients had adjunctive re-vascularization procedures including iliac stenting (40%) or distal bypass (31%).

The 30-day mortality was 3.6%, one of whom died secondary to an underlying malignancy. We noted 15 (10.1%) systemic complications and 16 (11.4%) minor complications. Systemic complications included four myocardial infarctions, one stroke, seven cases of sepsis and four cases of acute limb ischemia requiring thrombectomy. There was one patient with technical failure due to chronic occlusion. Minor complications included four groin infections, six wound dehiscences, and six surgical site collections, all managed conservatively. We report no amputations.

Conclusion: IFEE is a safe and alternative means of treating severe iliofemoral arterial disease.
#12: EXPERIENCED OPERATORS ACHIEVE SUPERIOR PRIMARY PATENCY AND WOUND COMPLICATION RATES WITH ENDOSCOPIC GREATER SAPHENOUS VEIN HARVEST COMPARED TO OPEN HARVEST IN LOWER EXTREMITY BYPASSES

**Presenter:** Helena Klein, Oregon Health and Sciences University**

**Authors:** HS Klein, MS Davis, GL Moneta MD, TK Liem MD, E Jung MD, CZ Abraham MD, GJ Landry MD

**Background:** Prior studies have suggested improved wound complication rates but decreased primary patency in lower extremity bypasses performed with endoscopic vein harvest (EVH) vs open harvest (OVH). We hypothesize that the inferior patency reflects the initial learning curve for EVH, and that with experience, improved patency can be achieved.

**Methods:** Single institution review of 113 subjects with critical limb ischemia that underwent infrainguinal bypass with a continuous segment of greater saphenous vein harvested either endoscopically (n=49) or through a single open incision (n = 64) from 2012 to 2017. EVH was performed by surgeons with > 5 years experience with this technique.

**Results:** There were no significant differences in patient demographics or medications between the two groups. Median operative time for OVH was 290 minutes and hospital length of stay 6 days, and for EVH 316 minutes and 5 days (p=ns). Harvest related wound complications were more frequent with OVH (28.6% vs 12.2%, p=0.037). Primary patency at 1 and 2 years was 57% and 41% for OVH, and 80% and 65% for EVH. Assisted primary patency at the same time points was 90% and 85% for OVH, and 97% at both times for EVH, p=0.11.

**Conclusions:** With experience, lower extremity bypass using EVH can result in improved primary patency compared to OVH, while also resulting in fewer wound complications and comparable operative times and hospital length of stay.
#13: VENOUS ARTERIALIZATION FOR NONRECONSTRUCTIBLE LOWER EXTREMITY ARTERIAL DISEASE - A MULTI-CENTRE CASE SERIES

**Presenter:** Kyle Arsenault, University of British Columbia**

**Authors:** KA Arsenault MD, LW Tse MD, J Gagnon MD, D Kelton MD, K Baxter MD, J Chen MD, W Johnson MD, V Kapila MD

**Background:** Approximately 15% of patients with critical limb ischemia are not candidates for revascularization due to lack of target outflow vessels. The prognosis for these patients is grim, with major amputation being the only option for pain control or wound healing. A potential alternative for these patients is venous arterialization of the foot, which may provide reverse flow to the capillary beds and increase collaterals.

**Methods:** Between January 2016 and February 2017, we performed fourteen venous arterialization procedures on thirteen patents for critical limb ischemia at three Canadian vascular surgery centres. We present a case series of our initial experience with this procedure, including indications, techniques, and patient outcomes.

**Results:** Patients undergoing a venous arterialization procedure were between 51 and 87 years old (median 73.5). Patients had significant comorbidities with diabetes mellitus in nine (69%), dialysis-dependence in three (23%), and contralateral amputations in three (23%). All patients had critical limb ischemia, with Rutherford classification of 4 in two limbs, 5 in ten limbs and 6 in two limbs. All patients had undergone previous attempts at revascularization, including either surgical bypass, tibio-pedal angioplasty, or catheter-directed thrombolysis for a thrombosed popliteal aneurysm. Patients underwent pre- or intraoperative ultrasound mapping of the distal greater saphenous vein (GSV) and the superficial venous system in the foot. A bypass was performed using the remaining ipsilateral GSV or harvested arm vein from the most distal suitable artery to the GSV, which was left in-situ. Through a venotomy at the ankle, valves proximally and distally were lysed. All patients had intraoperative completion angiograms. Three patients underwent concomitant digital amputations. Technical success was 93%. One patient died perioperatively. Primary patency at 30 days was 82%. Six patients had relief of their rest pain and wound healing. Four patients went on to have a major amputation and two have been offered amputation.

