PROGRAM

Southern California Vascular Surgical Society

41st Annual Meeting

April 28 – 30, 2023

La Quinta Resort Club and Spa

La Quinta, CA

ACKNOWLEDGMENT

Southern California Vascular Surgical Society gratefully acknowledges the educational grant support from the following companies:

Cook Medical

Gore & Associates

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History of the Southern California Vascular Surgical Society

On April 28, 1980, a group of well-known vascular surgeons representing various Southern California areas and local medical schools met for the purpose of forming a regional vascular surgical society. Max Gaspar initiated the first organizational meeting which was held at the Old Ranch Country Club in Long Beach on May 22, 1980. The founding members present were doctors John Ball, Max Gaspar, James McKittrick, Wesley Moore, Herbert Movius, Louis Smith and Richard Treiman. Doctors Wiley Barker, Eugene Bernstein, John Connolly and Peter Samuels were unable to attend.

The second organizational meeting was held at the Los Angeles County Medical Association building on April 12, 1981. A list of prospective members was reviewed and acted upon. Doctor Richard Treiman was selected as acting Secretary. A third organizational meeting was held at Yamamoto Restaurant in Los Angeles on May 13, 1981. The format of annual scientific meetings was discussed. Doctor Louis Smith offered to host the first Annual Meeting at Loma Linda University. The meeting was held at the Jerry L. Pettis Memorial Veterans Administration Hospital in Loma Linda on March 31, 1982. Seventy members and ten guests were in attendance. Doctor Richard Treiman was elected President and Doctor Louis Smith, Secretary.

Southern California Vascular Surgical Society

2023 Executive Council

Jason T. Chiriano, DO	President
Jessica O' Connell, MD	First President-Elect
Kaushal (Kevin) Patel, MD	Second President-Elect
Scott Musicant, MD	Secretary/Treasurer (2023)
Afshin Michael Molkara, MD	Recorder
Theodore Teruya, MD	Past President
Karen Woo, MD, PhD	Past President
Wesley Lew, MD	Membership Committee Chair
Sukgu Han, MD	Program Chair
Nii- Kabu Kabutey, MD	Councilor At-Large
Ali Azizzadeh, MD	Councilor At-Large
Kelley Hodgekiss- Harlow, MD	Councilor At-Large
Sharon Kiang, MD	Councilor At-Large

SCVSS Meetings

Year	City	President
1982	Loma Linda	Richard L. Treiman
1983	Los Angeles	Treiman Moore
1984	Los Angeles	Wesley S. Moore
1985	Santa Barbara	James E. McKittrick
1986	Long Beach	Max R. Gaspar
1987	Lake Arrowhead	Louis L. Smith
1988	San Diego	Eugene F. Bernstein
1989	Santa Barbara	Richard A. Lim
1990	Newport Beach	P. Michael McCart
1991	Marina Del Rey	Albert E. Yellin
1992	Dana Point Rey	Wiley F. Barker
1993	Coronado	Robert S. Ozeran
1994	Coronado	Samuel E. Wilson
1995	La Jolla	Ralph B. Dilley
1996	Dana Point	Rodney A. White
1998	La Jolla	John J. Bergan
1999	Ojai	Fred A. Weaver
2000	Indian Wells	D. Preston Flanigan
2001	Santa Barbara	George Andros
2002	San Diego	J. Dennis Baker
2003	Carlsbad	William J. Quinones-Baldrich
2004	La Jolla	Robert J. Hye
2005	La Quinta	Steven G. Katz
2006	Temecula	Jeffrey L. Ballard
2007	Coronado	Willis H. Wagner
2008	Westlake Village	Samuel S. Ahn
2009	Dana Point	Peter F. Lawrence
2010	Carlsbad (North San Diego)	Hugh A. Gelabert
2011	Ranchos Palos Verdes	Roy M. Fujitani
2012	Ojai	Paul L. Cisek
2013	Rancho Mirage	Christian de Virgilio
2014	Carlsbad	Carlos E. Donayre
2015	San Diego	Ahmed M. Abou-Zamzam, Jr.
2016	La Jolla	Vincent J. Guzzetta
2017	Rancho Mirage	Vincent L. Rowe
2018	Laguna Beach	John S. Lane, III
2019	Rancho Mirage	David A. Rigberg
2020	Virtual	Juan Carlos Jimenez
2021	Ojai	Karen Woo
2022	Coronado Island	Theodore Teruya
2023	La Quinta, CA	Jason Chiriano

SCVSS Past Leadership

Secretary-Treasurers

Louis L. Smith	1982-1985
P. Michael McCart	1985-1988
Robert S. Ozeran	1988-1991
Rodney A. White	1991-1994
D. Preston Flanigan	1994-1998
William J. Quinones-Baldrich	1998-2001
Willis H. Wagner	2001-2004
Roy M. Fujitani	2004-2007
Christian de Virgilio	2007-2010
Niren Angle	2010-2013
Juan Carlos Jimenez	2013-2016
Jason T. Chiriano	2016-2019
Kevin Kaushal Patel	2019-2021
Scott Musicant	2022-2024

Recorders

Ahmed M. Abou-Zamzam, Jr.	2006-2009
Theodore H. Teruya	2009-2012
Vincent L. Rowe	2012-2015
Jessica Beth O'Connell	2015-2018
Andrew Barleben	2018-2022
Afshin Molkara	2022-2024

Councilors

John D. Ball	1982
Wesley S. Moore	1982-1983
James E. McKittrick	1982-1984
P. Michael McCart	1982-1985
Wiley F. Barker	1982-1990
Eugene F Bernstein	1983-1986
Robert S. Ozeran	1984-1987
Robert F. Foran	1985-1988
John S. Pierrandozzi	1986-1989
J. Paul Thomassen	1987-1990
Samuel E. Wilson	1988-1991

SCVSS Past Leadership (continued)

Councilors (continued)

Ralph B. Dilley	1989-1992
Robert W. Harris	1990-1992
John N. Goodwin	1991-1995
George Andros	1992-1995
Donald D. Bell	1992-1993
Robert J. Hye	1993-1995
Fred A. Weaver	1993-1996
Steven G. Katz	1995-1998
Jeffrey L. Ballard	1995-1999
Robert J. Hye	1996-2000
Roy M. Fujitani	1999-2001
Willis H. Wagner	2000-2001
Carlos E. Donayre	2001-2003
Steven Sparks	2002-2004
Alan Williamson	2001-2004
Samuel S. Ahn	2002-2005
Wayne S. Gradman	2004-2006
Hugh A. Gelabert	2004-2007
James T. Dunn	2005-2008
Stephen R. Lauterbach	2006-2009
Niren Angle	2007-2010
Vincent L. Rowe	2008-2011
Vincent J. Guzzetta	2009-2012
Ian L. Gordon	2010-2013
John S. Lane	2011-2014
David A. Rigberg	2012-2015
Karen Woo	2013-2016
Brian G. DeRubertis	2014-2017
Theodore J. Teruya	2015-2018
Kaushal (Kevin) Patel	2016-2019
Christian Ochoa	2017-2020
Scott Musicant	2018-2021
Nii - Kabu Kabutey	2019-2022
Jessica O'Connell	2020-2023
Ali Azizzadeh	2021-2024
Kelley Hodgekiss-Harlow	2021-2024
Sharon Kiang	2022-2025

Invited Guest Speakers

1986 E. Stanley Crawford, MD
1987 John Porter, MD
1988 Larry Harker MD & Ronald Stoney, MD
1989 Larry Hollier, MD & Charles Peterson, MD
1990 Norman Hertzer, MD, Eugene Strandness, MD & Christopher Zarins, MD
1991 Allan Callow, MD, PhD & Richard Dean, MD
1992 Larry Hollier, MD & Ronald Stoney, MD
1993 Alexander Clowes, MD & Robert Hobson, MD
1994 Frank J. Veith, MD & Enrico Ascher, MD
1995 Kaj Johansen, MD, PhD & David Brewster, MD
1996 Keith Calligaro, MD & Thomas Fogarty, MD
1998 Peter Gloviczki, MD & William H. Pearce, MD
1999 Richard Cambria, MD & Kim Hodgson, MD
2000 Robert W. Hobson, II, MD & Donald Sliver, MD
2001 Peter Bell, MD, Keith Berwick, PhD & Richard M. Green, MD
2002 Thomas F. O'Donnell, Jr. MD & Gregorio A. Sicard, MD
2003 Enrico Ascher, MD & Anthony J. Comerota, MD
2004 K. Craig Kent, MD, Jon S. Matsumura, MD & Murray N. Ross, PhD
2005 Bruce A. Perler, MD, MBA
2006 Gregory L. Moneta, MD, Brenda K. Zierler, PhD & R. Eugene Zierler, MD
2007 Ronald L. Dalman, MD & Hazim J. Safi, MD
2008 Sean P. Roddy, MD & Blair Keagy, MD
2009 Anton N. Sidawy, MD & Michael S. Conte, MD
2010 Jack L. Cronenwett, MD & Roy K. Greenberg, MD
2011 R. James Valentine, MD & Daniel Clair, MD
2012 W. Darrin Clouse, MD FACS RPVI & Anthony J. Comerota, MD
2013 Alan B. Lumsden, MD & Jason T. Lee, MD
2014 Timothy A.M. Chuter, MD & Karl A. Illig, MD
2015 Elna M. Masuda, MD & David G. Armstrong, DPM, MD, PhD
2016 Julie A. Frieschlag, MD & Peter A. Schneider, MD
2017 Scott L. Stevens, MD
2018 Timothy A. M. Chuter, MD & Matt Thompson, MD
2019 Jeffrey Jim, MD, MPH & Malachi G. Sheahan III, MD
2020 John Ullmen, PhD & Benjamin W. Starnes, MD
2021 Melina Kibbe, MD & Gretchen Schwarze, MD
2022 Alik Farber, MD & Mark Nehler, MD
2023 Shipra Arya, MD & Frank R. Arko, III, MD

Robert J. Hye Best Trainee Awards

(BEST PAPER PRESENTATIONS)

2022 **FIRST PLACE**

Cyanoacrylate Embolization Versus Radiofrequency Ablation of the Greater Saphenous Vein: Clinical Outcomes Within a Health Management Organization

Caryssa Lim, MD, Kaiser Permanante, Fontana

SECOND PLACE

Single Stage and Two Stage Arteriovenous Fistulas Have Similar Outcomes

Rohini Patel, MD, University of California, San Diego

THIRD PLACE

Laser Fenestration in Complex Aortic Repair: Versatile Option in Difficult Anatomy, Emergencies and Bailouts

Peter Layman, DO, University of California, San Diego

2021 **FIRST PLACE**

The Order of Operative Repair Does Not Influence Outcomes in Patients with Concomitant Popliteal Artery and Orthopedic Injuries

Shauna Trinh, MD, Riverside University Health

SECOND PLACE TIE

Opioid Prescription for Index Hemodialysis Access Creation

Timothy Copeland, MPP, University of California, Los Angeles

SECOND PLACE TIE

Balancing Outcomes, Costs and Quality of Life in the Treatment of Chronic Mesenteric Ischemia: A Cost-Effectiveness Analysis

Christina Cui, MAS, University of California, San Diego

SECOND PLACE TIE

Carotid Duplex is not Warranted Before Transcatheter Aortic Valve Replacement

Cameron St. Hilaire, MD, Santa Barbara Cottage Hospital

Robert J. Hye Best Trainee Awards (continued)
(BEST PAPER PRESENTATIONS)

THIRD PLACE
Endovenous Microfoam Ablation of Truncal Veins with a Large Diameter Saphenofemoral and Saphenopopliteal Junction Results in Excellent Closure and Low Thrombotic Complication Rates
Amanda Chin, MD, University of California, Los Angeles

2020 **FIRST PLACE**
Anesthetic Choice During Transcarotid Artery Revascularization (Tcar) and Carotid Endarterectomy Impacts Risk of Myocardial Infarction (Mi)
RA Marmor MD MAS, University of California, San Diego

SECOND PLACE
Dual Antiplatelet Therapy Is Associated With Increased Risk of Bleeding and Decreased Risk of Stroke Following Carotid Endarterectomy
RA Marmor MD, University of California, San Diego

THIRD PLACE
Arteriovenous Fistula Maturation: Physical Exam vs Flow Study
BC Caputo MS3, Loma Linda University

THIRD PLACE
The Influence of Ethnicity On Outcomes of Peripheral Artery Disease in Southern California
JA Gabel MD, Loma Linda University

THIRD PLACE
Cost-Effectiveness Analysis of Carotid Endarterectomy Versus Transcarotid Artery Stenting
CL Cui BS, University of California, San Diego

2019 **FIRST PLACE**
ACS-NSQIP Targeted Database Evaluation of Obesity as a Risk Factor for Endovascular Aortic Aneurysm Repair Outcomes
S Maithel, University of California Irvine, Irvine, CA

Robert J. Hye Best Trainee Awards (continued)
(BEST PAPER PRESENTATIONS)

SECOND PLACE
Variations in Lower Extremity Use Endovascular Interventions and Atherectomy by Indication, Site of Service and Geographic Region
T Chiou, University of California Los Angeles, Los Angeles, CA

THIRD PLACE
Paneled Saphenous Vein Grafts Compared to Internal Jugular Vein Grafts in Venous Reconstruction After Pancreaticoduodenectomy
J Pantoja, University of California Los Angeles, Los Angeles, CA

2018

FIRST PLACE
Endovascular Reconstruction of the Subclavian Artery for Arterial Thoracic Outlet Syndrome
Meena M. Archie, MD
Ronald Reagan UCLA Medical Center, Los Angeles, CA

SECOND PLACE
Early Experience with Fenestrated and Branched Endografts for Endovascular Treatment of Complex Aortic Aneurysms
Antonio J. Covarrubias, MD
University of California, San Diego, La Jolla, CA

THIRD PLACE
Debranching of Supra-aortic Vessels with Femoral Artery Inflow for Late Ascending Aortic Rupture
Joshua A. Gabel, MD
Loma Linda University Medical Center, Loma Linda, CA

2017

FIRST PLACE
Ultrasound Vein and Artery Mapping by General Surgery Residents During Initial Consult Can Decrease Time to Dialysis Access Creation
Kelsey Gray, MD
Harbor–University of California Medical Center, Torrance, CA

Robert J. Hye Best Trainee Awards (continued)
(BEST PAPER PRESENTATIONS)

SECOND PLACE
Most Common Surgical Missteps in the Management of Venous Thoracic Outlet Syndrome Which Lead to Re-Operation
Mena Archie, MD
University of California, Los Angeles, Los Angeles, CA

THIRD PLACE
Pre-Operative Cardiac Stress Testing in the So Cal VOICe
Kaelan Chan, MD
University of California, Los Angeles, Los Angeles, CA

2016

FIRST PLACE
Dialysis Access Hemorrhage: Access Rescue from Surgical Emergency
Tazo Inui, MD
University of California, San Diego, La Jolla, CA

SECOND PLACE
Access to Post-Hospitalization Acute Care Facilities Depends on Payer Status for Open Abdominal Aortic Repair and Lower Extremity Bypass in the VQI
Jesus G. Ulloa, MD
University of California, Los Angeles, Los Angeles, CA

THIRD PLACE
Significance of Blunted Venous Waveforms Seen on Upper Extremity Ultrasound
Xuan-Binh D. Pham
Harbor-UCLA Medical Center, Torrance, CA

2015

FIRST PLACE
The Addition of Ultrasound Arterial Examination to Preoperative Upper Extremity Vein Mapping
Jerry J. Kim, MD
Harbor-UCLA Medical Center, Torrance, CA

Robert J. Hye Best Trainee Awards (continued)
(BEST PAPER PRESENTATIONS)

SECOND PLACE
Differential Endoleaks Rates After Endovascular Treatment of Infrarenal Abdominal Aortic Aneurysm Using Modular Bifurcated and Unibody Stent Grafts
Phong T. Dargon, MD
Loma Linda University Medical Center, Loma Linda, CA

THIRD PLACE
Vascular Access Complications Associated With Extracorporeal Membranous Oxygenation
Allan W. Tulloch, MD
University of California, Los Angeles, CA

2014

FIRST PLACE
Management of Spontaneous Isolated Visceral Artery Dissection: ARetrospective Review
Sae Hee Ko, MD
University of California at San Diego Medical Center, San Diego, CA

SECOND PLACE
Late Consequences of Type II Endoleak After EVAR
Vincent E. Kirkpatrick, MD
University California Irvine Medical Center, Orange, CA

THIRD PLACE (TIE)
The Management of Thoracic Aortic Aneurysms In Patients With Rare Aortic Anomalies Using Endovascular Techniques: Case Report and Review of Literature
Ankur Gupta, MD
Harbor-UCLA Medical Center, Torrance, CA

THIRD PLACE (TIE)
A Rare Case of Acroangiodermatitis Associated With A Congenital Arteriovenous Malformation (Stewart-Bluefarb Syndrome) In A Young Veteran: Case Report and Review of the Literature
Mark Archie, MD
UCLA Medical Center, Gonda (Goldschmied) Vascular Ctr, Los Angeles, CA

Robert J. Hye Best Trainee Awards (continued)

(BEST PAPER PRESENTATIONS)

2013 **FIRST PLACE**

Contemporary Medical Management of Asymptomatic Carotid Artery Stenosis In A Mixed Population
Jason Chang MD
Kaiser Permanente Southern California, Los Angeles, CA

SECOND PLACE

A Prospective Randomized Study Assessing Optimal Method ForTeaching Vascular Anastomoses Using A High Fidelity Model
Samuel Schwartz MD
Harbor-UCLA Medical Center, Torrance, CA

THIRD PLACE

Initial Experience With Off Label Use of Commercial Devices In Patients Unfit For Open Repair of Perivisceral Aortic Aneurysms
Andrew Barleben MD
UCLA Gonda Medical Center, Los Angeles, CA

2012 **FIRST PLACE**

Is Heparin Reversal Required for Safe Performance of Percutaneous Endovascular Aortic Aneurysm Repair?
Sinan Jabori - Medical Student
UCLA, Gonda (Goldschmied) Vascular Center, Los Angeles, CA

SECOND PLACE

Evaluation of Superficial Femoral Artery Remote Endarterectomy For the Treatment of Critical Limb Ischemia In Patients With Limited Autogenous Conduit
Neha Sheng MD
Jerry L. Pettis VA Hospital, Loma Linda, CA

THIRD PLACE

Claudication In Young Patients: Uncommon Symptoms SuggestUncommon Pathology
Andrew Barleben MD MPH
UCLA Gonda (Goldschmied) Vascular Center, Los Angeles, CA

Robert J. Hye Best Trainee Awards (continued)

(BEST PAPER PRESENTATIONS)

2011

FIRST PLACE

Impact of Sac Anchoring Prosthesis On Type II Endoleaks Following Endoluminal Exclusion of Abdominal Aortic Aneurysms

Houman Sahedi, MD

Harbor-UCLA Medical Center, Torrance, CA and Nellix International Investigators

SECOND PLACE

Outcomes of Retrieval Intent of Optional Inferior Vena Cava Filters: A Single Center Experience

Abid C. Mogannam

UC Irvine Medical Center, Irvine, CA

THIRD PLACE

Thoracic Outlet Syndrome In the Teenaged Athlete

Allan Tulloch, MD

UCLA Medical Center, Los Angeles, CA

2010

FIRST PLACE

Smaller Common Femoral Artery Diameter In African Americans: Implications For Peripheral Arterial Disease

Amy M. Tolan, MD

Harbor-UCLA Medical Center, Torrance, CA

SECOND PLACE

CTA As the Primary Diagnostic Modality In Penetrating Lower Extremity Vascular Injuries

Dina Wallin, BA

Harbor-UCLA Medical Center, Torrance, CA

THIRD PLACE

Carotid Endarterectomy In Academic Versus Community Hospitals: The NSQIP Data

Joy Garg, MD

Scripps Clinic Torrey Pines, La Jolla, CA

Robert J. Hye Best Trainee Awards (continued)
(BEST PAPER PRESENTATIONS)

2009 **FIRST PLACE**
Open Surgical Repair of Renal Artery Aneurysms In the Endovascular Era: A Safe, Effective Treatment For Both Aneurysm and Associated Hypertension
Ankur Chandra, MD
UCLA Gonda (Goldschmied) Vascular Center, Los Angeles, CA

SECOND PLACE
Will Carotid Endarterectomy For Asymptomatic Stenosis Match theResults of Best Medical Management?
Karen Woo MD
Scripps Green Hospital, La Jolla, CA

THIRD PLACE
Fasciotomy In Acute Limb Ischemia – Cui Bono?
Kelley D. Hodgkiss
UCSD Vascular & Endovascular Surgery, San Diego, CA

2008 **Endovascular Management of Mycotic Aortic Aneurysms & Associated Aorto-Aerodigestive Fistulae**
Wesley K Lew MD
USC Vascular Surgery and Endovascular, Therapy, Los Angeles, CA

Regional Variations In the Utilization of Carotid Endarterectomy
David P Magner MD
Cedars-Sinai Medical Center, Los Angeles, CA

Traumatic Injuries of the Inferior Vena Cava: The 20-Year Experience of a Level I Trauma Center
Jessica Deree MD
UCSD Division of Trauma/Critical Care, San Diego, CA

2007 **Carotid Reconstruction In Nonagenarians: Is Surgery Still A Good Option?**
Kelly L. Killeen, MD
Cedars-Sinai Medical Center, Los Angeles, CA

Robert J. Hye Best Trainee Awards (continued)

(BEST PAPER PRESENTATIONS)

2006 **Effect of Turbulence on Transit-Time Ultrasound Flow Waveform – Voltage/Frequency Analysis**
Scott Tobias, BS
University of California, Irvine, Medical Center, Orange, CA

2005 **Increased Incidence of Renal Cysts in Patients with Abdominal Aortic Aneurysms: A Common Pathogenesis?**
Arezou Yaghoubian, BS
Harbor-UCLA Medical Center, Torrance, CA

2004 **Endovascular Repair of A Thoracic Aorta Pseudoaneurysm Via the Axillary Artery**
Leoncio Kaw, Jr., MD
University of California, San Diego, Medical Center, San Diego, CA

2003 **Superiority of Autogenous Arteriovenous Hemodialysis Access: Maintenance of Function With Fewer Secondary Interventions**
Ganesha Perera, MD
University of California, Irvine, Medical Center, Orange, CA

Program Planning Committee

Sukgu Han, MD; Beatrix Leong, MD; and Kaushal (Kevin) Patel, MD

Course Objectives

LEARNING OBJECTIVES – ACCME INFORMATION

Topics will be presented which relate to the clinical treatment vascular surgery patients. Presentations will focus on best surgical practice and expert opinion.

