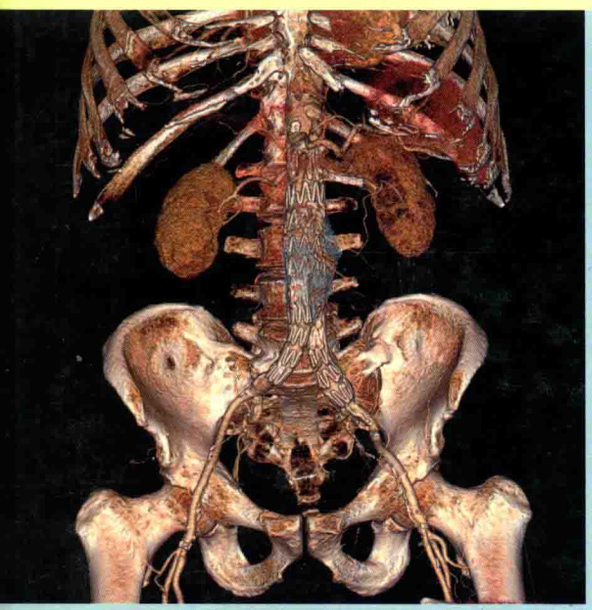
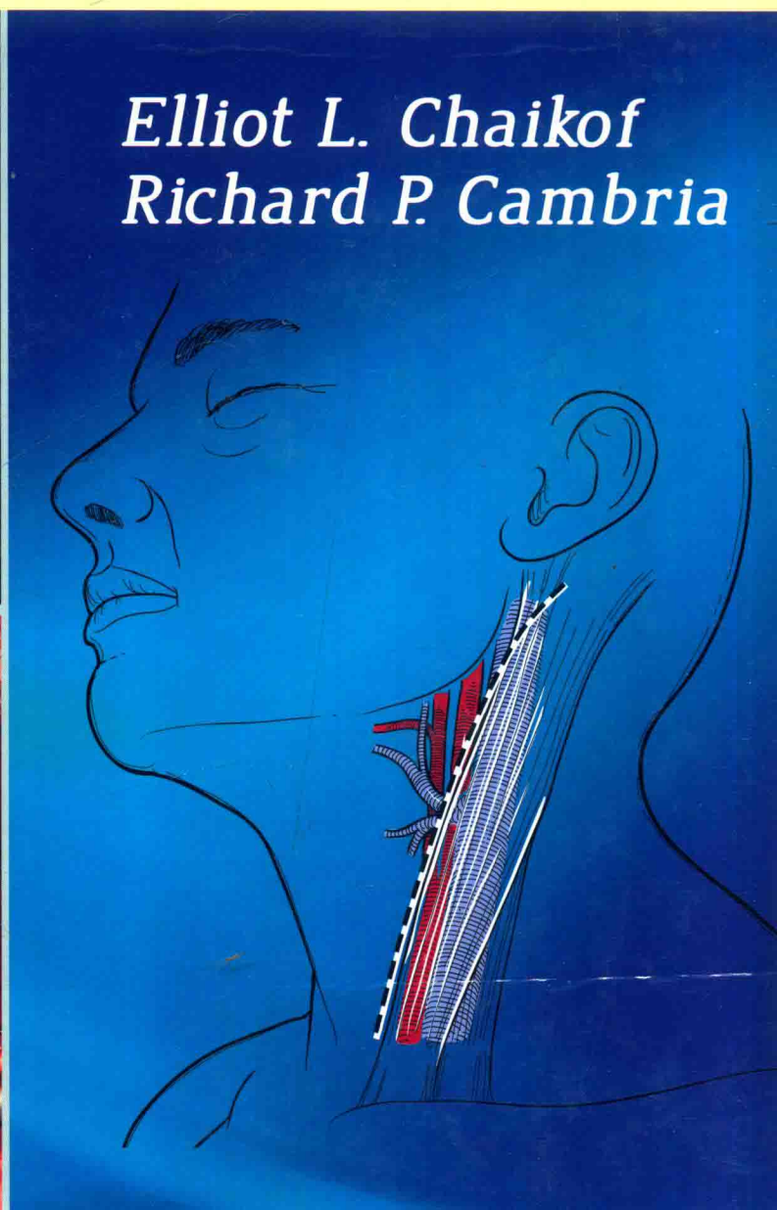
Atlas of Vascular Surgery and Endovascular Therapy