**Conclusions:** Venous arterialization may provide symptom relief and tissue healing in patients with otherwise nonreconstructible lower extremity arterial disease. Our early experience is encouraging, but further followup and development of post-procedure strategies are required to assist with the long term limb-salvage benefits of this procedure.
ABSTRACTS

#14: CELLULAR EFFECTS OF TOBACCO SMOKE EXPOSURE IN THE THORACIC AND ABDOMINAL AORTA

Presenter: No presenter available

Authors: TL Repella MD PhD, E Manalo BS, G Landry MD, C Abraham MD, L Sakai PhD, G Moneta MD, AF Azarbal MD

Background: Tobacco smoke exposure is a major risk factor for both aortic atherosclerosis and abdominal aortic aneurysms. The mechanism by which tobacco smoke can lead to aortic atherosclerosis and aneurysm is poorly understood. Specifically, the initial aortic changes caused by tobacco-smoke have not been described and the various contributions of nicotine and other noxious chemicals within tobacco smoke have not been differentiated. The objective of this study is to compare the cellular effects of tobacco smoke vs. nicotine on human aortic smooth muscle cells (HASMCs) and to look at the histologic changes in the aorta of both wild type (WT) and hyperlipidemic (apolipoprotein E knockout) mice exposed to solubilized tobacco smoke.

Method: We treated HASMCs with differing dilutions of solubilized tobacco smoke (2 cigarettes solubilized per 1 mL of buffer) to look at the relationship between solubilized tobacco smoke or nicotine concentration and cell death. Osmotic pumps with solubilized tobacco smoke were implanted into both WT and hyperlipidemic mice to investigate the effects of solubilized tobacco smoke exposure on the mouse aorta. Histologic and cellular changes in the abdominal and thoracic aorta where assessed with standard immunohistochemical methods.

Results: Treatment of HASMCs with solubilized tobacco smoke at dilutions higher than 1:1000 induce cell death while treatment of HASMCs with a nicotine only solution with similar nicotine concentration as the solubilized tobacco smoke did not. Treatment of WT mice with solubilized tobacco smoke resulted in elastin breaks in the aorta without a cellular infiltrate. Treatment of hyperlipidemic mice with solubilized tobacco smoke resulted in development of plaques in 67% of mice vs. 0% of controls. 33% of the mice developed plaques in the abdominal aorta while 50% developed plaques in the thoracic aorta (17% had plaques in both).

Conclusion: This study describes the early aortic changes caused by tobacco smoke exposure and differentiates between the effects of tobacco smoke versus nicotine alone. Solubilized tobacco smoke induces aortic smooth muscle cell death in vitro, while nicotine does not. In vivo, solubilized tobacco smoke causes breakage of elastin fibers without inciting and inflammatory infiltrate, and can enhance atherosclerotic plaque formation in hyperlipidemic mice.
#15: HOMOGRAFT AORTIC REPLACEMENT FOR CLOSTRIDIUM SEPTICUM AORTITIS

**Presenter:** Jason Hurd, University of Washington**

**Authors:** JR Hurd MD, N Singh MD, BW Starnes MD

**Background:** We present an interesting case of homograft aortic replacement with bilateral renal artery bypass and IMA re-implantation for Clostridium septicum aortitis.

**Method:** 82y M presenting with abdominal pain and nausea, found to have aortitis with retroperitoneal gas. Performed open cryopreserved 16mm homograft aortic replacement with antecedent axillofemoral bypass and sequential IMA reimplantation, R accessory renal reimplantation, BL renal artery bypass.

**Results:** Minimal ischemic time, hospital discharge on POD #9 on long-term antibiotic suppression.

**Conclusion:** Aortic homograft replacement with antecedent axillofemoral bypass and distal-to-proximal aortic reconstruction is a safe and feasible option for Clostridium septicum aortitis.
#16: EARLY EXPERIENCE WITH AN OFFICE BASED CATH LAB: MY FIRST 600 CASES

**Presenter:** Glen Roseborough, Advanced Vascular Therapy, LLC

**Authors:** Glen Roseborough, MD

**Methods:** Between 1/22/2016 and 7/28/2017, 600 patients were treated by a single practitioner in an office based cath lab (OBL). Interventions performed included 279 arterial procedures, 135 interventions for varicose veins, 173 procedures for dialysis access maintenance, and 13 miscellaneous venous procedures. Of the arterial procedures, 28 were diagnostic only while 251 involved intervention. Arterial territories treated included the innominate/subclavian arteries in 3, renal arteries in 9, mesenteric arteries in 3, iliac arteries in 53, femoral arteries in 115, popliteal artery in 58, and tibial arteries in 31; multiple territories were treated in some cases. Varicose vein interventions included radiofrequency ablation in 103, sclerotherapy in 21, and combined RFA/sclerotherapy in 11. Excepting sclerotherapy cases, all cases were performed under moderate IV sedation administered by a CRNA.