1. Describe imaging guidance modalities available for endovascular aortic aneurysm repairs and the reinterventions following EVAR.
2. Describe the impact of regionalization and interfacility transfer of lower extremity emergencies.
3. Develop a strategy to minimize the risk of stroke in carotid revascularization.
4. Describe the impact of COVID-19 on the care of patients with chronic limb threatening ischemia.
5. Identify the limitations of on IFU use of the new thoracic branch devices currently available or soon to be available and its applicability in blunt thoracic aortic injury.
6. Describe the use of Mannitol during the open AAA repair and its mechanism as well as effect on the outcomes.

OVERALL OBJECTIVES

"The overall purpose of this activity is to enable the learner to..."

1. to improve the standard of care and practice of vascular surgery in the Southern California geographical area
2. to contribute to the active continuing education of its members
3. to advance the science and art of vascular surgery

Accreditation

Southern California Vascular Surgical Society (SCVSS)
SCVSS 2023 41st Annual Meeting | April 28 – 30, 2023 | LaQuinta, CA

Accreditation Statement

This activity has been planned and implemented in accordance with the accreditation requirements and policies of the Accreditation Council for Continuing Medical Education (ACCME) through the joint providership of Amedco and the Southern California Vascular Surgical Society. Amedco is accredited by the ACCME to provide continuing medical education for physicians.

Acknowledgement of Financial Commercial Support

Gore & Associates
Cook Medical

Joint Accreditation Statement

JOINTLY ACCREDITED PROVIDER™
INTERPROFESSIONAL CONTINUING EDUCATION

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

Physicians (ACCME) Credit Designation

Amedco LLC designates this live activity for a maximum of 6.50 *AMA PRA Category 1 Credits*™. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

Accreditation

Southern California Vascular Surgical Society (SCVSS)
SCVSS 2023 41st Annual Meeting | April 28 – 30, 2023 | LaQuinta, CA

American Board of Surgery (ABS) MOC

Successful completion of this CME activity, which includes participation in the evaluation component, enables the learner to earn up to 6.50 credits toward the CME and/or Self-Assessment requirements of the American Board of Surgery's Continuous Certification program. It is the CME activity provider's responsibility to submit learner completion information to ACCME for the purpose of granting ABS credit.

Disclosure of Conflict of Interest

The following table of disclosure information is provided to learners and contains the relevant financial relationships that each individual in a position to control the content disclosed to Amedco. All of these relationships were treated as a conflict of interest, and have been resolved. (C7 SCS 6.1-6.2, 6.5)

All individuals in a position to control the content of CE are listed in the program book. If their name is not listed below, they disclosed that they had no financial relationships with a commercial interest.

Name	Commercial Interest: Relationship
Sukgu Han	W. L. Gore & Associates, Cook Medical, Terumo, Vestek – Consultant/Scientific Advisory Board - Consulting fee
Juan Carlos Jimenez	Boston Scientific – Consultant - Consulting fee
Gregory Magee	W. L. Gore & Associates, Silk Road Medical – Consultant - Consulting fee
Eric Pillado	Research Resident - EBP is supported by a grant by the National Heart, Lung, and Blood Institute of the National Institutes of Health (T32HL094293)

CME Information

How to Get Your CME Certificate

1. Go to http://scvss.cmecertificateonline.com
2. Click on the 2023 Southern California Vascular Surgery Society Annual Meeting link.
3. Evaluate the meeting.
4. (Optional) Click on the 2023 Southern California Vascular Surgery Society Annual Meeting ABS MOC link.
5. (Optional) Complete all MOC questions.
6. Print, download, or save your certificate for your records.

Scientific Program

Indicates the presenter is eligible for the Robert Hye "Best Trainee" Award

FRIDAY APRIL 28, 2023

8:00 AM – 4:00 PM
Kaiser Endovascular Symposium – Flores Ballroom

10:00 AM – 4:00 PM
SoCal VOICe Meeting – Las Brises Room

3:00 PM – 6:00 PM
Sponsor and Exhibitor Set Up – Flores 5, 6, 7, 8

4:00 PM – 5:00 PM
Executive Meeting – Las Brises Room

6:00 PM – 7:00 PM
Welcome Reception – Hotel Waterfall

7:00 PM – 8:00 PM
Past Presidents Dinner *(invite only)* – The Studios

SATURDAY APRIL 29, 2023

7:00 AM – 9:00 AM
Breakfast with Sponsors – Flores 5, 6, 7, 8

7:00 AM – 12:30 PM
Registration – Flores Foyer

7:00 AM – 1:30 PM
Exhibits – Flores 5, 6, 7, 8

8:00 AM – 9:05 AM

General Session I - MISC-Practice Improvement

Moderators: Jason Chiriano, DO & Kelley Hodgkiss – Harlow, MD

8:00 AM – 8:10 AM
1. **GEOMETRICAL FACTORS AFFECT WALL SHEAR STRESS IN SACCULAR ANEURYSMS OF THE INFRARENAL ABDOMINAL AORTA**
Joe Luis Pantoja, MD, *VA Loma Linda Healthcare System*

8:10 AM – 8:20 AM
2. **READABILITY OF SPANISH-LANGUAGE ONLINE PATIENT EDUCATIONAL MATERIALS FOR PERIPHERAL ARTERY DISEASE DO NOT MEET RECOMMENDED STANDARDS AND REPRESENT A LITERACY BARRIER TO CARE**
Joel L. Ramirez, MD, *University of California, San Francisco*

8:20 AM – 8:30 AM
3. **NOVEL FEMORAL ARTERIAL ACCESS SIMULATOR AND SIMULATION-BASED MASTERY LEVEL AID TRAINEES IN IMPROVING CONFIDENCE AND SKILLSET**
Eric Pillado, MD, *Northwestern University Feinberg School of Medicine*

8:30 AM – 8:40 AM
4. **STEPPING UP: THE IMPACT OF COMPETITIVE LEVEL ON OUTCOMES OF TOS, A COMPARISON OF HIGH SCHOOL AND COLLEGIATE ATHLETES**
Stephanie D. Talutis, MD, MPH, *University of California Los Angeles*

8:40 AM – 8:50 AM
5. **THE IMPACT OF COVID-19 INFECTION ON OUTCOMES OF OPEN OR ENDOVASCULAR REVASCULARIZATION FOR CHRONIC LIMB-THREATENING ISCHEMIA: A MULTICENTER ANALYSIS**
Nadin S. Elsayed, MD, *University of California San Diego*

8:50 AM – 8:55 AM
6. **ESOPHAGEAL EROSION OF A CAROTID-CAROTID-SUBCLAVIAN BYPASS: A MULTIDISCIPLINARY APPROACH TO REPAIR**
William Duong, MD, *University of California Los Angeles*

8:55 AM – 9:00 AM
7. **OUTCOME OF CONCOMITANT ILIAC BRANCHED ENDOPROSTHESIS AND PHYSICIAN-MODIFIED FENESTRATED BRANCHED ENDOVASCULAR AORTIC REPAIR**
Jesse Han, *Keck Medical Center of USC*

9:00 AM – 9:05 AM
8. **A SINGLE INSTITUTION CASE SERIES OF TOTAL ENDOVASCULAR RELINING FOR TYPE 3 ENDOLEAKS IN TRADITIONAL EVAR GRAFTS WITH RAISED BIFURCATIONS**
Rohini J. Patel, MD, MPH, *University of California San Diego*

9:03 AM – 9:27 AM

Rapid Fire Session I

Moderators: Sukgu Han, MD & Micheal Brewer, MD

9:03 AM – 9:06 AM
9. **LONG TERM RESULT OF TRUE AND FALSE LUMEN DOUBLE BARREL ENDOVASCULAR REPAIR OF A GIANT POST-DISSECTION THORACOABDOMINAL AORTIC ANEURYSM**
Alyssa J. Pyun, MD, *University of Southern California*

9:06 AM – 9:09 AM
10. **MULTIDISCIPLINARY REPAIR OF A MYCOTIC AORTIC PSEUDOANEURYSM IN A PEDIATRIC PATIENT**
Shruthi Nammalwar, MD, *Cedars-Sinai Medical Center*

9:09 AM – 9:12 AM
11. **SPONTANEOUS AND IATROGENIC PSEUDOANEURYSMS IN EHLERS DANLOS - A CASE REPORT**
Alexander Schurman, MD, *Riverside University Health System*

9:12 AM – 9:15 AM
12. **PHYSICIAN MODIFIED TOTAL ENDOVASCULAR ARCH REPAIR: A CASE REPORT**
Joshua Fallentine, *University of California San Diego*

9:15 AM – 9:18 AM
13. **INTRAVASCULAR LITHOTRIPSY AND KISSING ILIAC STENTS FOR REVASCULARIZATION OF LARGE OCCLUSIVE AORTIC CORAL REEF PLAQUE**
Michael A. Chapek, BA, *Kaiser Permanente Bernard J Tyson School of Medicine*

9:18 AM – 9:21 AM
14. **EXTERNAL ILIAC ARTERY ANEURYSM ASSOCIATED WITH MULTIPLE LOWER EXTREMITY ARTERIOVENOUS MALFORMATIONS**
Lili Sadri, MD, *Cedars-Sinai Medical Center*

9:21 AM – 9:24 AM
15. **NOVEL USE OF INTRACARDIAC ECHOCARDIOGRAPHY (ICE) CATHETER IN TREATMENT OF TYPE II ENDOLEAKS VIA TRANSCAVAL APPROACH**
Nia Robinson, MD, *Kaiser Fontana Medical Center*

9:24 AM – 9:27 AM
16. **MYCOTIC ABDOMINAL AORTIC ANEURYSM RUPTURE SECONDARY TO BCG THERAPY MANAGED WITH EVAR**
Ulysses Cázares, *University of California Riverside, School of Medicine*

9:27 AM – 10:00 AM
Coffee Break with Educational Exhibits

10:00 AM – 10:50 AM

General Session II – Aortic

Moderators: Ali Azizzadeh, MD & Allen Murga, MD

10:00 AM – 10:10 AM

17. **EFFECT OF MANNITOL ADMINISTRATION DURING OPEN AAA REPAIR ON EARLY AND MID-TERM MORTALITY, OUTCOMES**

Daniel Willie-Permor, MD, MPH, CPH, *University of California, San Diego*

10:10 AM – 10:20 AM

18. **INITIAL OUTCOMES OF THORACIC BRANCH DEVICE FOR ENDOVASCULAR REPAIR OF THORACIC AORTIC TRAUMA**

Elizabeth L. Chou, MD, *Cedars-Sinai Medical Center*

10:20 AM – 10:30 AM

19. **MIDTERM OUTCOMES OF PHYSICIAN MODIFIED FENESTRATED-BRANCHED ENDOVASCULAR AORTIC REPAIR FOR TYPE IA ENDOLEAK AFTER FAILED PRIOR ENDOVASCULAR AORTIC REPAIR**

Alexander DiBartolomeo, MD, *University of Southern California*

10:30 AM – 10:40 AM

20. **PRELIMINARY ANALYSIS COMPARING THE CYDAR 3D IMAGING SYSTEM AND CONVENTIONAL ENDOVASCULAR ANEURYSM REPAIRS**

Aldin Malkoc, MD, *Kaiser Permanente Fontana Medical Center*

10:40 AM – 10:45 AM

21. **IMPACT OF PROPHYLACTIC POST-OPERATIVE VASOPRESSORS ON 30-DAY MORTALITY OF PATIENTS UNDERGOING TEVAR**

Narek Veranyan, MD, *University of California San Diego Health*

10:45 AM – 10:50 AM

22. **ANATOMICAL ASSOCIATIONS AND CLINICAL RELEVANCE OF THE AORTIC REMNANT DIVERTICULUM**

Sydney Meadowcroft, BS, *Loma Linda University Medical Center*

10:50 AM – 11:50 AM
Presidential Invited Guest Lecturer - Dr. Frank Arko
The Evolution of Therapy in Type-B Aortic Dissection

6:00 PM – 8:30 PM
Presidential Banquet with the Dial Ups – Frank Capra Ballroom

SUNDAY APRIL 30, 2023

7:00 AM – 10:30 AM
Sponsor Displays Open

7:00 AM – 8:00 AM
Breakfast Buffet

7:00 AM – 12:00 PM
Registration

8:00 AM – 8:55 AM
General Session III - Peripheral/Trauma
Moderators: Jesus Ulloa, MD & Linda Chun, MD

8:00 AM – 8:10 AM
23. **INTERFACILITY TRANSFER IS ASSOCIATED WITH HIGHER POSTOPERATIVE AMPUTATION IN PATIENTS UNDERGOING LOWER EXTREMITY BYPASS FOR ACUTE LIMB ISCHEMIA: A MULTI-INSTITUTIONAL STUDY FROM VASCULAR QUALITY INITIATIVE**
Munir P. Moacdieh, MD, *University of California San Diego*

8:10 AM – 8:20 AM
24. **INCREASED MORTALITY IN PATIENTS TRANSFERRED TO A LEVEL 1 TRAUMA CENTER WITH BLUNT AND PENETRATING EXTREMITY VASCULAR INJURIES**
Aldin Malkoc, MD, *Arrowhead Regional Medical Center*

8:20 AM – 8:30 AM
25. **OUTCOMES FOLLOWING BELOW ELBOW ARTERIAL TRAUMA**
Millicent Croman, MBBCh, *Harbor UCLA Medical Center*

8:30 AM – 8:35 AM
26. **ERECTOR SPINAE VERSUS SURGICALLY PLACED PAIN CATHETERS FOR THORACIC OUTLET DECOMPRESSION**
Karissa Wang, BS, *University of California Los Angeles*

8:35 AM – 8:40 AM
27. **PROPHYLACTIC MODIFIED SARTORIUS ROTATIONAL FLAP FOR HIGH-RISK GROIN DISSECTIONS IN VASCULAR SURGERY - A CASE SERIES**
Alexander Schurman, MD, *Loma Linda University*

8:40 AM – 8:45 AM
28. **ENDOVASCULAR MANAGEMENT OF URETERO-ARTERIAL FISTULAS: A CASE SERIES**
Nishant Sharma, MD, *University of California Irvine*

8:45 AM – 8:50 AM
29. **INTRAOPERATIVE COMPLETION ANGIOGRAPHY IS ASSOCIATED WITH IMPROVED LIMB SALVAGE RATE FOLLOWING LOWER EXTREMITY BYPASS IN PATIENTS WITH CHRONIC LIMB THREATENING ISCHEMIA**
Munir P. Moacdieh, MD, *University of California San Diego*

8:50 AM – 8:55 AM
30. **DELAY IN COMPLETION AMPUTATION AFTER CRYOAMPUTATION MAY LEAD TO IMPROVED SURVIVAL IN THE VETERAN POPULATION**
Kevin N. Martins, BS, *VA Loma Linda Healthcare System*

8:55 AM – 9:16 AM

Rapid Fire Session II

Moderators: Moderator: Kaushal (Kevin) Patel, MD & Isabella Kuo, MD

8:55 AM – 8:58 AM
31. **NOVEL APPROACHES FOR CHRONIC LIMB ISCHEMIA – RE-DO HYBRID DEEP VENOUS ARTERIALIZATION VIA THE POPLITEAL VENOUS SYSTEM**
Aldin Malkoc, MD, *Arrowhead Regional Medical Center*

8:58 AM – 9:01 AM
32. **MAY-THURNER SYNDROME IS NOT ONLY A "LEFT-SIDED" CONDITION – CONSIDERATION OF VENOUS ANATOMICAL VARIATIONS**
Jacqueline Xu, *Kaiser Permanente Bernard J Tyson School of Medicine*

9:01 AM – 9:04 AM
33. **THE OPEN REPAIR OF A COMMON HEPATIC ARTERY ANEURYSM WITH EROSION INTO THE COMMON BILE DUCT AND OBSTRUCTIVE JAUNDICE**
Claire Yang, MD, *Kaiser Permanente Los Angeles Medical Center*

9:04 AM – 9:07 AM
34. **TIBIAL ARTERY ANEURYSM IN EHLERS DANLOS PATIENT, RARE PRESENTATION OF DISEASE, DIAGNOSIS AND MANAGEMENT**
Claire Janssen, MD, *Kaiser Permanente San Diego*

9:07 AM – 9:10 AM
35. **HYBRID TECHNIQUE FOR THE RETRIEVAL OF AN EMBOLIZED AMPLATZER PATENT FORAMEN OVALE OCCLUDER INTO THE SUPRARENAL AORTA**
Brittany Sullivan, MD, *University of California Irvine*

9:10 AM – 9:13 AM
36. **A STEPWISE APPROACH TO TRANSCAROTID ARTERY REVASCULARIZATION (TCAR) IN A PATIENT WITH HISTORY OF NECK RADIATION AND PERMANENT TRACHEOSTOMY FOR LARYNGEAL CANCER**
Lili Sadri, MD, *Cedars-Sinai Medical Center*