Anatomy and Technique



Elliot L. Chaikof
Richard P. Cambria



ELSEVIER
SAUNDERS

ATLAS OF VASCULAR SURGERY AND ENDOVASCULAR THERAPY:

Anatomy and Technique

ELSEVIER
SAUNDERS

1600 John F. Kennedy Blvd.
Ste. 1800
Philadelphia, PA 19103-2899

Atlas of Vascular Surgery and Endovascular Therapy:
Anatomy and Technique
ISBN: 978-1-4160-6841-9

Notices

Knowledge and best practice in this field are constantly changing. As new research and experience broaden our understanding, changes in research methods, professional practices, or medical treatment may become necessary.

Practitioners and researchers must always rely on their own experience and knowledge in evaluating and using any information, methods, compounds, or experiments described herein. In using such information or methods they should be mindful of their own safety and the safety of others, including parties for whom they have a professional responsibility.

With respect to any drug or pharmaceutical products identified, readers are advised to check the most current information provided (i) on procedures featured or (ii) by the manufacturer of each product to be administered, to verify the recommended dose or formula, the method and duration of administration, and contraindications. It is the responsibility of practitioners, relying on their own experience and knowledge of their patients, to make diagnoses, to determine dosages and the best treatment for each individual patient, and to take all appropriate safety precautions.

To the fullest extent of the law, neither the Publisher nor the authors, contributors, or editors assume any liability for any injury and/or damage to persons or property as a matter of products liability, negligence or otherwise, or from any use or operation of any methods, products, instructions, or ideas contained in the material herein.

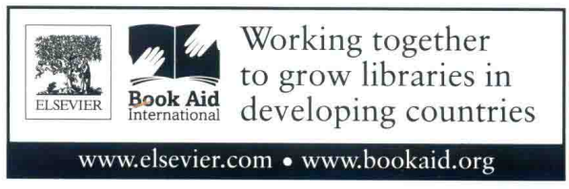
Library of Congress Cataloging-in-Publication Data

Atlas of vascular surgery and endovascular therapy : anatomy and technique / [edited by] Elliot L. Chaikof, Richard P. Cambria.
p. ; cm.
Includes bibliographical references and index.
ISBN 978-1-4160-6841-9 (hardcover : alk. paper)
I. Chaikof, Elliot L., editor of compilation. II. Cambria, Richard P., editor of compilation.
[DNLM: 1. Vascular Surgical Procedures--methods--Atlases. 2. Intraoperative Complications--prevention & control--Atlases. WG 17]
RD598.6
617.4'13--dc23
2013045756

Executive Content Strategist: Michael Houston
Content Development Specialist: Laura Schmidt
Publishing Services Manager: Anne Altepeter
Project Manager: Louise King
Design Manager: Ellen Zanolle

Printed in China

Last digit is the print number: 9 8 7 6 5 4 3 2 1



CO-EDITORS

Ronald M. Fairman, MD
The Clyde F. Barker – William Maul Measey Professor of Surgery
Chief, Division of Vascular Surgery and Endovascular Therapy
Vice-Chairman for Clinical Affairs, Department of Surgery
Professor of Surgery in Radiology
Hospital of the University of Pennsylvania
Philadelphia, Pennsylvania

Peter Gloviczki, MD
Joe M. and Ruth Roberts Professor of Surgery
Chair Emeritus, Division of Vascular and Endovascular Surgery
Director Emeritus, Gonda Vascular Center
Mayo Clinic
Rochester, Minnesota

Kimberley J. Hansen, MD
Professor of Surgery
Department of Vascular and Endovascular Surgery
Wake Forest University School of Medicine
Winston-Salem, North Carolina

Glenn M. LaMuraglia, MD
Associate Professor of Surgery
Harvard Medical School
Division of Vascular and Endovascular Surgery
Massachusetts General Hospital
Boston, Massachusetts

George H. Meier, MD, RVT, FACS
Professor and Chief
Department of Vascular Surgery
University of Cincinnati College of Medicine
Cincinnati, Ohio