**Results:** There was no mortality. Morbidity requiring transfer to hospital included a panic attack, acute CHF, NSTEMI, cardiac arrest from Propofol toxicity requiring CPR and intubation, acute LE ischemia requiring urgent intervention, SFA rupture requiring urgent re-intervention, and stroke.

**Conclusions:** Vascular interventions can be safely performed in an OBL with a hospital transfer rate of approximately 1%.
#17: OPEN SURGICAL MANAGEMENT OF A PEDIATRIC PATIENT WITH MID AORTIC SYNDROME CAUSED BY NEUROFIBROMATOSIS TYPE I

Presenter: Jennifer Culig, University of British Columbia**
Authors: A Salvian MD, J Culig MD

**Background:** Neurofibromatosis is an autosomal dominant disorder with a birth incidence of 1 in 2,700. Six percent of these patients develop hypertension due to mid aortic syndrome.

Middle aortic syndrome is a narrowing of the abdominal aorta and its major branches. It has various etiologies. It is a rare condition that presents early in life and can manifest as renovascular arterial hypertension. Often children do not respond to antihypertensive medical therapy and require surgical intervention.

**Case:** We present a case of an 11 year old female diagnosed with Neurofibromatosis Type I. The patient presents with hypertension and mild abdominal pain caused by segmental narrowing of the abdominal aorta and stenosis of its major branches. We include her clinical diagnosis, workup and management of her vascular disease. Severe stenosis of both renal arteries and visceral vessels led to open surgical management with an aorto-aortic bypass, bilateral renal revascularization and SMA bypass. We describe the procedure in this presentation.

**Conclusion:** We illustrate the presentation, diagnosis, workup, and surgical management of a pediatric patient with a rare condition, mid aortic syndrome, caused by an uncommon etiology, neurofibromatosis Type I.
#18 CHARACTERIZATION OF EXTERNAL CAROTID ARTERY STENOSIS DUPLEX CRITERIA

**Presenter:** Shivam Swamy, University of Portland**

**Authors:** SS Swamy, VK Brar, A Chopra MD, AF Azarbal MD, E Jung MD, CZ Abraham MD, EL Mitchell MD, TK Liem MD, GJ Landry MD, GL Moneta MD

**Background:** The external carotid artery (ECA) is examined routinely in the performance of carotid duplex ultrasound. However, unlike the internal carotid artery (ICA), there is virtually no information available about the ECA with respect to the anticipated duplex ultrasound findings and patterns of velocity elevations. Rather, many vascular laboratories extrapolate ECA stenosis criteria from published criteria for >50% ICA stenosis of peak systolic velocity (PSV) ≥125 cm/sec. The purpose of this study is to provide a systematic description of ECA PSVs encountered in the vascular laboratory.

**Methods:** From Dec 16, 2016 to July 25, 2017, ECAs with peak PSV <125 cm/sec and ≥125 cm/s were prospectively identified from carotid duplex studies performed in our university hospital Intersocietal Accreditation Commission accredited vascular laboratory and categorized with respect to prevalence, distribution of ECA PSVs, and color aliasing as an indication of turbulent flow. Aliasing assessment was assessed by two individual reviewers and validated by Cohen’s Kappa coefficient. Differences between groups were assessed using a chi-squared test.

**Results:** 1324 ECAs from 662 subjects were analyzed. Of those, 174 subjects had 266 ECA PSVs ≥125 cm/s (20% of all ECAs) and 488 subjects had 976 ECA PSVs <125 cm/s (80% of all ECAs). Review of demographic data within the ≥125 cm/s group indicates a slightly greater occurrence of ECA PSV elevation in males compared to females (58.3% vs 41.7%). The average age of this population was 71 years old. 31.3% of elevated ECA PSV values were between 125-149 cm/s (6.3% of all ECAs); 23.4% were between 150-174 cm/s (4.7% of all ECAs); 12.1% were between 175-199 cm/s (2.4% of all ECAs); 33.3% were ≥200 cm/s (6.7% of all ECAs).