9:13 AM – 9:16 AM
37. **TREATMENT OF POST-TCAR IN-STENT RESTENOSIS: CASE STUDY AND REVIEW**
Nicholas E. Olin, MD, *Riverside University Health System*

9:16 AM – 10:00 AM
Coffee Break with Educational Exhibits

10:00 AM – 11:00 AM
Dr. Dennis Baker Invited Guest Lecturer - Dr. Shipra Arya
Surgical Health Services Research: from Evidence to Implementation

11:00 AM – 12:00 PM

General Session IV - Cerebrovascular/HD/Venous

Moderators: Jessica O'Connell, MD & Nii - Kabu Kabutey, MD

11:00 AM – 11:10 AM
38. **STROKE PREVENTION IN BCVI: THE ROLE OF ASPIRIN 81 MG**
Sina Asaadi, *Loma Linda University Medical Center*

11:10 AM – 11:20 AM
39. **30-DAY RISK SCORE FOR MORTALITY AND STROKE IN PATIENTS WITH CAROTID ARTERY STENOSIS USING ARTIFICIAL INTELLIGENCE BASED CAROTID PLAQUE MORPHOLOGY**
Rohini J. Patel, MD, MPH, *University of California San Diego*

11:20 AM – 11:30 AM
40. **POST-OPERATIVE SURVIVAL AND OUTCOMES FOLLOWING HEMODIALYSIS VASCULAR ACCESS CREATION**
Karissa M. Wang, *University of California Los Angeles*

11:30 AM – 11:40 AM
41. **INCREASED BODY MASS INDEX AND REFLUX TIMES ARE ASSOCIATED WITH INCOMPLETE TARGET VEIN CLOSURE FOLLOWING MICROFOAM ABLATION OF INCOMPETENT TRUNCAL VEINS**
Amanda L. Chin, *Gonda Venous Center- University of California, Los Angeles*

11:40 AM – 11:50 AM
42. **SOCIAL INEQUITIES ASSOCIATED WITH INCREASED TUNNELED DIALYSIS CATHETER UTILIZATION AT AN URBAN HEMODIALYSIS CENTER**
Fares Al-Khouja, *University of California Irvine*

11:50 AM – 11:55 AM
43. **STATINS USED WITH ACE INHIBITORS OFFER BETTER PROTECTION THAN STATINS ALONE IN PATIENTS UNDERGOING CAROTID REVASCULARIZATION**
Daniel Willie-Permor, MD, MPH, CPH, *University of California San Diego*

11:55 AM – 12:00 PM
44. **SHORT-TERM OUTCOMES OF INTRAVASCULAR LITHOTRIPSY FOR TREATMENT OF CALCIFIED FEMORAL ARTERIAL LESIONS**
Jesse Y. Han, *Keck Medical Center of USC*

12:00 PM – 12:15 PM
Dr. Robert Hye Memorial Awards and Adjournment

12:15 PM – 12:45 PM
SCVSS Business Meeting

Indicates the presenter is eligible for the Robert Hye "Best Trainee" Award

Scientific Session Abstracts

Indicates the presenter is eligible for the Robert Hye "Best Trainee" Award

1. GEOMETRICAL FACTORS AFFECT WALL SHEAR STRESS IN SACCULAR ANEURYSMS OF THE INFRARENAL ABDOMINAL AORTA

Joe Luis Pantoja MD[1], Mary M. Lee DO[1], Sharon C. Kiang MD[1], Jeff D. Eldredge PhD[2]
[1]VA Loma Linda Healthcare System, [2]Department of Mechanical & Aerospace Engineering, University of California, Los Angeles

Background: Lower wall shear stress (WSS), the frictional force on the vessel wall created by blood flow and affected by vessel geometry, is predictive of aortic aneurysm growth and rupture. Yet, estimating WSS in a clinical setting is impractical whereas measuring aneurysm geometry on cross-sectional imaging is feasible. This study investigates the association between saccular aneurysm geometry of the infrarenal abdominal aorta and WSS.

Method: We used a patient specific, computational fluid dynamics model to create saccular aneurysms of the infrarenal abdominal aorta. The non-aneurysmal model is based on computed tomography images and is available through a public library of vascular models. Saccular aneurysms of varying geometry were created using this base model. The neck width, sac depth, and sac length varied from 1cm to 4cm (figure 1). The peak WSS, temporal average of WSS (TAWSS), and oscillatory shear index (OSI) were measured at the entire aneurysm sac (excluding the non-aneurysmal aorta) and at 3 cross sections along the aneurysm. Results were compared between the constructed, geometrically distinct saccular aneurysms.

Results: A smaller neck width was associated with a decrease in peak WSS and TAWSS. Decreasing the neck width from 4cm to 1cm decreased the peak WSS by 60% and the TAWSS by 83%. Neck width did not affect OSI. A deeper aneurysm sac was associated with a decrease in peak WSS and OSI. Increasing the sac depth from 1cm to 4cm decreased the peak WSS by 50% and OSI by 50%. Sac depth did not affect TAWSS. The ratio between sac depth and neck width (the aspect ratio) was negatively correlated to peak WSS ($p=0.013$). Peak WSS was more strongly associated with aspect ratio than neck width or sac depth, individually.

Conclusion: In saccular aneurysms of the infrarenal abdominal aorta, a smaller neck, a deeper aneurysm sac, and a larger aspect ratio decrease peak WSS. This combination of geometric characteristics may influence saccular aneurysm rupture. Moreover, geometry may serve as a clinically useful tool in estimating rupture risk.

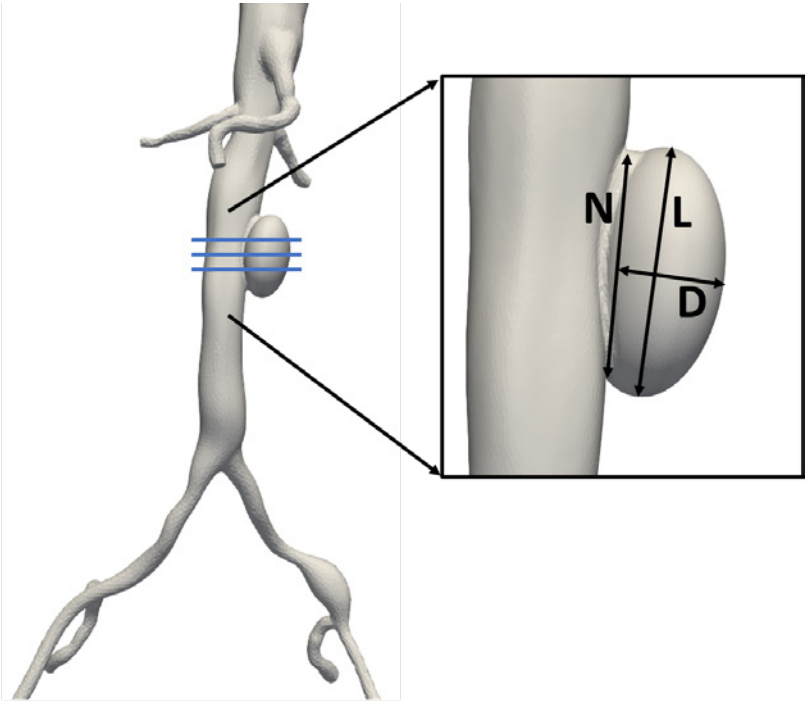


Figure 1: Computational fluid dynamics model of the abdominal aorta with a simulated infrarenal saccular aneurysm. The blue lines illustrate the planes used to measure wall shear stress. N=neck width, D=sac depth, L= sac length

2. READABILITY OF SPANISH-LANGUAGE ONLINE PATIENT EDUCATIONAL MATERIALS FOR PERIPHERAL ARTERY DISEASE DO NOT MEET RECOMMENDED STANDARDS AND REPRESENT A LITERACY BARRIER TO CARE

Joel L. Ramirez[1], Karissa Wang[2], Stephanie Hernandez[2], Monica Le[2], Tucker D. Avra[2], Stephanie Talutis[2], James C. Iannuzzi[1], Jesus G. Ulloa[2,3]
[1]Department of Surgery, Division of Vascular and Endovascular Surgery, University of California San Francisco, CA, [2]David Geffen School of Medicine, University of California Los Angeles, CA [3]West Los Angeles Veterans Health Administration, Los Angeles, CA

Background: Online resources are a valuable source of information for patients and have been reported to improve engagement and adherence to medical care. However, readability of online patient educational materials (OPEM) is crucial for them to serve their intended purpose. The American Medical Association (AMA) recommends that OPEM be written at or below the 6th grade reading level. To avoid disparities in access to comprehensible health information on peripheral artery disease (PAD), it is imperative that the readability of PAD OPEM is appropriate for both English- and Spanish-speaking patients. The aim of this study is to evaluate the readability of PAD OPEM in Spanish and compare to English-language OPEM.

Methods: We conducted a Google search in English and Spanish using "peripheral arterial disease" and "enfermedad arterial periferica", respectively, and the top 25 patient-accessible articles were collected for each. Articles were categorized by source type: hospital, professional society, or other. Readability of English-language OPEM was measured using the Flesch Reading Ease Readability Formula (FRES), Automated Readability Index, Coleman-Liau Index, Flesch-Kincaid Grade Level, Gunning Fog, Linsear Write Formula, and the Simple Measure of Gobbledygook Index. Readability of Spanish OPEM was measured using the Fernández-Huerta Index and INFLESZ Scale. Readability of the articles was compared to the AMA recommendation, between English- and Spanish-language, and across sources using statistical tests appropriate to the data.

Results: OPEM from professional societies represented the fewest number of English- (n=7, 28%) and Spanish-language (n=6, 24%) articles. Most English- (n=18, 72%) and Spanish-language (n=20, 80%) OPEM were considered difficult as measured by the FRES and Fernández-Huerta Index, respectively, but did not significantly differ between languages (P=0.59). There were no significant differences in the average readability of all readability measurements across sources (hospital, professional society, or other). All the average readability grade levels for English- and Spanish-language OPEM was significantly higher than the 6th grade reading level (P<0.01) (Table). Only three (6%) OPEM met the AMA recommended reading level and there was no significant difference between English- and Spanish-language OPEM (P=1.0) (Fig).

Conclusions: Nearly all Spanish- and English-language PAD OPEM assessed were written at a reading grade level higher than recommended by the AMA. There was no significant difference in the readability of materials from hospitals or professional societies. To prevent further widening of health disparities related to literacy, health content creators, particularly hospitals and professional societies, should prioritize, develop, and ensure that English- and Spanish-language patient education materials are written at a level appropriate for the public.

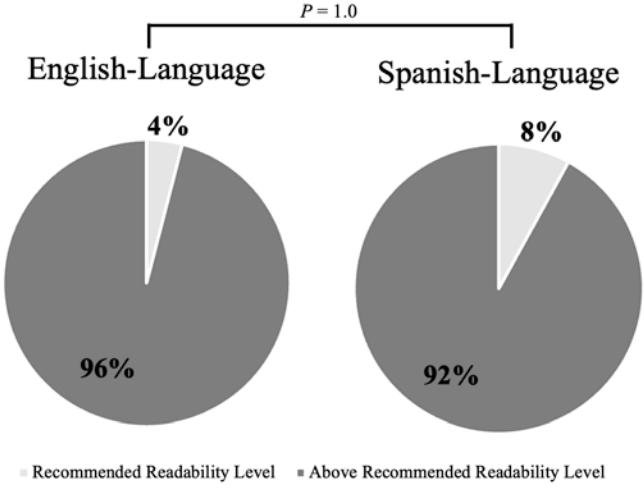


Figure. Few materials met the American Medical Association recommendation of a 6th grade reading level or lower.

	Median (Interquartile Range)	Comparison to 6th Grade or Lower Reading Level[a]
English (n=25)		
FRES[b]	54.3 (49.1-64.6)	*P*<0.01
Gunning Fog (grade level)	12.8 (11.7-14.0)	*P*<0.01
Flesch-Kincaid Grade Level (grade level)	9.8 (8.7-11.3)	*P*<0.01
Coleman-Liau Index (grade level)	11.0 (10.0-12.0)	*P*<0.01
SMOG (grade level)	9.6 (8.5-10.6)	*P*<0.01
Automated Readability Index (grade level)	9.7 (8.8-11.1)	*P*<0.01
Linsear Write Formula (grade level)	10.7 (8.6-12.2)	*P*<0.01
Spanish (n=25)		
Fernandez Huerta Index[b]	56.1 (51.3-58.6)	*P*<0.01
INFLESZ Scale[b]	51.7 (46.4-53.9)	*P*<0.01
FRES = Flesch Reading Ease Readability Forumla; SMOG = Simple Measure of Gobbledygook		
[a]Calculated using a Student's t-test with statistical significance set at *P*<0.05.		
[b]Scored from 0 (most difficult) to 100 (easiest).		

Table. Distribution of readability scores for English- and Spanish-language sites and how they compare to the recommended reading level.

3. NOVEL FEMORAL ARTERIAL ACCESS SIMULATOR AND SIMULATION-BASED MASTERY LEVEL AID TRAINEES IN IMPROVING CONFIDENCE AND SKILLSET

Eric Pillado MD[1], Marysa Leya MD[1], Ellie O'Brien BS[1], Ranya N. Sweis MD[1], Daniel Schimmel MD[1], Ashley Vavra MD[1], Kush Desai MD[1], Jeffrey H. Barsuk MD[1], Eric Hungness MD[1], Diane Wayne MD[1], Christian de Virgilio MD[2], Laura Davidson MD[1], Tadaki Tomita MD[1]
[1]Northwestern University Feinberg School of Medicine, Chicago, IL, [2]Harbor-UCLA Medical Center, Torrance, CA

Introduction: Femoral arterial access (FAA) is important for endovascular procedures with most trainees having limited exposure to practicing this skill set. Simulation-based mastery level (SBML) creates a curriculum to assess mastery level for trainees. Our objective was to assess our FAA SBML in our standard model compared to our novel simulation model.

Methods: This was a prospective study on cardiology fellows (CF) and vascular surgery trainees (VT) undergoing a FAA simulation-based mastery level. Pretest included using the standard FAA model at our institution with manual pumping to simulate arterial blood flow and instructional video on FAA. Trainees were graded using a 17-point SBML checklist. Trainees underwent the final SBML test on a novel FAA model with mechanical pulsatile flow and fluoroscopy simulation (Figure 1). All participants completed a confidential survey on their experiences with SBML and simulation models.

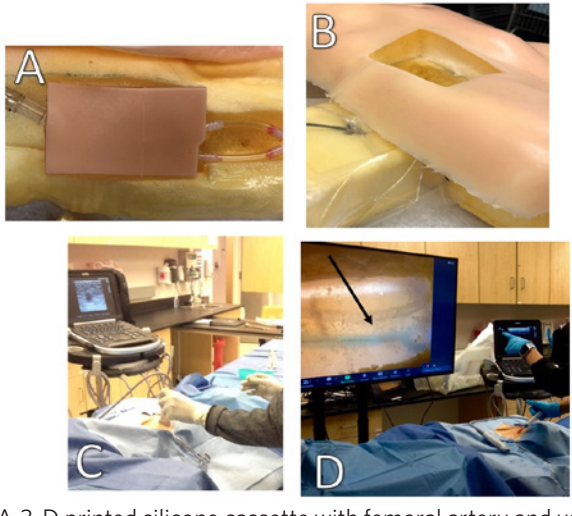
Results: Of nine participants, the majority were CF (n=7, 77.8%) with no prior clinical FAA experience (66.7%). The average pre-test score was 6 out of 17 (interquartile range (IQR 3,8)) with all trainees having an air and vascular complication significantly improved to 17 (IQR 17,17, $p<0.001$) with no air or vascular complications. All trainees reported the skills lab as a positive experience with the median score "Strongly Agree" for improving ability to perform FAA, overall FAA skill set, and more confidence to perform FAA after this simulation (Table I). Those with prior FAA experience preferred the tactile feedback on the novel model compared to those with no prior FAA experience (n=3 (100%) vs n=6 (0%), p=0.012).

Conclusion: All trainees reached mastery level through our FAA curriculum where trainees had no air or vascular complications in the post-test. All trainees reported a positive experience with the simulation for confidence in FAA and most trainees preferred the novel FAA simulator.

Table I: Post SBML Survey

	Median/ N=9	IQR/%
How would you rate the skills lab experience (1 Poor, 5 Excellent)?	4	(4,5)
The teaching in the skills lab improved my ability to perform femoral artery access (1 Strongly Disagree, 5 Strongly Agree):	5	(5,5)
The teaching in the skills lab improved my overall skill set (1 Strongly Disagree, 5 Strongly Agree):	5	(4,5)
Do you feel more confident with femoral arterial access after this simulation (1 Strongly Disagree, 5 Strongly Agree)?	5	(4,5)
Prefers Novel Simulator	7	77.80%
Preferred Novel Simulator's Tactile Feedback	3	33.30%
Preferred Novel Simulator's Pulsatile Flow	9	100.00%
Preferred Novel Simulator's Fluoroscopy	8	88.90%
Did the pulsatile flow help during the simulation?	8	88.90%
Did the angiogram help during the simulation?	8	88.90%
Would you want future arterial access simulations with the model from Session 2?	8	88.90%

Figure 1: Novel FAA Simulator



A.3-D printed silicone cassette with femoral artery and vein cast with tubing. B. Silicone torso where cassette is placed and video positioned below torso C. Simulator using the ultrasound to identify common femoral artery D. Simulation angiography depicting contrast (in blue) on the screen with the common femoral artery (black arrow) and bifurcation

4. STEPPING UP: THE IMPACT OF COMPETITIVE LEVEL ON OUTCOMES OF TOS, A COMPARISON OF HIGH SCHOOL AND COLLEGIATE ATHLETES

Stephanie D. Talutis, MD, MPH, Jesus G. Ulloa, MD, MBA,
Hugh A. Gelabert, MD
University of California Los Angeles, CA

Background: Thoracic outlet syndrome has life changing impact on young athletes. As the level of competition increases between high school (HS) and collegiate (CO) stage of athletics the impact of TOS may differ. Our objective is to compare surgical outcomes of thoracic outlet in HS and CO athletes.

Methods: Retrospective review of HS and CO athletes within a prospective surgical TOS database. Primary outcome: postoperative return to sport. Secondary outcomes: resolution of symptoms assessed with somatic pain scale (SPS) and QuickDASH scores.

Results: Thirty-two HS and 52 CO athletes were identified. Females comprised 82.9% HS and 61.5% CO athletes (p=0.08). TOS diagnoses were similar (Venous TOS: HS 50.0% vs CO 42.3%, Neurogenic TOS: 43.9% vs 57.7%, pectoralis minor syndrome (PMS): 6.3% vs 0.0%)(p=0.12).

Sports included baseball/softball (39.3%), volleyball (12.4%), and water polo (10.1%), and did not differ between groups (p=0.145). TOS operations were similar in HS and CO (First rib resection: 94.3% vs 98.1%, Scalenectomy: 0.0% vs 1.9%, pectoralis minor tenotomy (PMT): 6.3% vs 0.0%) (p=0.15). Follow up was 6.9 months for HS and 10.5 months for CO. Majority patients experienced symptom resolution (HS 80.0% vs CO 77.8%) (Table 1), as well as improvement in SPS and QuickDASH scores (Table 2). Return to sport was similar between HS and CO (72.4% vs 73.3%). HS had higher incidence of secondary injury cited as reason for not returning to sport (75.0% vs 16.7%, p=0.009). Other reasons for not returning to sport included medical conditions (12.5% vs 33.3%), and graduation (12.5% vs 33.3%) although these were similar between groups.

Conclusions: An unrelated second injury, medical condition and graduation are the most common reasons prohibiting return to sports. Despite increased level of competition, CO demonstrate similar high rates of symptom resolution and return to competition as HS following TOS surgery.