Mark D. Morasch, MD, FACS
Department of Cardiovascular Surgery
St. Vincent Healthcare
Billings, Montana

Marc L. Schermerhorn, MD
Chief, Division of Vascular and Endovascular Surgery
Beth Israel Deaconess Medical Center
Associate Professor of Surgery
Harvard Medical School
Boston, Massachusetts

ATLAS OF VASCULAR SURGERY AND ENDOVASCULAR THERAPY:

Anatomy and Technique

Elliot L. Chaikof, MD, PhD
Johnson and Johnson Professor of Surgery
Harvard Medical School
Chairman, Roberta and Stephen R. Weiner Department of Surgery
Surgeon-in-Chief
Beth Israel Deaconess Medical Center
Boston, Massachusetts

Richard P. Cambria, MD
The Robert R. Linton MD Professor of Vascular and Endovascular Surgery
Harvard Medical School
Chief, Division of Vascular and Endovascular Surgery
Department of Surgery
Massachusetts General Hospital
Boston, Massachusetts

ELSEVIER
SAUNDERS

To our patients, families, students, and teachers,
who have inspired us and provided us with
the privilege of being able to serve

Preface

The grammar of all medicine consists not in its tools but in its method: to effectively treat clinical problems based on fundamental principles and an ordered framework. Those principles require detailed knowledge not only of a patient's complaint and physical findings, but also through effective communication, intimate familiarity with the patient as a person, as well as the patient's family and unique circumstances. A framework is necessary for the care of the surgical patient. That framework is derived from an organized and structured approach that considers all options in formulating a therapeutic plan. Above all, it requires humility in the face of the existing limits inherent in the recommended treatment, so that the patient and the patient's family are provided with an understanding of the nature of the problem and recommended course of treatment with compassion, composure, and calm.

It has been difficult for surgeons living in the first decades of the twenty-first century to accurately measure the relative significance of what our age is contributing to the history of medicine. Our contributions can only be weighed from a single vantage point—a perspective based on the past. However, with the past as our reference, it appears that we have now entered a third era in vascular surgery, witnessing a revolutionary change that has made it necessary to rewrite our textbooks and profoundly alter our approach to the care of patients with vascular disease. Our field has evolved over the past 100 years, from one that focused largely on the applications of fundamental anatomic principles that rendered the entire vascular system surgically accessible, but with limited capability for repair, to a specialty capable of heroic feats of reconstruction and replacement. This third era in which we find ourselves today is defined by a focus on achieving these goals in a manner that seeks to limit the trace of our footprint.

An atlas provides a guide that allows us to trace our way through highly diverse pathways of surgical care. Although it is inevitable that during periods of rapid technical change, when new advances continue to afford changes in care, fundamental principles of surgical techniques and methods of teaching surgical techniques will remain unchanged. The proficient surgeon often performs many sophisticated surgical procedures automatically or intuitively through a process that has evolved over decades of experience. Nevertheless, effective teaching in the operating room requires a detailed understanding of the evolution of each clinical situation as a rational system of logical rules that can be communicated, demonstrated, and applied. To conduct an operation is to orchestrate a team in the interpretation of a score of anatomic findings and physiologic principles using an existing set of instruments. The strategic plan for each patient dictates that the surgeon select a pathway that is as safe and efficient as possible, based on an appreciation of all relevant pitfalls and danger points.

This atlas emphasizes operative and interventional strategy based on anatomic and physiologic principles, critical intraoperative decision making, and technique. In several instances, the technique described in print is supplemented by a

video presentation. Each description is preceded by a review of the rationale guiding the underlying approach, preoperative care, intraoperative pitfalls and errors, and techniques to achieve an effective result, including postoperative care.

In Greek mythology, Atlas was the primordial Titan who held up the celestial sphere, carrying the burden of this task in the service of mankind. For those who pursue a career in surgery, this chosen mission serves to organize and measure the best of our energies and skills as clinicians. It is with humility that we recognize that to be a surgeon is not easy, for surgery tests us each and every day. When patients and their families put their lives and their health in our hands, as surgeons we recognize, as represented by Atlas in an era long ago, that the burden of our duty is not light. Surgical training is not short or finite, but lifelong. We hope this atlas will be a source of both information and ideas that leads to more effective care of patients with vascular disease, easing the burden and lightening the load, so that we continue to move forward toward perfection.