Color aliasing was able to be evaluated in 341 ECAs. Of these, 26.1% had ECA PSV <125 cm/sec with 2.2% showing color aliasing. 22.6% ECAs had a PSV of 125-149 cm/sec with 28.6% showing color aliasing. 16.4% of ECAs had a PSV of 150-174 cm/sec with 21.4% showing color aliasing. 9.7% of ECAs had a PSV of 175-199 cm/sec with 39.4% showing color aliasing. 16.4% of ECAs had a PSV of 200-300 cm/sec with 46.4% showing color aliasing. 8.8% of ECAs had a PSV of ≥300 cm/sec with 80.0% showing color aliasing.

Subjects were further divided into groups of PSV ≥200 cm/sec and <200 cm/sec. Among 89 ECAs with PSV ≥200 cm/sec, 64% had color aliasing. Of the 259 ECAs with PSV <200 cm/sec, 26.3% had color aliasing (p = <0.0001, κ = 0.730).

**Conclusion:** Data suggests that isolated PSVs >125 cm/sec overestimate stenosis in the ECA, while combined considerations of PSV >200 cm/sec and color aliasing are likely highly to be predictive of hemodynamically significant ECA stenosis. Criteria for >50% ECA stenosis should require PSVs considerably >125 cm/sec and may be enhanced by a combining of PSV with presence of color aliasing. This hypothesis requires testing by angiographic comparison.
#19: RETROSPECTIVE ANALYSIS OF MODERATE TO SEVERE CAROTID ARTERY STENOSIS ON CAROTID DUPLEX FOR IDENTIFICATION OF SCREENING RISK FACTORS: THE SCREENING CAROTID ARTERY RISK FACTOR STUDY (SCARFS)

**Presenter:** Kenneth Hassler, Maricopa Integrated Health System**

**Authors:** KR Hassler DO, M Segal DO, R Eubanks DO, M Sivakumar MD

**Background:** USPSTF guidelines recommend that there is no benefit of screening for carotid artery stenosis due to the low yield of benefit to a small prevalence among asymptomatic patients in the general population. This recommendation is based on evidence that harms of screening for asymptomatic carotid artery stenosis outweigh the benefits. In the United States there are half a million new strokes each year, resulting in approximately 150,000 deaths. Ultrasonography has little direct harm as a screening modality, and is associated with high sensitivity/specifity in determining severity of disease. The purpose of our study is to identify patient characteristics useful for the early identification and screening protocols applicable to moderate-to-severe carotid artery disease patients, with a goal to prevent potential long-term disability and surging medical costs related to carotid artery stenosis and stroke.

**Methods:** After IRB approval, a retrospective review was performed on patients age >18 years that underwent carotid artery duplex studies with identification of at least >50% stenosis from January 1, 2014 until November 1, 2016 in a single institution. Patient general characteristics including age, sex, obesity, smoking status, DM, HTN, HLD, PVD history, history of stroke, history of myocardial infarction, and history of coronary artery disease/coronal artery bypass graft were collected. Also, the blood velocity at the site of stenosis, percent stenosis, and plaque morphology analysis of each carotid duplex scans was collected. Descriptive statistics related to the characteristics of patients with moderate-to-severe carotid artery disease were presented.

**Results:** 174 patients, 89 females (51.1%) and 85 males (48.9%) met study criteria. Mean age was 75.6 years with a standard deviation of 10.5. Obesity (26%), current or former tobacco use (43.1%), HTN (93.6%), HLD (72.3%), history of PVD (26.6%), history of myocardial infarct (9.2%), and history of stroke/TIA (38.7%) were major findings.

**Conclusion:** Our results support that very high percentage of patients with HTN and HLD had >50% carotid artery stenosis. This preliminary study’s data alone, does not allow us to draw any definitive conclusions regarding risk factors. A future ongoing study of ours will compare these results with a cohort of
#20: CARDIAC ABNORMALITIES DETECTED BY TRANSTHORACIC ECHOCARDIOGRAPHY IN PATIENTS WITH TYPE B AORTIC DISSECTION

**Presenter:** Alexander Taylor, University of Washington**

**Authors:** AP Taylor MD, RV Freeman MD, M Bartek MD, S Shalhub MD

**Background:** There is a paucity of data on cardiac abnormalities associated with type B aortic dissection (TBAD). While routine in some practices, we do not obtain transthoracic echocardiograms (TTEs) on all patients with TBAD in the acute or subacute phase. We aimed to describe cardiac abnormalities detected by TTE and determine if TTE should be included in the initial workup of TBAD.