Table 1: Postoperative Outcomes

	HS N = 32	CO N = 52	Total N = 84	P value
Symptom Resolution	80.0%	77.8%	78.8%	1.00
Return to Sport	72.4%	73.3%	73.0%	0.93
Reason for not returning				
Secondary Injury	75.0%	16.7%	40.0%	**0.009***
Medical Condition	12.5%	25.0%	20.0%	0.49
Graduation as reason for not returning	12.5%	33.3%	25.0%	0.39
Follow Up Duration, months	6.9 ± 10.9	10.5 ± 1.7	9.1 ± 16.2	0.39

HS = High school
CO = Collegiate
*Significance defined as p<0.05.

Table 2: Comparison of Pre- and Post-Operative SPS, QuickDASH, and Derkash Scores (might make this a figure instead)

	QuickDash		
	Pre-Op	Post-Op	P
HS	55.3 ± 22.7	25.9 ±19.4	<0.001*
CO	45.7 ± 21.3	20.7 ± 18.8	<0.001*
Overall	49.4 ± 22.1	20.7 ± 18.8	<0.001*

	SPS		
	Pre-Op	Post-Op	P
HS	2.8 ± 2.9	1.2 ± 2.1	0.035*
CO	4.6 ± 3.2	1.1 ± 1.9	<0.001*
Overall	3.9 ± 3.2	1.1 ± 2.0	<0.001*

HS = High school
CO = Collegiate
*Significance defined as p<0.05.

5. THE IMPACT OF COVID-19 INFECTION ON OUTCOMES OF OPEN OR ENDOVASCULAR REVASCULARIZATION FOR CHRONIC LIMB-THREATENING ISCHEMIA: A MULTICENTER ANALYSIS

Nadin S. Elsayed MD, Ann C. Gaffey MD, Mahmoud B. Malas MD MHS
University of California, San Diego, CA

Objectives: Our knowledge of COVID-19 is still rapidly evolving. To date, we do not yet know the broad impact of this pandemic on vascular surgery patients. It has been reported that patients with vascular diseases are at high risk of developing complications, particularly thromboembolic if infected by COVID-19. Our aim is to describe the postoperative outcomes and one-year survival of patients with COVID-19 infection undergoing open or endovascular revascularization for chronic limb-threatening ischemia (CLTI).

Methods: We retrospectively reviewed all patients undergoing peripheral vascular interventions (PVI) and infrainguinal bypasses in the vascular quality initiative database from 2020-2022. Multivariable logistic and Cox regression analyses were used to assess in-hospital outcomes and one-year survival, respectively.

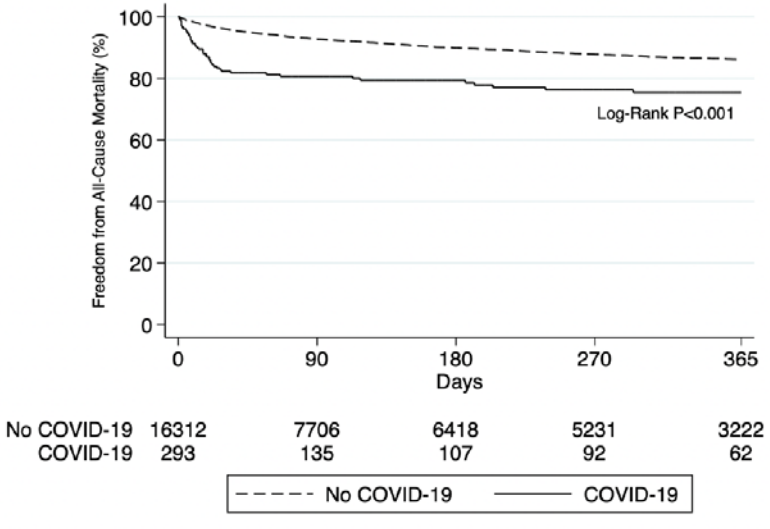
Results: A total of 16,608 patients underwent PVI, and 10,460 patients underwent infrainguinal bypasses. The percentage of urgent/emergent cases among COVID-19 patients was 50.9% for PVI and 40% for infrainguinal bypass patients. COVID-19 patients undergoing PVI were at higher risk of in-hospital mortality (10.9% vs 1.8%, P<0.001; aOR: 4.9, 95%CI:3.2-7.9, P<0.001), ipsilateral amputation (17.7% vs 10.6%, P<0.001; aOR: 1.8, 95%CI:1.2-2.5, P=0.002), renal complications (4.1% vs 1.8%, P=0.003; aOR: 1.9, 95%CI:1.1-3.5, P=0.026), and pulmonary complications (6.8% vs 1.2%, P<0.001; aOR:4.9, 95%CI:3.0-7.9, P<0.001)(Table 1). COVID-19 patients undergoing infrainguinal bypass were at high risk of ipsilateral amputation (aOR: 1.6, 95%CI:1.0-2.6, P=0.049) (Table 1). At one year, COVID-19 patients undergoing PVI had higher mortality (24.6% vs 13.8%, P<0.001; aHR: 2.1, 95%CI:1.5-2.9, P<0.001) (Figure 1).

Conclusions: In this multi-institutional international study we were able to show the wide impact of COVID-19 on CLTI patients. There was a significant increase in the risk of in-hospital and one-year mortality in patients undergoing PVI. COVID-19 infection also increases the risk of limb loss in patients undergoing PVI and infrainguinal bypasses. Renal and pulmonary complications were also higher. Patients should be informed of the higher risk of adverse events associated with COVID-19. Medical optimization and close follow-up of COVID-19 patients are imperative to reduce the risk of morbidity and mortality. Postponing elective cases should be considered to avoid the high risk of complications.

Table 1. In-hospital outcomes

Patients undergoing peripheral vascular interventions					
	No COVID N=16,315	**COVID N=293**	**P value**	**aOR (95%CI)**	**P value**
Mortality	293 (1.80)	32 (10.92)	<0.001	4.9 (3.2-7.9)	<0.001
Ipsilateral amputation	1,007 (10.62)	43 (17.70)	<0.001	1.8 (1.2-2.5)	0.002
Cardiac complications	426 (2.61)	12 (4.10)	0.116	1.2 (0.6-2.4)	0.610
Renal complications	285 (1.75)	12 (4.10)	0.003	1.9 (1.1-3.5)	0.026
Pulmonary complications	187 (1.15)	20 (6.83)	<0.001	4.9 (3.0-7.9)	<0.001
Patients undergoing infrainguinal bypass					
Mortality	176 (1.71)	3 (1.86)	0.881	0.8 (0.2-3.3)	0.539
Ipsilateral amputation	1,268 (12.40)	28 (17.50)	0.053	1.6 (1.0-2.6)	0.049
Respiratory complications	216 (2.11)	7 (4.38)	0.050	2.4 (0.9-6.1)	0.077
Cardiac complications	366 (3.58)	5 (3.14)	0.768	0.9 (0.4-2.2)	0.839
Renal complications	464 (4.54)	6 (3.75)	0.634	0.9 (0.3-2.2)	0.768

Figure 1. Kaplan Meier survival of PVI patients



6. ESOPHAGEAL EROSION OF A CAROTID-CAROTID-SUBCLAVIAN BYPASS: A MULTIDISCIPLINARY APPROACH TO REPAIR

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Background: First described by Moore et al in 1976, the carotid-carotid bypass has become a useful extra-anatomic alternative to carotid artery revascularization to avoid median sternotomy. Although the graft can be tunneled anteriorly or posteriorly, studies have shown excellent graft patency in the retroesophageal position, which provides the shortest bypass route and is protected from injury. However, some case reports have suggested the incidence of post-operative dysphagia and recommend the anteroinferior tunneling approach. We present a complex case in which a retroesophageal carotid-carotid bypass developed esophageal erosion and required a multi-disciplinary approach to repair.

Method: We present a 42-year-old female with a history of coarctation of the aorta and ventricular septal defect (VSD) who underwent aortic repair at the age of four followed by a redo median sternotomy with pericardial patch closure of her VSD at the age of 22. She was found to have a large 8.1 cm saccular aortic aneurysm at the site of her coarctation repair in the proximal descending segment of her thoracic aortic arch and underwent staged repair. A right to left carotid to left subclavian bypass was completed with a left vertebral artery transposition followed by a zone 1 thoracic endovascular stent graft placement in 2021. In 2023, she developed recurrent bacteremia with work-up suggestive of graft infection (Figure 1).

Results: Given the ongoing sepsis and mechanical erosion of the graft into the esophagus, our patient required explantation of the graft and potentially revascularization. This was particularly high risk given her history of multiple cardiothoracic and neck surgeries further complicated by a history of known complete right recurrent laryngeal nerve injury (RLNi) and partial left RLNi. She first underwent an endovascular balloon occlusion of her left internal carotid artery, which was able to be completed successfully for 45 minutes without neurologic changes on electroencephalogram even with reduction of systolic blood pressure to less than 100 mmHg (Figure 2). Vascular surgery then completed an exploration of her right and left carotid artery, excision of the infected bypass graft, repair of the right carotid artery with a saphenous vein patch, and ligation of the left internal carotid artery. The left subclavian artery bypass graft was also excised. Otolaryngology and thoracic surgery then primarily repaired the esophagus protected by a sternocleidomastoid rotational flap. A prophylactic tracheostomy and gastrostomy were constructed.

Conclusion: The patient had an uneventful postoperative course without any peri or post-operative neurovascular events. Although rare, a retroesophageal carotid-carotid bypass can erode the esophagus and lead to sepsis with risk of high morbidity/mortality. A multi-disciplinary approach can be successful in planning an operative strategy for repair.

Figure 1

Figure 2

7. OUTCOME OF CONCOMITANT ILIAC BRANCHED ENDOPROSTHESIS AND PHYSICIAN-MODIFIED FENESTRATED BRANCHED ENDOVASCULAR AORTIC REPAIR

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Background: Treatment of iliac aneurysms with the iliac branch endoprosthesis (IBE) has been well-documented to be effective with high patency rates, good freedom from reintervention, and decreased pelvic ischemic complications. However, there is limited data evaluating the safety and efficacy of treating complex abdominal (cAAA) and thoracoabdominal aortic aneurysms (TAAA) with associated iliac aneurysms with concurrent physician-modified fenestrated branched endovascular aortic repair (PM-FBEVAR) and IBE. Therefore, we describe the outcomes of concomitant PM-FBEVAR and IBE for the treatment of cAAA/TAAA, associated with iliac aneurysms.

Methods: A single institution retrospective review of consecutive patients who underwent staged or concurrent PM-FBEVAR and IBE between September 2015 and December 2022 was conducted. Patients with both unilateral and bilateral IBE implantation were included. Patients without follow-up computed tomography angiography imaging were excluded. Patient demographics, technical success, and operative factors were analyzed. Primary outcome was the incidence of pelvic ischemia manifested by buttock, thigh claudication, spinal cord ischemia, as well as patency of internal and external limbs of the IBE. Secondary outcomes included 30-day major adverse events (MAE), 30-day mortality, type IB or III endoleaks.

Results: A total of 22 patients were treated with concomitant PMEG and IBE, of which 3 were treated with bilateral IBEs. There was no buttock claudication or spinal cord ischemia. Patency of ipsilateral internal iliac artery limb and external iliac artery limb were 96% (24 of 25) and 100%, respectively, during mean follow-up of 14 months. The patient with occlusion of internal iliac limb was asymptomatic and received no re-intervention. Technical success was 100%. 30-day MAE rate was 4.5% (1 of 22) with one patient experiencing myocardial infarction. 30-day mortality was 4.5% (1 of 22) with one death due to intracerebral hemorrhage. One patient experienced a type III endoleak during follow-up, but this occurred in the thoracic aorta and did not involve the IBE.

Conclusion: Treatment of aortoiliac aneurysms using concomitant PMEG and IBE is feasible with high efficacy and safety. Long-term follow-up is planned to assess durability of repair with PMEG and IBE.

Table 1.

	PMEG and IBE	
Total Patients	22	
Total IBEs	25	
Endoleak at IBE on follow-up		
Type IB	0	0%
Type III	0	0%
Primary patency after IBE implantation		
Internal iliac artery	24	96%
External iliac artery	25	100%
Intra-Operative Metrics		
Procedure time (min)	338 ± 121	
Iodinated contrast (cc)	131 ± 62.5	
Fluoroscopy time (min)	70 ± 26.7	
Estimated blood loss (cc) [median, IQR]	175.5 [475]	
RBC transfused (units)	1.0 ± 1.5	
30-day Outcomes		
Major adverse events	1	4.5%
Mortality	1	4.5%
All-time Outcomes		
All-cause mortality	4	18.2%
New onset ipsilateral buttock claudication	0	0%
Spinal cord ischemia	0	0%

8. A SINGLE INSTITUTION CASE SERIES OF TOTAL ENDOVASCULAR RELINING FOR TYPE 3 ENDOLEAKS IN TRADITIONAL EVAR GRAFTS WITH RAISED BIFURCATIONS

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Background: Many devices used to repair abdominal aortic aneurysms (AAA) elevate the aortic bifurcation. This graft configuration limits options for future repairs in the event of a type 3 endoleak (T3EL). First-generation devices are susceptible to T3EL, including the Medtronic AneuRx and the Cook Zenith grafts. Often, repair is accomplished by conversion to an aorto-monoiliac device, with femoral-femoral bypass. The goal of this case series is to provide technical details and outcomes regarding a novel technique to re-line these grafts to treat T3EL, while maintaining patency of both iliac limbs.

Methods: This was a single institution case series of patients who had endoleaks requiring intervention after a previously placed graft with an elevated aortic bifurcation (Figure 1a). Primary outcomes included technical success (i.e. placement of all planned devices), resolution of T3EL, aneurysm size at follow-up, and requirement for reintervention. Secondary outcomes included 30-day complications, aneurysm-related mortality (ARM), and all-cause mortality (ACM). Technical details of the operation include back table deployment of an Ovation device, modification of the deployment system tether and preemptive placement of an up and over 0.014" wire (Figure 1b). The wire is placed up and over and hung outside the contralateral gate. Once the main body is introduced above the old graft, the 0.014" is snared from the contralateral side and externalized. The main body is then able to be seated at the bifurcation, as the limb is not fully deployed, and then device deployment is completed per IFU (Figure 1c).

Results: We report 4 interventions for T3EL, three of which were initially treated with an AneuRx graft and one with a combination of Gore and Cook grafts. All four patients were male with an average age of 84.5 years at time of re-lining. Re-line was performed at least 10 years after the index EVAR surgery (Table I). Primary outcomes including technical success was 100%, and absence of type 1 or 3 endoleaks at last follow-up. One patient required reintervention due to type 2 endoleak with sac growth. Secondary outcomes included one case of cardiac dysfunction due to demand ischemia within 30 days. ARM was 0% and ACM was 25% at average follow up of 2.44 years due to unknown reasons.

Conclusion: Late complications of EVAR include aortic degeneration, stent migration, or stent material damage, causing endoleak and device failure. In this case series, we present an endovascular technique to treat T3EL, in patients with previous graft with elevated aortic bifurcations. Using modified Ovation stent grafts, complete graft re-lining was accomplished without evidence of type 1 or 3 endoleaks on follow-up imaging. This approach allows treatment of T3EL with a high graft bifurcation, while maintaining patency of both iliac limbs.

Figure 1: Endoleak Requiring Re-Intervention
1a Initial Angiogram
1b Back table Modification
1c Completion Angiogram

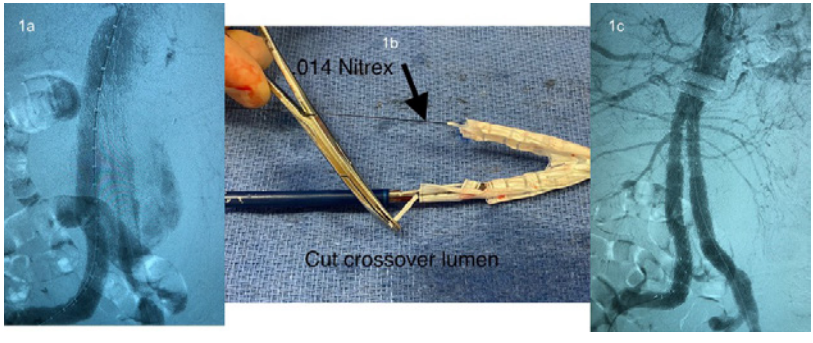

Table 1: Aneurysm History

Patient	Original EVAR	Aneurysm Size at Initial EVAR	Reinterventions Prior to Re-Line	Follow-Up Aneurysm Size	Indication for Re-Line	Date of Surgery
1	2000	78	Limb Extensions	80	3b EL	7/7/16
2	2001	68	None	68	1/3 EL	1/18/18
3	2008	63	Coil embolization x 2	89	3b EL	4/27/18
4	2012	unknown	Coil embolization x 3, re line of limbs, open sacotomy	93	3/5 EL	2/11/22

17. EFFECT OF MANNITOL ADMINISTRATION DURING OPEN AAA REPAIR ON EARLY AND MID-TERM MORTALITY, OUTCOMES

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Objectives: Mannitol has been used in some patients to reduce acute kidney injury incidence after vascular surgery. The routine use of mannitol is not a standard recommendation as there is no strong level of evidence to support its potential benefits in reno-protection. Studies in the contemporary era are scanty to examine its usefulness. Using an international multi-center dataset, we seek to examine the current trends of benefits or otherwise of mannitol use vs no mannitol use. Our results will strengthen current SVS recommendations or open a new avenue for further studies on mannitol benefits in mortality, reno-protection and other post-op outcomes.

Methods: Multivariable logistic regression was used to assess the association between perioperative outcomes and the use of mannitol, adjusting for potential confounders, using the multi-center VQI data from One-year survival was evaluated using Kaplan-Meier survival curves and Log-rank tests. Cox-regression analysis was used to study the association between the use of mannitol and 1-year mortality, adjusting for potential confounders, including proximal clamp location. Analysis was conducted using Stata version 17 SE (Stata Corp, College Station, TX). Statistical significance was defined as $\alpha < 0.05$.

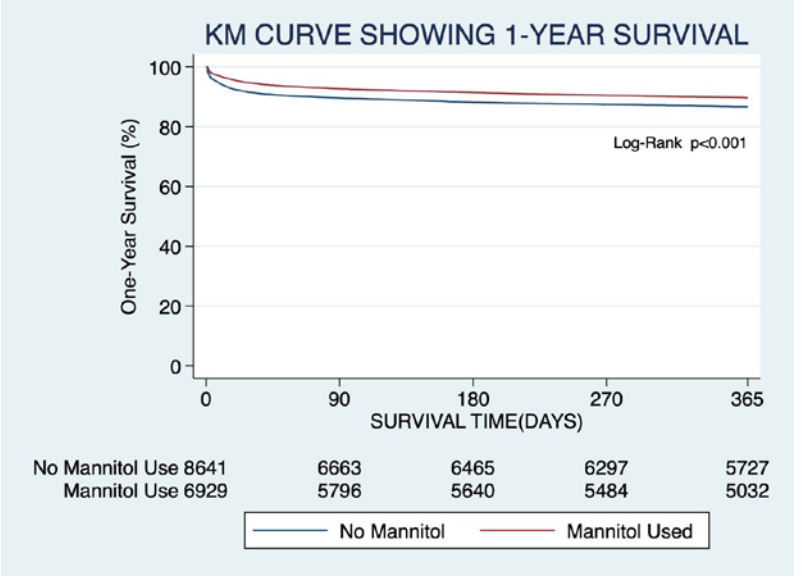
Results: The final study population consisted of 8,963 patients who did not receive mannitol during open AAA repair, and 6,998 patients who did. 8,522 patients had infrarenal clamp location, 30% of whom received mannitol: 2,124 patients had clamp location above one renal, of whom 58% received mannitol; 3,614 patients had clamp location above both renals, of whom 67% received mannitol; 1505 patients had a supra-celiac clamp location, of which 49% received mannitol.

Overall, 30-day all-cause mortality was higher in each patient group stratified by clamp location in non-receivers of mannitol vs receivers:9.6% vs 5.4% in infrarenal group, p<0.001; 10.4% vs 5.7% in suprarenal(one renal) group, p<0.001; 14.4% vs 6.8% in the suprarenal(both renals) group, p <0.001; and 32.8% vs12.0% in the supra celiac group, p<0.001.

Patients who received mannitol had lower incidence of 30-day mortality(IRR 0.76, 95% CI 0.66-0.87, p<0.001). One-year survival probability in the mannitol group was 89.7% vs 86.7% in the non-mannitol group.(Log-rank p<0.001) (Figure 1). The adjusted hazards of 1-year mortality was lower in the mannitol group compared to the non-mannitol group(aHR0.82, 95% CI 0.72-.94, p=0.003)

Conclusion: Mannitol use could offer reduction in postop and long term mortality regardless of proximal clamp location used. Further studies are required to analyze its benefits or otherwise in reno-protection.

FIG 1: Kaplan-Meier Curve Showing One-Year Survival In Both Groups



18. INITIAL OUTCOMES OF THORACIC BRANCH DEVICE FOR ENDOVASCULAR REPAIR OF THORACIC AORTIC TRAUMA

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Objective: Endovascular repair of blunt aortic injury has dramatically reduced the morbidity and mortality of intervention. Injuries involving zone 2 of the aorta traditionally involves sacrifice of the left subclavian artery (LSA) or open revascularization. Furthermore, injuries involving the LSA are associated with increased risk of in-hospital mortality and long-term morbidity. Here we report 1-year outcomes of total endovascular repair of blunt thoracic aortic injuries with the GORE® TAG® Thoracic Branch Endoprosthesis for LSA preservation.

Methods: Across 34 investigative sites, 9 patients with traumatic aortic injuries requiring subclavian artery coverage were enrolled in a nonrandomized, prospective study of a single branched aortic endograft. The thoracic branch endoprosthesis device allows for graft placement proximal to the LSA and incorporates a single side branch for LSA perfusion.

Results: This initial cohort included 8 male and 1 female patient with a median age of 43 (22, 76) and 12 months of follow-up. Five total years of follow-up is planned. All participants had grade 3 blunt aortic injuries. All procedures took place between 2018-2019. The median injury severity score was 2 (0, 66). (Table 1) The median procedure time was 109 minutes (78, 162). All aortic injuries were repaired with a single piece aortic component, under general anesthesia and with heparinization. (Table 2A) A spinal drain was used in one case. Post-deployment balloon angioplasty was conducted in one case at the distal landing zone. There was one asymptomatic LSA branch occlusion 6 months after repair. It did not require revascularization or treatment and was attributed to branch stenosis related to deployment location. There were no strokes, fatalities and no aortic or graft-related adverse events (migration, endoleak, native aortic expansion, dissection or thrombosis) through 12 months of follow-up. (Table 2B)

Conclusions: Initial cohort outcomes suggest that endovascular repair of zone 2 blunt aortic injuries is feasible and has favorable outcomes using the thoracic branch device with left subclavian artery preservation. Additional cases and longer-term follow-up are required for definitive assessment of the device safety and durability in traumatic aortic injuries.

Table 1. Baseline Demographics

Total Number of Enrolled Subjects, n	9
Sex (M/F)	8 / 1
Race / Ethnicity, n (%)	
White	5 (55.6%)
Hispanic or Latino	4 (44.4%)
Age (yrs)	
Mean (Std Dev)	42.4 (18.95)
Median (Range)	43.0 (22, 76)
Range	
BMI	
Mean (Std Dev)	29.5 (5.03)
Median (Range)	29.1 (23.8, 38.8)
Comorbidities, n (%)	
Active smoking	2 (22.2%)
HTN	4 (44.4%)
DM	1 (11.1%)
CAD	1/9 (11.1%)
ESRD	1/9 (11.1%)
History of stroke	1/9 (11.1%)
Peripheral vascular disease	1/9 (11.1%)
Hours from Injury to Treatment	
Mean (Std Dev)	3421.5 (9102.40)
Median (Range)	71.3 (3, 27634)
Etiology of Injury, n (%)	
Motor vehicle accident	7 (77.8%)
Pedestrian hit by motor vehicle	1 (11.1%)
Other	1 (11.1%)
Blunt Aortic Injury Classification	
Grade III - Pseudoaneurysm	9 (100.0%)
Injury Severity Scale Score (0-75, higher is worse)	
Mean (Std Dev)	20.4 (29.31)
Median (Range)	2.0 (0, 66)
ISS Polytrauma (ISS > 17), n (%)	2 (40.0%)
Glasgow Coma Scale Score	
Mean (Std Dev)	12.0 (4.14)
Median (Range)	13.0 (3, 15)
GCS Category	
Severe brain injury (GCS 3-8)	1/8 (12.5%)
Moderate brain injury (GCS 9-12)	3/8 (37.5%)
Mild brain injury (GCS 13-15)	4/8 (50.0%)

19. MIDTERM OUTCOMES OF PHYSICIAN MODIFIED FENESTRATED-BRANCHED ENDOVASCULAR AORTIC REPAIR FOR TYPE IA ENDOLEAK AFTER FAILED PRIOR ENDOVASCULAR AORTIC REPAIR

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Background: Type IA endoleak after endovascular aortic aneurysm repair (EVAR) has become a common failure mode with the increasing and more liberal use of EVAR. Open conversion of these failed EVARs can be associated with significant morbidity and mortality. Despite the recent literature and guidelines supporting the use of custom manufactured fenestrated-branched devices (CMD) for the treatment of type IA endoleak, CMD remains unavailable to most centers in the United States. The aim of this study is to report the outcomes of physician-modified fenestrated-branched endovascular aortic repair (PM-FBEVAR) for type IA endoleak of failed prior EVAR.

Methods: Patients who underwent PM-FBEVAR at a single center between 2015 and 2021 were reviewed. The patients were stratified into two cohorts based on whether the indication for PM-FBEVAR was type IA endoleak of a prior EVAR. Patient characteristics, operative details, and postoperative outcomes were compared between the groups. This study includes data from patients enrolled in the prospective physician-sponsored investigational device exemption protocol (PS-IDE) (FDA#: G200159), as well as those prior to the PS-IDE.

Results: A total of 189 patients underwent PM-FBEVAR, with 25 patients treated for type IA endoleak of a prior EVAR and the remaining 164 had no type IA endoleak. Patients treated for failed EVAR were older (81 vs 72 years old, P<0.001), had worse preoperative renal function, and a larger aneurysm max diameter prior to repair (82 vs 65 mm, P<0.001). Then failed EVAR group had no dissections compared to 20% in the other group (P=0.009) and had a higher proportion of pararenal/paravisceral (76% vs 27%) than thoracoabdominal aortic aneurysms (24% vs 70%) (P<0.001). The mean number of target vessels was 3.8 in each group. Technical success was 80% in the failed EVAR group, compared to 94.5% (P=0.024). Technical failures in the failed EVAR group occurred exclusively within the first tertile of the study period. Major adverse event rates did not differ between the groups (16% vs 23%, P=0.606). 30-day mortality was 0% for the failed EVAR group and 6.1% for the other group (P=0.364). Type II was the most common endoleak type and was seen more commonly in the failed EVAR group (52% vs 27%, P=0.019). Two new type IA endoleaks occurred in the failed EVAR group and were repaired at 7 days and 25 months postoperatively with proximal extension. At mean follow-up of 14 months, all-cause mortality (16% vs 22%, P=0.607), primary branch patency (93% vs 96%, P=0.366), and freedom from reinterventions (64% vs 65%, P=1.0) were similar between the groups.

Conclusions: PM-FBEVAR is feasible as a rescue treatment for patients with prior failed EVAR with type IA endoleak, albeit with higher technical challenges. Long-term follow-up is planned to assess durability and failure modes that are unique to this patient population.

20. PRELIMINARY ANALYSIS COMPARING THE CYDAR 3D IMAGING SYSTEM AND CONVENTIONAL ENDOVASCULAR ANEURYSM REPAIRS

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Background: Endovascular aneurysm repair (EVAR) success depends on imaging technology both in the planning and operative phases. Endovascular repair requires intravenous contrast and radiation exposure to the patient as well as radiation exposure to the operator. Recent developments in imaging technology attempt to merge preoperative imaging with intraoperative imaging to improve the efficiency and accuracy of EVAR. The Cydar 3D imaging system combines the preoperative and intraoperative imaging during the operation. We aim to investigate the use of the Cydar 3D imaging system during EVAR compared to conventional methods.

Method: Retrospective review of all patients undergoing an EVAR at a single quaternary vascular center from 2019-2023 was collected. This cohort was divided into two groups: 1. Repair using Cydar 3D imaging or 2. Repair without Cydar 3D imaging. Overall, 138 unique patients were identified with 27 operations using Cydar 3D imaging and 111 operations without Cydar 3D imaging. We performed a 1-to-1 propensity score – matched analysis using nearest-neighbor matching for variables including age, case urgency, and if the case was performed in the operative room or interventional radiology room. A match occurred when a patient in the Cydar 3D imaging group had an estimated score within 0.01 standard deviations of a patient in the control group. From this we paired 27 from each cohort for a total of 54 patients. Demographic data included length of stay (LOS) in days, contrast volume (ml), Fluoroscopy time (min), procedure length (mins), mortality, blood loss (ml). Univariate analyses were performed and a p-value less than 0.05 was considered statistically significant.

Results: A total of 54 vascular patients were analyzed with 27 without the Cydar 3D imaging and 27 with the Cydar 3D imaging. In the univariate analysis there was no statistical difference in the average length of stay (6.4 days ± 11.76 vs. 4.1 ± 6.03, p = 0.372), aneurysm size (5.9 ± 1.4 vs. 5.9 ± 1.2, p=0.88), contrast volume in mL (91.3 ± 47.0 vs. 91.1 ± 33.49, p=9.88), fluoroscopy time in mins (20.2 ± 17.2 vs. 19.5 ± 19.4, p=0.89) , procedure length (299.3 ± 177.9 vs. 353 ± 191.98, p=0.279), blood loss in mL (513.8 ± 791 vs. 353 ± 191.98, p=0.594). There was an increase in reintervention for endoleaks in the group with use of Cydar 3D imaging (0 vs 6, p=0.043). A sub-analysis of physician modified EVARs did show a 15% reduction in the contrast volume used.

Conclusion: The use of 3D imaging technology has the potential to increase the safety of EVAR to both patients and operators. In our study we did not find any difference in standard EVARs however there was a contrast use decrease in physician modified EVARs. Further studies will need to be performed to determine the realized benefit from performing EVARs using this new technology.

21. IMPACT OF PROPHYLACTIC POST-OPERATIVE VASOPRESSORS ON 30-DAY MORTALITY OF PATIENTS UNDERGOING TEVAR

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Background: Perioperative hypotension is associated with spinal cord ischemia (SCI) in patients undergoing thoracic endovascular aortic repair (TEVAR), stressing the importance of perioperative hemodynamic augmentation in this group of patients, although there is lack of evidence-based data on prophylactic use of vasopressor. In this study, we aim to determine the association between prophylactic post-operative vasopressors and 30-day mortality after TEVAR.

Methods: All TEVAR patients in the Vascular Quality Initiative (VQI) between 2010 and 2020 were identified. As defined in the VQI data dictionary, prophylactic post-operative vasopressors were exclusively administered to patients with no evidence of transient or permanent SCI. Univariate and multivariate logistic regression analyses were performed to assess the relationship between these prophylactic agents and 30-day mortality. Subgroup analyses stratifying by urgency and symptomatic status were performed and adjusted odds ratios were obtained to account for any potential confounders.

Results: Out of 14,979 TEVAR patients, 2408 (16.1%) received prophylactic post-operative vasopressors. Compared to those who were untreated, prophylactic post-operative vasopressors were more commonly administered to patients who were symptomatic or had procedures scheduled on an urgent/emergent basis. These patients also had histories significant for congestive heart failure, end-stage renal disease, cerebrovascular disease, prior aortic surgery, preoperative aortic diameters>5cm, and/or intraoperative hemoglobin levels less than 12g/dL (Table I). Multivariable analysis revealed that prophylactic post-operative vasopressors were associated with a nearly four-fold increase in the odds of 30-day mortality [aOR(95%CI): 3.83(3.01-4.87), P<0.001] (Table II). Subgroup analyses showed that these agents were associated with similar outcomes in elective [aOR(95%CI): 3.91(2.77-5.50), P<0.001], urgent [aOR(95%CI): 3.81(2.37-6.12), P<0.001], and emergent TEVAR patients [aOR(95%CI): 3.58(2.48-5.16), P<0.001]. Similarly, prophylactic post-operative vasopressors were associated with an increase in 30-day mortality odds in asymptomatic [aOR(95%CI): 4.45(3.07-6.46), P<0.001], symptomatic non-ruptured [aOR(95%CI): 4.38(3.24-5.92), P<0.001], and symptomatic ruptured patients [aOR(95%CI): 2.18(1.43-3.33), P<0.001].

Conclusion: This contemporary, multi-center study of patients undergoing TEVAR demonstrates that, post-operative prophylactic vasopressor administration was associated with significantly higher odds of 30-day mortality, irrespective of procedural urgency or symptomatic status. Therefore,

the role of prophylactic vasopressors should be reevaluated, and administration should be carefully weighed against the risk of SCI on an individualized basis. A prospective study would be required to confirm the findings demonstrated in our analysis.

Table I: Baseline characteristics of patients receiving prophylactic post-operative vasopressors versus those who were untreated.

Patient Characteristics	No Prophylactic Post-Op Vasopressors	Prophylactic Post-Op Vasopressors	P-Value
Age>75	4247 (33.8%)	779 (32.4%)	0.172
Male Sex	8285 (65.9%)	1464 (60.8%)	<0.001
Non-Hispanic	11870 (94.9%)	2281 (95.0%)	0.861
Non-White Race	3430 (27.3%)	755 (31.4%)	<0.001
Symptomatic	4464 (41.3%)	1322 (55.1%)	<0.001
BMI>35	1550 (12.4%)	313 (13.1%)	0.357
Poor Functional Status	251 (2.4%)	75 (3.1%)	0.024
Cerebrovascular Disease	1117 (10.2%)	281 (11.7%)	0.032
CAD	2502 (19.9%)	471 (19.7%)	0.750
CHF	1454 (11.6%)	351 (14.6%)	<0.001
Diabetes Mellitus	2048 (16.3%)	365 (15.2%)	0.179
Dialysis or Creatinine>1.8	1106 (8.8%)	318 (13.2%)	<0.001
Hypertension	10561 (84.3%)	2013 (84.3%)	0.958
Current Smoker	3939 (31.4%)	724 (30.3%)	0.288
History of CABG	1339 (10.9%)	249 (10.4%)	0.439
History of PCI	1740 (14.2%)	304 (12.7%)	0.050
Prior Aortic Aneurysm	2296 (18.3%)	636 (26.5%)	<0.001
Prior Bypass	705 (5.7%)	156 (6.6%)	0.089
Preoperative Aortic Diameter >5.0cm	8873 (70.6%)	1582 (65.7%)	<0.001
Prior Aortic Surgery	2720 (21.7%)	743 (31.0%)	<0.001
Hemoglobin <12	5253 (41.8%)	1265 (52.5%)	<0.001
Preoperative ASA	6819 (54.4%)	1221 (51.0%)	0.002
Preoperative P2Y12 Inhibitor	1286 (10.3%)	186 (7.8%)	<0.001
Preoperative Statin	7140 (56.9%)	1275 (53.2%)	0.001
Preoperative ACE Inhibitor	5033 (41.1%)	918 (38.3%)	0.011
Preoperative Beta Blocker	8156 (65.0%)	1644 (68.6%)	0.001
Preoperative Anticoagulation	1437 (11.7%)	304 (12.7%)	0.192
Preoperative Ejection Fraction<50%	1372 (17.6%)	300 (18.9%)	0.232

22. ANATOMICAL ASSOCIATIONS AND CLINICAL RELEVANCE OF THE AORTIC REMNANT DIVERTICULUM

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Introduction: The aortic remnant diverticulum, an incomplete involution of the ductus arteriosum, appears as an outpouching in zone 3 on the lesser curve of thoracic aorta, and is considered a benign, radiographic finding. However, its clinical significance and associated aortic pathologies remain uncharacterized. The objective of this study is to describe the characteristics of incidentally diagnosed remnant diverticula and identify their radiographic evolution over time.

Methods: We performed a retrospective review of all contrast chest Computed Tomography (CT) studies with key word "remnant diverticulum" at a tertiary level health care system between 2012 and 2019. CT images were independently reviewed by a vascular surgeon to note location in zone 3 of the lesser curve and diverticulum geometry. Patient demographics, concurrent comorbidities, diverticulum geometry, and other arch anomalies were recorded. Subsequent chest CT studies were analyzed to determine changes in diverticulum geometry over time.

Results: Twenty-four patients had an incidentally detected remnant diverticulum during the study period (13 females, mean age: 52.75 years, age range: 2-95 years). CT scans were ordered for trauma evaluation (38%), cancer staging (25%), pulmonary emboli studies (12%), and other (25%). Hypertension (33%) was the most common comorbidity followed by chronic kidney disease (16%) and hyperlipidemia (20%). A history of cerebrovascular accidents was found in 4 (17%) patients. Six patients had concurrent arch anomalies, including a bovine arch (n=2), a double arch (n=1), a right-sided arch (n=1), an aberrant right vertebral artery (n=1), and an aberrant right subclavian artery (n=1). Echocardiography studies (n=12) found ascending aortic dilation (25%) and aortic root dilation (12.5%). The mean depth and diameter of the diverticula on the initial CT scan were 17.56 +/- 9.9 mm and 10.42 +/- 6.4 mm, respectively. Eight patients underwent a second CT scan after a mean time of 2.1 years which showed no significant increase in diverticulum size (depth, 18.56±7.4 mm, p=0.542, and diameter, 11.25±8.4 mm, p=0.141). Available medical records revealed no complications associated with the diverticulum, including rupture.

Conclusion: Aortic remnant diverticula are incidental radiographic findings that are associated with aortic arch anomalies and appear to have insignificant growth over time. Further, multi-institutional studies should be performed to determine their long-term clinical significance.

23. INTERFACILITY TRANSFER IS ASSOCIATED WITH HIGHER POSTOPERATIVE AMPUTATION IN PATIENTS UNDERGOING LOWER EXTREMITY BYPASS FOR ACUTE LIMB ISCHEMIA: A MULTI-INSTITUTIONAL STUDY FROM VASCULAR QUALITY INITIATIVE

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Objective: Patients with acute limb ischemia (ALI) should undergo an urgent/emergent revascularization procedure without delay to prevent limb loss. However, interfacility transfer (IFT) is inevitable in certain circumstances particularly when optimal surgical service is unavailable. IFT can delay the surgical care and compromise the outcomes. We aimed to investigate the impact of IFT on postoperative outcomes of lower extremity bypass (LEB) in patients presenting with ALI.

Methods: The Vascular Quality Initiative Database was queried for patients presenting with ALI and undergoing LEB between January 2003 to June 2022. The patients were stratified by IFT status. The primary outcome was postoperative major amputation (MA). The secondary outcomes were postoperative complications, 30-day mortality, prolonged length of stay (PLOS), major adverse cardiovascular events (MACE) and major adverse limb events (MALE). MACE was defined as any in-hospital myocardial infarction, stroke or death. MALE was defined as untreated loss of patency, reintervention on the revascularized segment, or major amputation. PLOS was defined as hospitalization for ≥7-days. Logistic regression was used for multivariate analyses.