**Methods:** This is a single center retrospective review of patients with acute TBAD from 2000 to 2015. Clinical and TTE data were abstracted for studies obtained within 6 weeks after dissection. Congenital and valvular abnormalities, cardiac function and stigmata of hypertensive heart disease were ascertained. Characteristics and outcomes of patients with and without left ventricular hypertrophy (LVH) on TTE were compared.

**Results:** Of 238 patients with TBAD, 95 (40%) had TTEs (75% male). Studies were obtained at a median of 2 (range 1-42) days from TBAD. Most studies (62%) were obtained to evaluate left ventricular or cardiac function. Patients with TTE did not differ in age, gender and most comorbidities when compared to those without TTE. However, TTE patients were less likely to be Caucasian (64% vs. 76%, P=0.04), had longer average hospital stays (14 ± 12 vs. 10 ± 9 days, P<0.01) and tended to undergo endovascular aortic repair at a higher rate (35% vs. 27%, P=0.18). There were no congenital abnormalities, and advanced pathology of the mitral and aortic valves was uncommon. Left ventricular ejection fraction was normal (≥60%) in 81% of patients. At least mild pulmonary hypertension was present in 67% of patients (n=49 with available data). A majority of patients (56%) had at least borderline LVH, including 42% of patients without a history of hypertension. A comparison of those with and without LVH showed equal mean descending thoracic aortic diameter at the TBAD (3.7 ± 0.8 cm) and higher admission diastolic blood pressure in patients with LVH (101 ± 30 vs. 84 ± 25 mmHg, P=0.012). Patients with LVH had more pericardial effusions, were less likely to have Marfan syndrome, and tended to have more retrograde dissections or aortic rupture and longer hospital stays. Moreover, LVH patients tended to have higher all-cause mortality (37% vs. 24%, P=0.147), younger age at death (59 ± 13 vs. 67 ± 13 years, P=0.147) despite a similar age of TBAD onset, and undergo open surgical or endovascular aortic repair at a higher rate (30% vs. 21%, P=0.34).

**Conclusion:** Hypertensive heart disease is common in patients with TBAD even without a history of hypertension. While this study is underpowered, our exploratory findings demonstrate seemingly worse TBAD outcomes in patients with LVH. Further study is warranted to assess LVH as a potential novel biomarker for long-term complications from TBAD.
#21: URETERO-INTERNAL ILIAC ARTERY FISTULA PRESENTING AS LIFE THREATENING INTRAOPERATIVE HEMORRHAGE: DIAGNOSTIC CHALLENGE AND ENDOVASCULAR RESCUE

Presenter: Gautamn Sarwal, University of British Columbia**

Authors: G Sarwal MD, S Bidnur MD, ECP Chedgy MBBS MSc, and AG Kavanagh, MD MPH

Objective: We present a rare case of a patient who suffered life-threatening intraoperative hemorrhage after ureteric stent removal, due to an undiagnosed uretero-internal iliac artery fistula, during nephrectomy for unexplained hematuria. This case highlights the diagnostic challenges and further need for awareness of this pathology given multiple radiographic investigations that failed to reveal this fistula.

Case Report: A 66 year old female with chronic ureteric stenting, presented with persistent, visible hematuria and urosepsis. Arterial extravasation was not identified on multiple computed tomography arteriograms (CTA) or diagnostic renal arteriograms. To manage this unexplained hematuria, renal embolization and subsequently a nephrectomy, was performed with limited result. Provocative angiography was not considered preoperatively to rule out an uretero-arterial fistula. Intraoperatively, on stent removal, bright red, pulsatile blood was noted. The patient became hemodynamically unstable due to severe hemorrhage. Without a tamponading stent, pelvic arteriography demonstrated fistulation between the left internal iliac artery (IIA) and ureter, requiring endovascular rescue by means of coil embolization and endovascular covered stenting, providing immediate cessation of hematuria.

Conclusion: Although rare, the incidence of uretero-arterial fistulas is increasing due to ureteric stenting, pelvic radiation or surgery, and remains a life threatening emergency. It is not uncommon to have negative CTA examinations. The identification and treatment of the fistula may be challenging, often requiring the expertise of urology and endovascular surgery. This case highlights the need for further awareness of this pathology given high morbidity and mortality and its inherent diagnostic and treatment challenges.
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.
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.

L. 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
2017 Membership
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PNWVS 2018
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