Results: A total of 8,338 patients were analyzed (No IFT=6,680, 80.1%; IFT=1,658, 19.9%). Median age was 66 (59, 74) and 65 (58, 74) years in patients in non-IFT and IFT cohorts (P=0.028), respectively. Patients who underwent LEB after being transferred were more likely to have undergone urgent or emergent revascularization (42.3% vs. 32.4% and 36.4% vs. 16.8%, respectively; P<0.001). Moreover, they had higher rates of MA (8.2% vs. 4.6%; P<0.001), respiratory complications, PLOS, 30-day mortality, MACE, and MALE (Tab. 1). After adjusting for potential confounders, transfer was associated with higher rates of MA (aOR=1.45, 95% CI: 1.12-1.89; P=0.006) and PLOS (aOR=1.18, 95% CI: 1.01-1.37; P=0.033) (Tab. 1). Factors associated with transfer were ASA class IV/V, moderate to severe anemia, obesity, current smoking, ALI resulting from lower extremity aneurysm, urgent/emergent bypass and performing bypass on weekends, while non-white race and Medicaid insurance were associated with non-transfer (Fig. 1). The overall one-year survival was similar in patients with and without IFT (85.7% vs. 87.1%, P=0.089).

Conclusions: Patients presenting with ALI requiring transfer for LEB are more likely to have lower extremity aneurysms as the primary cause of ischemia. Additionally, they have poor general condition presenting with higher ASA

Class. Transferred patients are more likely to require urgent and emergent bypass and to undergo bypass on weekends. They are also more likely to experience limb loss and PLOS. Although transfer of patients with ALI is inevitable in certain situation, every effort should be made to manage these patients at the initial institution and transfer should be limited to conditions when appropriate resources are truly not available.

Table 1: Perioperative outcomes and 30-Day mortality following lower extremity bypass in patients with acute limb ischemia stratified by interfacility transfer

Outcome	**Not Transferred*** N=6,680 (80.1%)	**Transferred*** N=1,658 (19.9)	**P-Value**	**aOR** (95% CI)**	**P-Value**
Major Amputation	304 (4.6)	135 (8.2)	<0.001	1.45 (1.12-1.89)	0.006
Myocardial Infarction	233 (3.5)	60 (3.6)	0.789	0.84 (0.62-1.13)	0.239
Respiratory Complications	267 (4.0)	86 (5.2)	0.030	0.93 (0.67-1.30)	0.676
Stroke	62 (1.0)	21 (1.3)	0.188	0.99 (0.59-1.65)	0.965
PLOS (>7 days)	2,079 (31.1)	678 (40.9)	<0.001	1.18 (1.01-1.37)	0.033
30-Day Mortality	229 (3.4)	84 (5.1)	0.002	1.04 (0.74-1.46)	0.824
In-Hospital MACE	412 (6.3)	134 (8.4)	0.003	0.91 (0.71-1.16)	0.460
In-Hospital MALE	911 (13.8)	278 (17.1)	0.001	1.05 (0.87-1.26)	0.633

*Data is presented as frequency (%)
**Reference = Not Transferred
aOR, adjusted odds ratio; *CI*, confidence interval; *MACE*, major adverse cardiovascular event; *MALE*, major adverse limb event; *PLOS*, prolonged length of stay

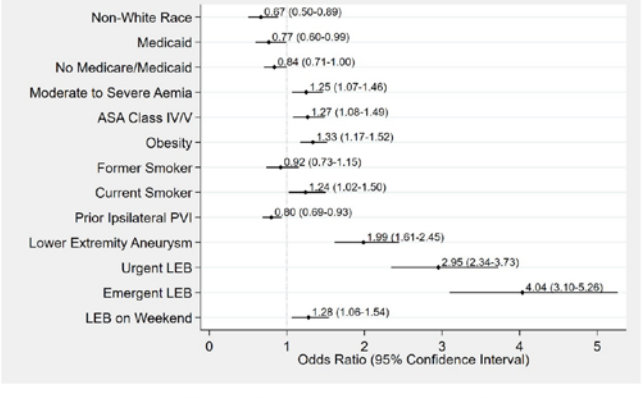

Figure 1: Factors associated with interfacility transfer in patients presenting with acute limb ischemia and undergoing lower extremity bypass. *ASA*, American society of anesthesiologists; *LEB*, lower extremity bypass; *PVI*, peripheral vascular interventions

24. INCREASED MORTALITY IN PATIENTS TRANSFERRED TO A LEVEL 1 TRAUMA CENTER WITH BLUNT AND PENETRATING EXTREMITY VASCULAR INJURIES

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Objective: Trauma centers serve a uniquely vulnerable population. These patients depend on a complex transfer system to ensure timely and adequate care at major trauma centers. Patient outcomes depend on the reliability of their management between a local or community hospital and a tertiary or quaternary trauma institution. Patients with polytrauma, extremity trauma, and vascular injuries require multidisciplinary management at a trauma hospital. Our study investigates outcomes in this population at a level one trauma center covering the largest geographic county in the contiguous United States.

Methods: A retrospective case-control review of all extremity trauma patients that presented to a high-capacity level 1 trauma center over 10 years was collected and split into two groups, transferred from another medical center for higher level of care or presented directly. 19,417 patients were identified with 15,317 that presented directly, and 3,830 patients transferred from an outside hospital. 268 patients were found to have vascular injuries. Demographic data and medication history were ascertained. Primary outcomes measures included Injury severity score, Mechanism of Injury, Trauma Response Level, Arrival Method (ground, air, police, self), tertiary center emergency department disposition, and presence of vascular injury in either upper or lower extremity.

Results: A total of 268 vascular patients were analyzed with 207 non-transferred and 61 transferred patients. In the univariate analysis injury severity score was an average 11.4 in non-transferred patients versus 8.4 in transferred ($p < 0.001$), 50% of blunt injury in the non-transferred group and 28% in the transferred group ($p < 0.001$), in hospital mortality was 4% in non-transferred patients versus 28% in the transferred group ($p < 0.001$). There was no difference in transfer status between the upper extremity versus lower extremity vascular injury. A sub-analysis of the transferred only group stratified by upper and lower extremity only found injury severity score statistically significant with average of 10.1 in lower extremity patients versus 6.5 in upper extremity patients ($p = 0.01$). A multivariate logistic regression demonstrated mortality is 8 times more likely if a patient with vascular extremity injuries is transferred. Additionally, transfusion of packed red blood cell was less likely if patients presented directly to the trauma center.

Conclusion: Extremity trauma with vascular injuries can be lethal if not triaged appropriately. Transferred patients to our level 1 trauma center had a substantial increase in mortality compared to non-transferred patients. Blood transfusion within the first four hours of arrival to the trauma center was associated with better survival. More research efforts are needed to treat this vulnerable patient population.

Table 1: Binary logistic regression with Mortality and Transfer Status as dependent variables.

	Clinical Variables of Mortality in Vascular Patients (Binary Logistic Regression Analysis)[a]			Clinical Variables of Transfer Status in Vascular Patients (Binary Logistic Regression Analysis)[a]		
Characteristic	**Odds Ratio (n = 266)**	**95% Confidence Interval**	***P*[a]**	**Odds Ratio (n = 266)**	**95% Confidence Interval**	***P*[a]**
Age	1.015	0.985 – 1.046	0.327	0.989	0.969 – 1.009	0.284
Injury Severity Score	0.985	0.906 – 1.070	0.719	0.965	0.912 – 1.021	0.220
Location of Injury (Upper and Lower Extremity)	0.394	0.095 – 1.640	0.201	2.692	1.058 – 6.484	0.038
Injury Type	5.021	1.338 – 18.845	0.017	1.983	0.984 – 3.997	0.056
Response Level	0.786	0.476 – 1.295	0.344	1.354	0.962 – 1.907	0.082
Transfer Status	7.901	2.933 – 21.286	0.001	--	--	--
Mortality	--	--	--	8.254	3.115 – 21.868	0.001
Packed Red Blood Cells (1st 4 hours) (%)	0.534	0.061 – 4.654	0.570	0.075	0.009 – 0.623	0.016

[a]Total cases analyzed = 268.

25. OUTCOMES FOLLOWING BELOW ELBOW ARTERIAL TRAUMA

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Introduction: Upper extremity arterial injury can have major implications for patients. Previous literature has described low rates of limb loss but poor functional outcomes with regards to concomitant nerve injury, especially brachial plexus injury; however, the management between proximal and distal injury can vary significantly. There is a paucity of data regarding outcomes specific to small arterial injury of the upper extremity. We focus on describing outcomes of traumatic arterial injury to vessels below the elbow.

Methods: A retrospective review of all patients who suffered below elbow upper extremity vascular injuries was performed at a Level 1 trauma center from 2014 - 2022. Patients were identified by ICD-10 codes. Patients with isolated venous or small arterial branch injury, who were treated at outside hospital or who arrived in arrest were excluded. Interventions, outcomes, and complications were assessed.

Results: One hundred forty-eight patients were identified of which 135 were included. The mean age was 37.7 +/- 14.1 years and 80.7% were male. On arrival, 40 (29.6%) patients had an absent pulse and 21 (15.6%) had absent doppler signals in the affected limb. Most patients suffered penetrating injury (94.8%). The most injured artery was the radial artery in 80 (59.3%) patients followed by the ulnar artery in 64 (47.4%) patients and the below-elbow brachial artery in 7 (5.2%) patients. Injuries included 115 transections, 17 occlusions, 4 pseudoaneurysms and 1 dissection. 80.0% of patients underwent operative intervention, of those 84.3% were performed by Trauma Surgery(TS), 9.26% by Vascular Surgery(VS) and 6.5% by Plastic Surgery(PRS). Arterial ligation was performed in 79 (58.5%), primary repair in 19 (14.1%), bypass graft in 11 (8.2%), thrombectomy in 3 (2.2%), other endovascular intervention in 6 (4.4%). Most patients (72.7%) who underwent bypass had multiple arterial injuries. Bypasses were performed by VS in 8, TS in 1 and PRS in 2. Overall, 11.8% of patients had orthopedic intervention. Fifty-nine (43.7%) patients had associated nerve injury and 48 (35.7%) underwent nerve repair. Three patients underwent delayed bypass with PRS at the time of nerve repair. Of those with nerve repair, 14.5% had complete sensory and 12.9% had complete motor loss and were more likely to have delayed artery and nerve repair. Four patients required unplanned reoperation, two for thrombectomy and two for compartment syndrome. One patient underwent amputation at index operation due to significant crush and burn injuries.

Conclusion: Management of upper extremity small arterial injury requires multidisciplinary input. Most patients required operation for hemorrhage control, yet the amputation rate was low. Arterial ligation can be safely performed in those with single small vessel injury without signs of ischemia. Future research should assess functional outcomes for patients with below elbow arterial injury and how staging of repair may affect outcomes.

26. ERECTOR SPINAE VERSUS SURGICALLY PLACED PAIN CATHETERS FOR THORACIC OUTLET DECOMPRESSION

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Background: Perioperative care following surgical decompression utilizes multimodal pain control in the management of thoracic outlet syndrome (TOS). Surgically placed pain catheters for bupivacaine infusion is one component of a multimodal approach to minimize perioperative narcotic use. This study aims to compare surgically placed pain catheters (SP) with erector spinae pain catheters (ESP) placed by the Anesthesia pain service.

Methods: Retrospective review of a prospectively maintained surgical TOS database identified patients who underwent transaxillary first rib resection (FRR) and had either SP or ESP placed for pain control. Patients were matched for age and gender. Data collected included demographics, operative details, and perioperative pain medication use. Narcotic pain medication doses were converted to milligram morphine equivalents (MME) for comparison between groups. Pain medications were collected at distinct time points: intraoperatively, each post-operative day (POD), and for the entire hospital stay.

Results: Eighty-eight patients were selected for comparison: 44 patients in both SC and ESP groups. Patients in each group did not differ with regards to age, BMI, gender, diagnosis, or comorbidities (table 1). there were no differences in preoperative narcotic use, preoperative pain score, or QuickDASH score.

All patients underwent FRR. Concurrent cervical rib resection was performed in 6.8% SC and 6.8% ESP patients (p=1.00), pectoralis minor tenotomy in 34.1% SC and 29.5% ESP patients (p=0.65), and venogram in 31.8% SC and 31.8% ESP patients (p=1.00). Mean OR time was 90.0 minutes in SC and 105.3 minute in ESP cases (p=0.15). Mean length of stay was 1.9 days for SC and 1.8 days for ESP patients (0.56).

Perioperative pain medication is presented in Table 2. There were no significant differences in intraoperative narcotics dosing in MME (SC: 22.1 vs ESP: 25.3, p=0.018). On POD 0, there were no differences in total narcotic dosing (MME) (SC: 112.0 vs ESP: 100.7, p=0.59), or in the use of acetaminophen, NSAIDS, or muscle relaxants. A similar trend in narcotics dosing was observed on POD 1 (SC: 58.6 vs ESP: 69.7, p=0.43), and POD 2 (SC: 23.5 vs ESP: 71.3, p=0.23). On POD 1, there was a higher percentage of SC patients taking NSAIDs (63.6% vs 40.9%, p=0.024), however this difference was not observed on POD2. There were no differences in acetaminophen or muscle relaxant use on POD 1 or 2. Total hospital stay MME dose was also similar between groups (SC: 215.9 vs ESP: 250.9, p=0.23)

Conclusion: Pain catheters with bupivacaine infusions are helpful adjuncts in postoperative pain control after FRR for TOS. This study identified no difference in narcotic use between SC and ESP groups. SC should be used for pain control in facilities which do not have an anesthesia pain service available for ESP placement.

Table 1: Demographics

	SC N = 44	ESP N = 44	Total N = 88	P value
Mean Age	35.4 ± 12.2	35.3 ± 12.3	35.3 ± 12.2	0.97
BMI	25.3 ± 4.8	27.5 ± 5.3	26.4 ± 5.1	0.05
% female	63.6%	61.4%	62.5%	0.83
Primary Diagnosis VTOS NTOS	 31.8% 68.2%	 31.8% 68.2%	 31.8% 68.2%	1.00
Comorbidities Other Arm/Shoulder/Hand Pathology Pain Syndromes Anxiety/Depression	 11.4% 2.3% 20.5%	 9.1% 6.8% 18.2%	 10.2% 4.5% 19.3%	 0.73 0.31 0.79
Preoperative Narcotic Use	11.4%	9.1%	20.5%	0.73
Pre-Operative Pain Score	5.4 ± 3.0	6.1 ± 2.8	5.7 ± 2.9	0.288
Pre-Operative QuickDASH	55.2 ± 25.1	52.3 ± 26.7	53.8 ± 25.8	0.631

SC = Surgically placed catheter
ESP = Erector spinae catheter
*Significance defined as $p<0.05$

Table 2: Perioperative Pain Control

	SC N = 44	ESP N = 44	Total N = 88	P value
Intraoperative Narcotics				
Fentanyl (mcg)	83.5 ± 75.3	80.7 ± 69.0	82.1 ± 71.8	0.85
Hydromorphone (mg)	0.6 ± 0.5	0.8 ± 0.4	0.7 ± 0.5	0.11
Total Intraoperative in MME	22.1 ± 10.5	25.3 ± 10.3	23.7 ± 10.8	0.17
POD 0 Pain Medications				
Narcotics				
Fentanyl (mcg)	117.6 ± 93.2	113.66 ± 98.2	115.6 ± 95.2	0.85
Hydromorphone (mg)	4.5 ± 3.9	4.0 ± 2.5	4.2 ± 3.2	0.48
Oxycodone (mg)	5.6 ± 10.7	5.2 ± 10.0	5.4 ± 10.3	0.88
TOTAL POD 0 in MME	112.0 ± 79.2	100.7 ± 57.1	106.4 ± 68.9	0.59
POD 1 Pain Medications				
Narcotics				
Hydromorphone (mg)	1.0 ± 2.3	1.5 ± 3.4	1.2 ± 2.9	0.37
Oxycodone (mg)	25.4 ± 1.4	26.1 ± 21.9	25.8 ± 20.1	0.88
TOTAL POD 1 in MME	58.6 ± 50.8	69.7 ± 77.4	64.1 ± 65.3	0.43
POD 2 Pain Medications				
Narcotics				
Hydromorphone (mg)	0.0 ± 0.0	2.4 ± 10.2	1.1 ± 6.9	0.20
Oxycodone (mg)	13.4 ± 20.9	13.5 ± 15.	13.5 ± 18.6	0.99
TOTAL POD 2 in MME	23.5 ± 34.7	71.3 ± 209.1	45.2 ± 143.4	0.23
TOTAL HOSPITAL MME	215.9 ± 127.7	250.9 ± 227.8	233.4 ± 184.5	0.38

SC = Surgically placed catheter
ESP = Erector spinae catheter
MME = milligram morphine equivalents
*Significance defined as $p<0.05$

27. PROPHYLACTIC MODIFIED SARTORIUS ROTATIONAL FLAP FOR HIGH RISK GROIN DISSECTIONS IN VASCULAR SURGERY - A CASE SERIES

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Introduction: Groin dehiscence and wound infections are a common complication of femoral artery exposure. In patients with prosthetic conduits placed in the groin, these complications can lead to graft infection or anastomotic dehiscence. Sartorius flaps can be useful in preventing graft infections or anastomotic breakdown in the setting of wound infections. Prophylactic sartorius flaps have been suggested to be a useful adjunct in patients who are at high risk for groin complications. Standard sartorius flaps can be difficult to perform and increase the operative time.

Methods: We present our experience with a modified sartorius flap, which avoids dissection to the anterior, superior iliac spine (Figure 1). Patients who received femoral artery exposure and received a modified prophylactic Sartorius flap were included in this case-series. The Penn Groin Assessment Scale (PGAS) was calculated for each patient and our primary outcome was rate of deep space wound infections.

Results: Sixteen patients received a modified prophylactic Sartorius flap. The average age of the cohort was 68.1 (35-86) years. Eight (50%) were male. The mean PGAS was 2.3 (0-6). Seven (43.7%) patients had a prosthetic conduit underlying the flap. Eight (50%) patients received Sartorius flap after femoral artery exposure for thromboembolectomy, endarterectomy or access complications. Four (25%) patients for infrainguinal bypass, 3 (18.8%) for femoral-femoral bypass and 1 (6.3%) patient received Aortic-Bifemoral bypass. Six (37.5%) patients developed superficial surgical site infections however no deep space infections nor prosthetic graft excisions resulted.

Conclusions: This procedure was effective in preventing graft infections in all patients with high-risk features for groin infection in our retrospective case series. The segmental blood supply is maintained while providing good coverage of the femoral vessels (Figure 2) with this rotational flap.

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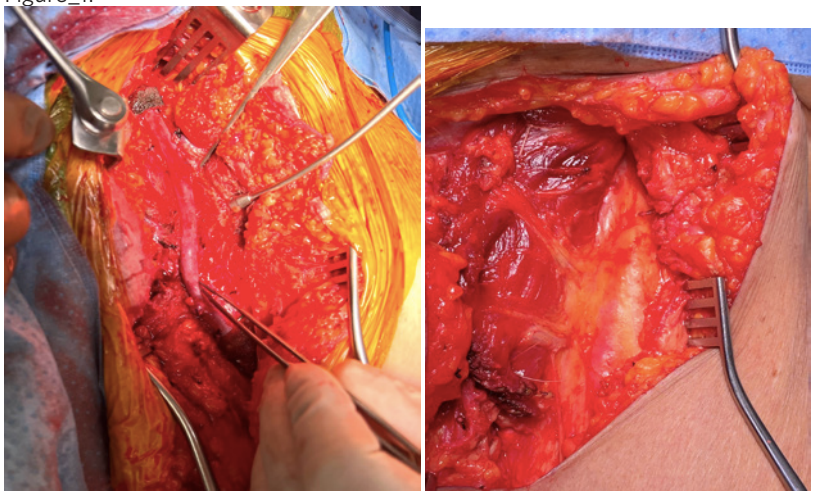
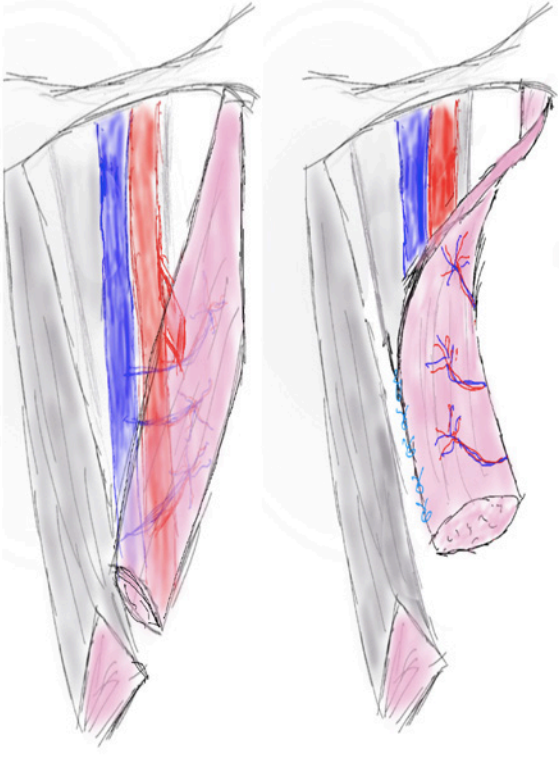


Figure 2:



28. ENDOVASCULAR MANAGEMENT OF URETERO-ARTERIAL FISTULAS: A CASE SERIES

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Background: Uretero-arterial fistula is a rare life-threatening condition with only about 150 cases reported in the literature. Several potential inciting factors including prior ureteral injury, radiation therapy, aneurysm, pseudoaneurysm, and previous vascular or oncological surgery can lead to uretero-arterial fistulas. Diagnosis and management of uretero-arterial fistula can be challenging for clinicians, due to unusual clinical presentations, intermittent symptoms, and possibility of severe hemorrhagic complications. Endovascular management strategies have become a mainstay for treatment. In this study, we report a case series of three patients with uretero-arterial fistulas who had successful resolution of their symptoms using percutaneous endovascular techniques.

Method: This case series presents a total of three patients with uretero-arterial fistulas secondary to pelvic malignancy from 2020-2022. The clinical management, intraoperative findings, and postoperative results were tabulated and reported.

Results: From September 2020 to March 2022, three patients with pelvic malignancies were found to have uretero-arterial fistulas. Average age of the patients was 58 years of age. Two patients were female and one male. All three patients had undergone chemoradiation therapy and previous open surgery. Each patient presented with hematuria and had a long-standing history of prior ureteral stent placements. For management, they were successfully treated with endovascular techniques including stent graft placement and coil embolization. Two of the three patients had to undergo repeat endovascular interventions. There were no procedural related complications. No death was observed in the three patients during the study period.

Conclusion: Uretero-arterial fistula is a rare complication that should be suspected in the presence of early and/or delayed hematuria. Risk factors include pelvic surgery, chemoradiotherapy, prolonged ureteral stent placement. Successful management with stent grafting has been shown to be an effective strategy for treatment.

29. INTRAOPERATIVE COMPLETION ANGIOGRAPHY IS ASSOCIATED WITH IMPROVED LIMB SALVAGE RATE FOLLOWING LOWER EXTREMITY BYPASS IN PATIENTS WITH CHRONIC LIMB THREATENING ISCHEMIA

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Objectives: Intraoperative technical success of a lower extremity bypass (LEB) is a must for all vascular surgeons. Yet the way technical success is determined differs among surgeons. Completion angiography (CA) enables real time bypass assessment when it can be revised for technical defects. However, no consensus on the use of CA at the time of LEB exists. Thus, we aimed to investigate the impact of CA on perioperative outcomes of LEB in the real-world practice using the Vascular Quality Initiative (VQI) database.

Methods: We queried all patients with chronic limb threatening ischemia (CLTI) who underwent LEB during 2011 to 2022 in the VQI database. Patients with concomitant suprainguinal procedures and patients undergoing intraoperative duplex were excluded. The remaining patients were stratified by the performance of CA. The primary outcome was postoperative major amputation (MA). Secondary outcomes included postoperative complications, prolonged length of stay (PLOS), 30-day mortality, major adverse cardiovascular events (MACE), major adverse limb events (MALE), return to operating room (RTOR) and patency at discharge. PLOS was defined as hospitalization for ≥7-days. MACE was defined as any MI, stroke or death. MALE was defined as untreated loss of patency, reintervention, or major amputation. Logistic regression modeling was used for the multivariate analysis.

Results: The study included two cohorts of patients undergoing LEB without a CA (N=24,041, 72.3%) and with a CA (N=9,204, 27.3%). The patients who underwent LEB without a CA were more likely to have ASA class IV or V, CAD and CKD and to use RAAS inhibitors. On the other hand, patients who underwent LEB with a CA were more likely to undergo an infra-geniculate bypass, to receive an autogenous graft and to undergo concomitant endarterectomy. The patients in two groups had similar rates of postoperative MA in univariate analysis (1.9%, P=0.708; Table I); however, after adjusting for potential confounders, CA was associated with reduced odds of MA (aOR=0.79, 95%CI=0.65-0.97; P=0.027). The rates of postoperative MI and respiratory complications were not different in two groups in the logistic regression model (aOR=1.04, 95%CI=0.81-1.33 and aOR=1.14, 95%CI=0.97-1.35, respectively). Moreover, CA did not affect the rates of PLOS, 30-day mortality, MACE, MALE, RTOR and discharge patency in the logistic regression model. The rate of permanent dialysis at discharge was also not affected by performance of CA (Table II).

Conclusions: We found that CA is associated with lower odds of perioperative limb loss in CLTI patients undergoing LEB without increasing postoperative complications. Based on this study, routine use of CA for infrainguinal bypasses is recommended in patients undergoing LEB. However, further prospective studies are necessary to investigate the true role of completion imaging in patients with normal distal pulses and Doppler sounds following LEB.

Table I: Univariate analysis of the perioperative outcomes stratified by the performance of completion angiography

Outcome	Completion Angiography		P-Value
	NOT Performed N=24,041 (72.3%)	Performed N=9,204 (27.3%)	
Major Amputation	459 (1.9%)	170 (1.9%)	0.708
Myocardial Infarction	693 (2.9%)	339 (3.7%)	<0.001
Respiratory Complication	500 (2.1%)	242 (2.6%)	0.002
Permanent Dialysis at Discharge	87 (0.4%)	32 (0.4%)	0.847
PLOS	5,920 (24.6%)	2,716 (29.5%)	<0.001
30-Day Mortality	524 (2.2%)	182 (2.0%)	0.253
MACE	1,001 (4.2%)	449 (4.9%)	0.004
MALE	1,774 (7.4%)	834 (9.1%)	<0.001
RTOR	3,227 (13.5%)	1,512 (16.5%)	<0.001
RTOR for Thrombosis or Revision	875 (3.7%)	410 (4.5%)	0.001
Loss of Patency at Discharge	353 (1.5%)	168 (1.8%)	0.019

MACE, major adverse cardiovascular event; MALE, major adverse limb event; PLOS, prolonged length of stay; RTOR, return to operating room

Table II: Multivariate logistic regression of the perioperative outcomes stratified by the performance of completion angiography (Reference = Angiography NOT Performed)

Outcome	**Adjusted Odds Ratio*** (95% Confidence Interval)	**P-Value**
Major Amputation	0.79 (0.65-0.97)	0.027
Myocardial Infarction	1.04 (0.81-1.33)	0.758
Respiratory Complication	1.14 (0.97-1.35)	0.117
Permanent Dialysis at Discharge	0.82 (0.53-1.28)	0.384
PLOS	1.08 (0.94-1.23)	0.293
30-Day Mortality	0.86 (0.71-1.03)	0.104
MACE	0.98 (0.80-1.20)	0.865
MALE	1.12 (0.91-1.36)	0.291
RTOR	1.14 (0.98-1.34)	0.088
RTOR for Thrombosis or Revision	1.00 (0.85-1.16)	0.964
Loss of Patency at Discharge	0.94 (0.75-1.17)	0.588

MACE, major adverse cardiovascular event; MALE, major adverse limb event; PLOS, prolonged length of stay; RTOR, return to operating room
*Adjusted for demographic variables, insurance type, smoking, comorbidities, prior cardiovascular procedures, preoperative medications, and procedural data

30. DELAY IN COMPLETION AMPUTATION AFTER CRYOAMPUTATION MAY LEAD TO IMPROVED SURVIVAL IN THE VETERAN POPULATION

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Background: Critically ill patients with pedal sepsis may not be suitable candidates for major amputation. Cryoamputation is a bedside technique that physiologically provides local source control yet the optimal metrics for survival have not been defined. This study aims to describe clinical metrics that lead to improved survival after cryoamputation in the veteran (VA) population.

Methods: A retrospective chart review was performed of all patients who underwent cryoamputation for pedal sepsis between 2019 and 2021 at a single VA hospital. Cryoamputations were performed according to a standardized protocol. Demographics, clinical presentation, laboratory findings, periprocedural events, and post-operative outcomes were collected.

Results: We identified five patients with pedal sepsis who underwent cryoamputation. The median age was 75 years (range: 56-76 years). All had hyperlipidemia (LDL > 100 mg/dL), four had hypertension (systolic blood pressure > 140mmHg), and three had type 2 diabetes mellitus (HbA1c >6.5. Three patients had documented peripheral arterial disease. (Table 1)

At presentation, 3 patients were in septic shock with hemodynamic instability, one patient was unresponsive, and one was in atrial fibrillation with rapid ventricular response. All patients presented with leukocytosis (mean: 26.2 x109/L, range: 11.2-42 x109/L).

Reasons for a delay between cryoamputation and completion amputation included an acute myocardial infarction (MI) in two patients (one requiring coronary intervention), severe anemia requiring blood transfusions in two patients, persistent hypotension requiring continuous vasopressor infusion in three patients, and respiratory failure due to aspiration pneumonia and pneumomediastinum in two patients.

Four patients underwent completion amputation after a median time of 22 days (range: 9-43 days). Two patients with completion amputation dates at 9 and 11 died on post-op days (POD) 7 and 1 due to respiratory failure and cardiogenic shock, respectively. The two patients with delayed completion amputation dates of 33 and 43, however, were discharged on POD 7 and 8, respectively. Their outpatient clinic follow-up did not reveal any post-op complications. The fifth patient died 21 days after cryoamputation without a completion, as a complication of COVID-19.

Conclusion: Physiologic arrest of pedal sepsis can be achieved through cryoamputation in patients whose critical illness precludes undergoing an immediate amputation. Delaying the completion amputation well beyond the resolution of acute conditions may lead to increased survival in this patient population.

Table 1. Patients who underwent cryoamputation

Age	Comorbidities	Extent of amputation	Delay to amputation	Days to Mortality After Definitive Amputation
75	HTN, HLD, critical limb ischemia	Definitive amputation not performed	N/A	0 *Did not undergo definitive amputation
74	HTN, HLD, CHF, PAD, critical limb ischemia	AKA	11	7
76	HTN, HLD, DM (insulin dependent), PAD, wet gangrene	AKA	9	1
75	HTN, HLD, DM (insulin dependent), CAD, PAD, CHF, DVT, venous insufficiency, myonecrosis	AKA	33	N/A
56	HLD, DM, CAD, wet gangrene	AKA	43	N/A

HTN, hypertension; HLD, hyperlipidemia, CHF, congestive heart failure; PAD, peripheral arterial disease; DM, diabetes mellitus; CAD, coronary artery disease; DVT, deep vein thrombosis; AKA, above knee amputation.

38. STROKE PREVENTION IN BCVI: THE ROLE OF ASPIRIN 81 MG

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Background: The stroke rate in blunt cerebrovascular injury (BCVI) varies from 25% without treatment to less than 8% with antithrombotic therapy. There is no consensus on the optimal management to prevent stroke BCVI, including the choice of antithrombotic and dosing that has led to a significant variation in BCVI management. We investigated the efficacy and safety of oral Aspirin (ASA) 81 mg to prevent BCVI-related stroke in comparison with historically reported stroke rates with ASA 325 and heparin.

Method: This was a single-center retrospective study including adult trauma patients who received oral ASA 81 mg for BCVI management between 2013 and 2022. Patients on anticoagulants at the time of admission, those with Biffl grade V injury, and patients who underwent spine surgery during admission were excluded. Medical records were reviewed for demographic and injury characteristics, imaging findings, treatment-related complications, and outcomes.

Results: Eighty-four patients treated with ASA 81 mg for BCVI were identified. The mean age was 41.50 years old, and 61.9% were male. Mean ISS and GCS scores were 19.82 and 12.12, respectively. Traumatic brain injury (TBI) was found in 42.9%, and 16.7% of patients had a solid organ injury (SOI). A total of 101 vessel injuries were identified, including vertebral artery injuries in 56.4% and carotid artery injuries in 44.6%. Biffl grade I (52.4%) injury was the most common, followed by grade II (37.6%), and grade III (4.9%). ASA was started in the first 24 hours after injury in 57 patients, including 17 patients with TBI, 5 patients with SOIs, and 3 patients with concurrent TBI and SOI. BCVI-related stroke occurred in 3 (3.5%) patients with Biffl grade II (n=2) and III (n=1). In the stroke group, ASA was started within the first 24 hours in one patient without a TBI or SOI, while two others received ASA after 24 hours; one had TBI and the other had concurrent SOI and TBI. ASA-related complications were not identified in any patient. Neurosurgical intervention was performed in 11 patients, including EVD placement in 5, craniotomy in 4, and craniectomy in 2 patients. Endovascular coil embolization was performed in 2 patients with pseudoaneurysm. The mean length of stay in the hospital was 10.94 days, and 8 patients died during hospitalization due to complications of polytrauma. Follow-up with CTA was performed in 9 patients, which showed improvement in 6 and a stable lesion in 3 at a mean time of 58 days after discharge.

Discussion: ASA 81 mg is a viable option for BCVI-related stroke prevention when compared with the reported stroke rates (3–8%) with commonly used antithrombotics. In addition, it theoretically might pose a lower risk of bleeding in high-risk trauma patients, particularly those with TBI and SOIs. Future prospective randomized controlled trials are needed to provide insight into the safety and efficacy of low-dose ASA compared to regular-strength ASA or anticoagulants in the management of BCVI.

39. 30-DAY RISK SCORE FOR MORTALITY AND STROKE IN PATIENTS WITH CAROTID ARTERY STENOSIS USING ARTIFICIAL INTELLIGENCE BASED CAROTID PLAQUE MORPHOLOGY

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Background: The gold standard for determining carotid artery stenosis is using the NASCET angiographic measures and carotid duplex criteria and plan for medical versus surgical management based on percent stenosis and symptomatic status. Few studies have assessed plaque morphology as an additive tool for stroke prediction. However, multiple recent studies have shown that stenosis alone is not a sensitive marker for stroke prediction and simultaneous evaluation of plaque morphology and geometry can lead to better risk stratification before elective intervention in asymptomatic patients. Supplemental software employing artificial intelligence (AI) for the assessment of atherosclerotic plaque is an emerging technology that aims to improve the diagnostic and prognostic abilities of radiologic imaging with precise decision-making algorithms. Our study uses an AI software in conjunction with a patient's computed tomography angiography (CTA) scan of the neck to create a 3D model of the carotid artery and assess plaque morphology including the volumes of calcification, intraplaque hemorrhage, matrix, and perivascular adipose tissue. Our goal is to create a 30-day risk score for mortality and stroke in patients with carotid artery stenosis that would be inclusive of plaque morphology.

Methods: This is a retrospective review of a single tertiary institution from 2010 to 2021. Patients with a head/neck CTA and a diagnosis of carotid artery disease were included in our analysis. Each CT scan was run through a third-party software to create a 3D image for plaque visibility and analysis. The Framingham Study was used as a model for our risk score to incorporate demographic and clinical factors. Each individual was assigned points to estimate risk for 30-day stroke or death inclusive of clinical factors and plaque morphology.

Results: There were 366 patients over the study period. We identified the following risk factors as significant and thus were included in the calculation of our risk scores: clinical [age, sex, history of stroke, history of transient ischemic attack, body mass index, hyperlipidemia, chronic obstructive pulmonary disease] and plaque characteristics [matrix volume, perivascular adipose tissue volume, lipid rich necrotic core volume]. A summary of points can be found in Table 1. Overall, we found that age over 80, history of chronic obstructive pulmonary disease and history of stroke were the three strongest predictors of 30-day stroke and mortality. Additionally, we found that for patients with even 3 points in our risk score have a 20% chance of stroke/death (Table II).

Conclusion: We present in this study a novel risk calculator incorporating both clinical and plaque characteristics for predicting 30-day stroke and mortality in patients with carotid artery disease. External validation and prospective studies are needed to confirm the accuracy of this risk calculator and its benefit in patient management strategies.

Table 1: Summary of Points Allocation

RISK FACTOR	CATEGORIES	POINTS	Patient A Example*	Patient B Example**
Age Categories	<=60 years	0		
	>60-70 yrs	2		
	>70-80 yrs	3	3	3
	>80 yrs	16		
Sex	Male	0	0	0
Female 3				
Stroke History	No	0	0	0
	Yes	4		
TIA History	No	0	0	0
	Yes	3		
BMI Category	Underweight <18.5kg/m2	0		
	Normal 18.5kg/m2 to <25	-1	-1	
	Overweight 25kg/m2 to <30	-6		-6
	Obese >/=30kg/m2	-10		
COPD History	No	0	0	0
	Yes	6		
Hyperlipidemia	No	0	0	0
	Yes	-2		
Matrix	<=75th	0		0
	>75th	1	1	
Perivascular Adipose Tissue	<=75th	0		0
	>75th	1	1	
Lipid Rich Necrotic Core	<=75th	0	0	
	>75th	-1		-1
TOTAL			3	-4

*74M with history of diabetes, former smoker without previous stroke or TIA and over 75th percentile matrix and perivascular adipose tissue in plaque morphology. Estimated risk is 21.14%
**74M with history of hypertension, former smoker without history of previous stroke or TIA and over 75th percentile lipid rich necrotic core and less than 75th percentile matrix and perivascular adipose tissue in plaque morphology. Estimated risk is <1.0%.

Table II: Total Points with Risk of Stroke and Mortality

POINTS TOTAL	ESTIMATE OF RISK(%)	POINTS TOTAL	ESTIMATE OF RISK
-13	0.01	11	93.02
-12	0.02	12	95.60
-11	0.03	13	97.25
-10	0.05	14	98.30
-9	0.08	15	98.95
-8	0.12	16	99.35
-7	0.20	17	99.60
-6	0.33	18	99.75
-5	0.54	19	99.85
-4	0.87	20	99.91
-3	1.41	21	99.94
-2	2.28	22	99.97
-1	3.66	23	99.98
0	5.83	24	99.99
1	9.17	25	99.99
2	14.12	26	99.99
3	21.14	27	99.99
4	30.40	28	99.99
5	41.58	29	99.99
6	53.71	30	99.99
7	65.40	31	99.99
8	75.50	32	99.99
9	83.39	33	99.99
10	89.11	34	99.99

40. POST-OPERATIVE SURVIVAL AND OUTCOMES FOLLOWING HEMODIALYSIS VASCULAR ACCESS CREATION

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Background: The literature suggests that for patients to experience the purported advantages of an arteriovenous fistula (AVF) over arteriovenous graft (AVG), a minimum survival of a several years is required. With the vascular access guideline shift away from "Fistula First" towards shared decision making, patient survival after vascular access creation is a major factor to consider in optimal access selection. The objective of this study is to examine outcomes of vascular access in patients with short survival and factors associated with short survival.

Method: We performed a retrospective review of 200 access procedures performed between August 2018 and November 2020 at a single institution. Maturation was defined as the date when the surgeon deemed the access ready to be used for dialysis. A modified Risk Analysis Index (RAI) score was used to calculate frailty.

Results: Within 3 years after access creation, 55 (27.5%) were recorded as dead (3YMORT). In the 3YMORT group, 5 did not follow up with the surgeon prior to death and 22/34 (65%) of AVF vs 15/16 (94%) of accesses were deemed mature prior to death (p=0.03). Of the accesses that matured, the median days to maturation for AVF was 69 (IQR 53, 87) vs 28 (IQR 18, 32) for AVG (P<0.001). Patients in the 3YMORT group were older (70.6 vs 63.4, P=0.004) and had a lower body mass index (BMI) (24.8 vs 27.4, P=0.03). Patients in the 3YMORT group had higher prevalence of dysrhythmia (35% vs 15%, p=0.002), COPD (20% vs 10%, P=0.048) and dialysis dependence at the time of access creation (91% vs 75%, P=0.01). There was no significant difference in sex, white race, Hispanic ethnicity, coronary artery disease, congestive heart failure, previous coronary artery bypass graft or percutaneous coronary intervention, diabetes, hypertension, and peripheral arterial disease between the two groups. The 3YMORT group had a significantly higher prevalence of frailty (78% vs 49%, P=0.002). Patients categorized as frail by the RAI had a significantly higher risk of 3YMORT (OR 3.74, 95% CI 1.82-7.66) compared to non-frail patients. Patients categorized as very frail by the RAI had an even higher risk of 3YMORT (OR 4.20, 95% CI 1.95-9.05), compared to non-frail patients.

Conclusion: Patients with short life expectancy after vascular access creation may have high rates of AVF non-maturation and longer time to maturation. Factors associated with high risk of mortality within 3 years of vascular access creation correlate well with factors included in the RAI frailty score. Patients who are frail or very frail may be appropriate candidates for AVG creation over AVF considering their high risk for short life expectancy.

41. INCREASED BODY MASS INDEX AND REFLUX TIMES ARE ASSOCIATED WITH INCOMPLETE TARGET VEIN CLOSURE FOLLOWING MICROFOAM ABLATION OF INCOMPETENT TRUNCAL VEINS

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Background: Body mass index (BMI) and venous reflux times (RT) have been associated with increased severity of symptomatic chronic venous insufficiency. The effects of BMI and RT on clinical outcomes following microfoam ablation (MFA) of the saphenous veins have not been characterized. The study objective was to analyze outcomes following MFA in patients with elevated BMI and RT.

Methods: A retrospective review of a prospectively maintained database was performed. All patients who underwent MFA for symptomatic great, accessory, and small vein reflux were identified. The study cohort was divided into groups 1 (BMI < 30) and 2 (BMI > 30) Patients were subcategorized into the following groups: (1A)- BMI < 30, RT < 4 sec; (1B)- BMI < 30, RT > 4 sec; (2A)- BMI > 30; RT< 4 sec, and (2B)- BMI > 30; RT > 4 sec). All patients had postoperative duplex (48-72 hours) scanning and had subsequent clinical follow up at 3-6 weeks. Demographic data, CEAP Classification, Venous Clinical Severity Score (VCSS), procedure details, adverse thrombotic events and follow up data were abstracted and compared.

Results: Between June 2018 and September 2022, 224 limbs underwent MFA for symptomatic superficial vein reflux. Of these, 127 limbs met inclusion criteria. Demographic data for all groups are reported in Table 1. The overall mean vein diameter treated was 9.0 + 3.9 mm. Microfoam volume used was 5.8 ml vs. 7.0 ml in groups 1 and 2, respectively (p=0.02). The average operative time was 32.5 + 16.1 minutes. Mean follow up was 197.4 days. Complete target vein closure by group was: 1A- 100%, 1B- 98.1%, 2A-76.5% and 2B- 75.9% (p< 0.001). Overall postoperative VCSS decreased from 10.3 + 3.6 to 8.2 + 3.2 and symptomatic relief for the entire cohort was 91.3%. These did not differ between groups. The complete ulcer healing rate was 75% for the entire cohort. Proximal deep venous thrombus extension was 4.7% and remote deep venous thrombosis occurred in 1.6%. These were also not significant between groups. All resolved with short-term oral anticoagulation.

Conclusion: Elevated BMI and longer reflux times are associated with incomplete target truncal vein closure following MFA. Despite these differences, a significant decrease in VCSS along with excellent symptom relief and ulcer healing rates were demonstrated across all groups. Adverse thrombotic events did not differ between groups and are difficult to predict. Postoperative ultrasound surveillance can identify patients with deep venous extension who may require selective anticoagulation following MFA.

Table 1: Demographics of Study Population Based on Body Mass Index and Reflux Times

Groups:	1: BMI < 30		2: BMI >30		P Value
	1A: Reflux < 4 s	1B: Reflux > 4 s	2A: Reflux <4 s	2B: Reflux > 4 s	
	N = 28	N = 53	N = 17	N = 29	
Mean Age	64.5 ± 15.6	62.4 ± 14.3	67.8 ± 10.8	64.6 ± 10.2	0.53
BMI ± SD	26.8 ± 2.2	24.8 ± 2.7	35.7 ± 5.3	36.5 ± 5.4	**<0.001***
% Female	57.1%	71.1%	76.5%	65.5%	0.48
Deep Venous Reflux	67.9%	66.0%	82.4%	89.7%	0.09
History of DVT	3.6%	3.8%	11.8%	20.7%	**0.045***
On Oral Anticoagulation	3.6%	5.7%	17.6%	20.7%	0.07
CEAP Classification					
C2	49.9%	39.6%	35.3%	6.9%	**0.01***
C3	17.9%	22.6%	23.5%	24.1%	0.94
C4	17.9%	22.6%	11.8%	24.1%	0.73
C5	3.6%	3.8%	5.9%	27.6%	**0.002***
C6	17.9%	11.3%	23.5%	1.2%	0.64
Mean Reflux Time	2.2 ± 0.8	4.3 ± 0.7	2.2 ± 0.5	3.6 ± 1.2	**<0.001***

42. SOCIAL INEQUITIES ASSOCIATED WITH INCREASED TUNNELED DIALYSIS CATHETER UTILIZATION AT AN URBAN HEMODIALYSIS CENTER

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Background: Tunneled hemodialysis catheters (TDCs) are an alternative primary, but less favorable, vascular access for patients requiring hemodialysis (HD). We sought to identify socioeconomic factors associated with TDC use in our patient population. We hypothesized that patients undergoing HD with TDCs were more likely to reside in lower income neighborhoods and have more comorbidities than those with arteriovenous access (AVA).

Methods: Patients undergoing HD at an academic urban hemodialysis center were identified. Those undergoing HD via TDCs as primary access were compared to those on HD via AVA as primary access. Data was collected over one year. Mean household income data was obtained via a county sponsored non-governmental organization.

Results: We identified 177 HD patients, including 38 patients using TDCs as primary vascular access. When compared to patients with TDCs, those without were similar in age (58.8 versus 61.1, p=0.47) and male gender (58% versus 46%, p=0.72). The two groups had similar rates of comorbidities including diabetes mellitus (TDC-68% versus AVA-63%, p=0.56), coronary artery disease (29% versus 27%, p=0.77), and hypertension (98% versus 94%, p=0.43). The two groups had similar rates of private insurance (5.2% versus 7.3%, p=0.36) and there was no difference in TDC usage when stratified by mean household income level of a patient's home zip code by quartile. There was a significantly higher proportion of patients with a TDC self-identifying as non-white versus those with AVA (92% versus 88%, p<0.01). Patients with TDCs were twice as likely to die over the study period, though this was not statistically significant (18% versus 9.4%, p=0.11).

Conclusion: In a single, academic, hemodialysis center, patients with TDCs had similar comorbidities, insurance status, and resided in similar economic communities as those with AVA. However, non-white patients were more likely to have TDCs serve as primary access. Nephrologists and HD access surgeons must recognize that potential social, economic, and race-related disparities may exist in hemodialysis access surgery to ensure that a proper algorithm of dialysis access procedures are provided in order to optimize care.

43. STATINS USED WITH ACE INHIBITORS OFFER BETTER PROTECTION THAN STATINS ALONE IN PATIENTS UNDERGOING CAROTID REVASCULARIZATION

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Background: Statin use has been studied and confirmed to have a beneficial impact on perioperative carotid endarterectomy (CEA) and carotid artery stenting (CAS) outcomes. The benefits of Angiotensin-converting enzyme (ACE) inhibitors in hypertension, ischemic heart disease, heart failure, diabetes mellitus, and renal disease are well-known. However, the impact of continuing or withholding ACE inhibitors on CEA and CAS outcomes is not addressed well in the literature. This study aimed to evaluate the impact of preoperative statin use combined with ACE inhibitors in patients undergoing CEA or CAS on mortality and morbidity using a multi-institutional database.

Methods: We utilized the vascular quality initiative data of all patients who underwent carotid artery revascularization, including CEA, transcarotid artery stenting(TCAR) and transfemoral carotid artery stenting (TFCAS) from 2003-2021. Our primary outcome was 30-day mortality/stroke after carotid revascularization based on pre-op exposure to statins alone, or statins and ACE inhibitors taken together. Secondary outcomes were post-op myocardial infarction (MI) and post-op congestive heart failure (CHF). Poisson regression with robust variance was used to determine post-op outcomes comparing Statin & ACE inhibitor group with Statins alone group. (Adjusting for type of carotid procedure(CEA, TCAR, TFCAS), age, gender, race, ethnicity, prior CHF, COPD, preop smoking, preop hemoglobin , prior CABG, prior PCI, major amputation, preop P2Y, previous CEA/CAS, ASA class, anticoagulant use, betablocker use, hypertension, diabetes, prior aneurysm repair, prior coronary heart disease, dialysis, functional status, TIA/stroke history and degree of stenosis)

Results: A total of 174,446 patients were included in the study, with 79,635 receiving statins only and 94,811 receiving both statins and ACE inhibitors. The statin only group was more likely to have CAS, a little older(70.8 vs 70.7, p<0.01), less asymptomatic(70.6% vs 74.4%, p<0.001), less obese(Mean BMI 28.0 vs 29.6, p<0.01), more likely to be non-diabetic(68.8% vs 56.1%, p<0.01), less likely to be hypertensive(82.3% vs 97.4%, p<0.01). [Table I]
After adjusting for potential confounders, the statins/ACE group had a 12% lower risk of post-op mortality/stroke (IRR 0.88, 95% CI 0.81-0.95 , p=0.001), 18% lower risk of post-op CHF (IRR 0.82, 95% CI 0.68-0.98, p=0.029), and similar risk of post-op MI (IRR 1.05 95% CI 0.91-1.20, p=0.54) compared to the Statin only group. [Figure 1]

Conclusion: Preoperatively Statins use combined with ACE inhibitors offer better protection compared to Statins alone in patients undergoing carotid revascularization surgery. We recommend addition of ACE inhibitors to patients with carotid artery disease, especially if they have concurrent hypertension.

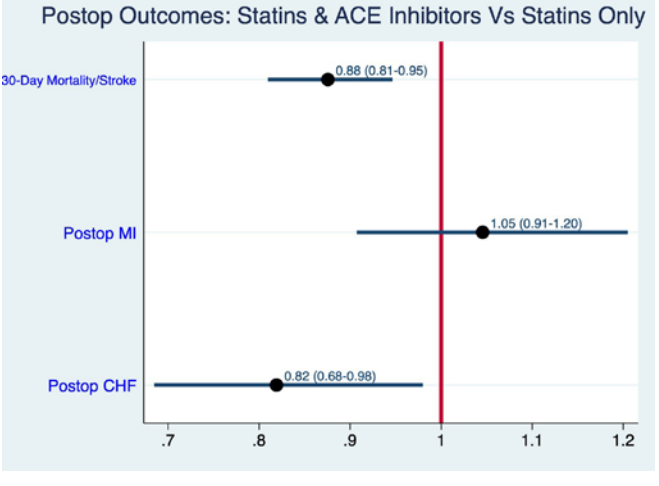
Table I: Baseline Demographic and Clinical Characteristics stratified by Statin/ACE Inhibitor Exposure

Variables	Description	Statins Only N=79,635	Statins & ACE Inhibitors N=94,811	p-value
Procedure	CEA	56162 (71.2%)	68119 (72.3%)	<0.01
	TCAR	10909 (13.8%)	12801 (13.6%)	
	TFCAS	11849 (15.0%)	13247 (14.1%)	
Age	Mean (SD)	70.8 (9.7)	70.7 (9.2)	0.02
Symptomatic Status	Asymptomatic	49787 (70.6%)	62727 (74.4%)	<0.01
Gender	Male	49158 (61.7%)	59516 (62.8%)	<0.01
BMI	Mean (SD)	28.0 (3.7)	29.6 (3.7)	<0.01
Ethnicity	Non-Hispanic/ Latino	76885 (96.9%)	90952 (96.3%)	<0.01
CHD	Yes	27803 (35.0%)	36768 (38.9%)	<0.01
Prior CHF	None	69960 (87.9%)	81363 (85.9%)	<0.01
Functional Status	Fully functional	61197 (81.8%)	73888 (83.0%)	<0.01
COPD	No	60271 (75.8%)	72390 (76.4%)	<0.01
Diabetes	No	54704 (68.8%)	53188 (56.1%)	<0.01
Hypertension	Yes	65300 (82.3%)	92029 (97.4%)	<0.01
Preop Smoking	Never	20684 (26.0%)	23760 (25.1%)	<0.01
	Prior	38074 (47.9%)	47610 (50.3%)	
	Current	20782 (26.1%)	23371 (24.7%)	
Dialysis	No	78336 (98.4%)	94041 (99.2%)	<0.01
Prior CABG	None	64088 (80.6%)	74508 (78.6%)	<0.01
Prior PCI	None	62340 (78.4%)	69921 (73.8%)	<0.01
Prior aneurysm Repair	No	59017 (97.2%)	71576 (97.2%)	0.50
ASA	YES	69472 (87.3%)	83156 (87.7%)	<0.01
P2Y use	Yes	42040 (52.8%)	50932 (53.7%)	<0.01
Betablocker	Yes	40624 (52.7%)	53948 (58.7%)	<0.01
Prior Anticoagulation	No	69776 (87.7%)	83581 (88.3%)	<0.01
Stroke/ TIA History	Hx TIA/Stroke	42514 (53.4%)	46476 (49.1%)	<0.01
ASA Class	1	621 (0.8%)	657 (0.7%)	<0.01
	2	4829 (6.2%)	5011 (5.4%)	

	3	55634 (70.9%)	67354 (71.9%)	
	4	17334 (22.1%)	20552 (21.9%)	
	5	58 (0.1%)	60 (0.1%)	
Degree of Stenosis	0-49%	1181 (1.5%)	1175 (1.2%)	<0.01
	50-69%	20481 (25.8%)	23407 (24.8%)	
	70-79%	14404 (18.2%)	18041 (19.1%)	
	80-99%	38345 (48.4%)	46593 (49.3%)	
	Occluded	4869 (6.1%)	5216 (5.5%)	

CEA, Carotid endarterectomy; TCAR, Transcarotid artery revascularization; TFCAS, Transfemoral artery stenting; BMI, Body mass index; CHD, Coronary heart disease; CAD, Coronary artery disease; CHF, Congestive heart failure; COPD, Chronic obstructive pulmonary disease; DM, Diabetes Mellitus; CABG, Coronary artery bypass graft; PCI, Percutaneous coronary intervention; ASA, Acetylsalicylic acid; ACE, Angiotensin converting enzyme; TIA, Transient ischemic attack.

Figure 1: Adjusted Outcomes After Carotid Revascularization Comparing Statin/ACE combination with Statin Only



MI: myocardial infarction; CHF: congestive heart failure
Adjusted for type of carotid procedure (CEA, TCAR, TFCAS), age, gender, race, ethnicity, prior CHF, COPD, preop smoking, preop hemoglobin, prior CABG, prior PCI, major amputation, preop P2Y, previous CEA/CAS, ASA class, anticoagulant use, betablocker use, hypertension, diabetes, prior aneurysm repair, prior coronary heart disease, dialysis, functional status, TIA/stroke history and degree of stenosis.

44. SHORT-TERM OUTCOMES OF INTRAVASCULAR LITHOTRIPSY FOR TREATMENT OF CALCIFIED FEMORAL ARTERIAL LESIONS

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Background: Endovascular treatment of calcified lesions located within the common femoral artery (CFA) and its branches presents unique complications such as inadequate luminal expansion, embolization, increased risk of stent fractures, and challenges with future percutaneous access through the stented site. Intravascular lithotripsy (IVL) has shown promising results in the treatment of calcified lesions without the associated complications arising from traditional treatment options. This study describes our initial experience with utilization of IVL for the treatment of calcified femoral arterial lesions.

Methods: A retrospective review of patients who underwent IVL for calcified femoral arterial lesions from June 2022 to December 2022 at a single institution was performed. All patients included had lower extremity duplex ultrasound (DUS) conducted prior to intervention and intraoperative angiography to assess for stenosis. Shockwave (Shockwave Medica, Santa Clara, CA) balloons were used during the procedure and pulsed between 4 and 10 cycles. Patient demographics, technical success, and intraoperative details were assessed.

Results: A total of 8 patients were treated with IVL for calcified femoral arterial lesions. Mean age was 75.7±10.8 and 87.5% were men. Two patients underwent IVL at 2 separate target vessel lesions. One patient was treated with IVL in the CFA bilaterally. Of the 11 total vessel lesions treated, 6 were in the common femoral artery (CFA), 2 in the profunda femoris artery (PFA), and 3 in the superficial femoral artery (SFA). Pre-operatively, mean peak systolic velocity (PSV) of the target lesions at the CFA, PFA, and SFA were 395.6, 289.5, and 307.33, respectively. Treatment indications for IVL were claudication (50%), gangrene (12.5%), rest pain (25%), and non-healing ulcer (25%). Technical success was 100%. Procedural complications included one access site hematoma which did not require operative treatment.

Conclusion: IVL is a safe and efficacious treatment option for calcified femoral arterial lesions with high technical success. Continued follow-up is planned to assess the durability and clinical outcomes of this treatment technique.

Table 1. Patient Characteristics

	Shockwave Intravascular Lithotripsy Treatment
Total Patients	8
Total Treated Vessel Lesions	11
Age	75.63±10.01
Male	7 (87.5%)
Comorbidities	
History of Tobacco Use	4 (50%)
Hypertension	6 (75%)
Hyperlipidemia	5 (62.5%)
Congestive Heart Failure	3 (37.5%)
Coronary Artery Disease	4 (50%)
COPD	1 (12.5%)
Diabetes Mellitus	4 (50%)
Prior Stroke or TIA	0
Indications for treatment	
Claudication	4 (50%)
Rest Pain	2 (25%)
Gangrene	1 (12.5%)
Non-healing Ulcer	2 (25%)
Anatomic location of lesion	
Common Femoral Artery	6 (54.5%)
Profunda Femoris Artery	2 (18.2%)
Superficial Femoral Artery	3 (27.3%)
Pre-operative ABI	0.64±0.39
Rutherford Class	
3	4 (44.4%)
4	2 (22.2%)
5	2 (22.2%)
6	1 (11.1%)
Pre-operative PSV (cm/s)	
Common Femoral Artery	395.6±328.88
Profunda Femoris Artery	289.5±14.85
Superficial Femoral Artery	307.33±154.42

Table 2. Procedural Details

	Shockwave Intravascular Lithotripsy Treatment
Treatment length (cm)	14.2±7.85
Estimated Blood Loss (cc) [median, IQR]	2.22 [0, 10]
IVL cycles	8 ±2.38
Maximum inflation pressure (atm)	9.2±1.1
Technical success	9 (100%)

Notes

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