Elliot L. Chaikof, MD, PhD
Richard P. Cambria, MD
Boston, Massachusetts

Contributors

Matthew J. Alef, MD
Clinical Fellow
Vascular and Endovascular Surgery
Division of the Cardiovascular Institute
Beth Israel Deaconess Medical Center
Boston, Massachusetts
Chapter 48: Endovascular Treatment of Femoral-Popliteal Arterial Occlusive Disease

Javier E. Anaya-Ayala, MD
Vascular Research Fellow
Cardiovascular Surgery
Houston Methodist DeBakey Heart & Vascular Center
Houston, Texas
Chapter 43: Endovascular Treatment of Hepatic, Gastroduodenal, Pancreaticoduodenal, and Splenic Artery Aneurysms

George Andros, MD
Medical Director
Amputation Prevention Center
Valley Presbyterian Hospital
Los Angeles, California
Chapter 52: Amputations of the Forefoot

Frank R. Arko III, MD
Vascular and Endovascular Surgery
Sanger Heart and Vascular Institute
Carolinas Medical Center
Charlotte, North Carolina
Chapter 58: Endovascular Treatment of Iliofemoral and Femoral-Popliteal Deep Vein Thrombosis

George J. Arnaoutakis, MD
Resident in General Surgery
Department of Surgery
The Johns Hopkins Hospital
Baltimore, Maryland
Chapter 16: Transaxillary Rib Resection for Thoracic Outlet Syndrome

Jeffrey L. Ballard, MD, FACS
Clinical Professor of Surgery
Department of Surgery
University of California, Irvine
Staff, Vascular Surgeon
Vascular Institute
St. Joseph Hospital
Orange, California
Chapter 32: Spine Exposure

Adam W. Beck, MD
Assistant Professor of Surgery
Division of Vascular Surgery
University of Florida College of Medicine
Gainesville, Florida
Chapter 4: General Principles of Endovascular Therapy: Guidewire and Catheter Manipulation

Michael Belkin, MD
Professor of Surgery
Harvard Medical School
Chief of Vascular and Endovascular Surgery
Brigham and Women's Hospital
Boston, Massachusetts
Chapter 23: Direct Surgical Repair of Aneurysms of the Infrarenal Abdominal Aorta and Iliac Arteries

Nicholas J. Bevilacqua, DPM
Associate, Foot and Ankle Surgery
North Jersey Orthopaedic Specialists, P.A.
Teaneck, New Jersey
Chapter 52: Amputations of the Forefoot

James H. Black III, MD
Bertram M. Bernheim MD Associate Professor of Surgery
Johns Hopkins University School of Medicine
Attending Vascular and Endovascular Surgeon
The Johns Hopkins Hospital
Baltimore, Maryland
Chapter 24: Direct Surgical Repair of Juxtarenal and Suprarenal Aneurysms of the Abdominal Aorta

Arash Bornak, MD
Assistant Professor of Surgery
Vascular and Endovascular Surgery
University of Miami Miller School of Medicine
Miami, Florida
Chapter 41: Endovascular Treatment of Occlusive Superior Mesenteric Artery Disease

Thomas C. Bower, MD
Professor of Surgery
Mayo College of Graduate Medical Education
Chair, Division of Vascular and Endovascular Surgery
Mayo Clinic
Rochester, Minnesota
Chapter 56: Surgical Reconstruction of the Inferior Vena Cava and Iliofemoral Venous System

Peter B. Brant-Zawadzki, MB, BCh
Vascular Surgery Fellow
Department of Surgery
University of Wisconsin School of Medicine and Public Health
Madison, Wisconsin
Chapter 5: General Principles of Endovascular Therapy: Angioplasty, Stenting, Recanalization, and Embolization

David C. Brewster, MD
Clinical Professor of Surgery
Harvard Medical School
Division of Vascular and Endovascular Surgery
Massachusetts General Hospital
Boston, Massachusetts
Chapter 28: Direct Surgical Repair of Aortoiliac Occlusive Disease

W. John Byrne, MCh, FRCSI (Gen)
Vascular Surgeon
The Institute for Vascular Health and Disease
Albany, New York
Chapter 7: Eversion Endarterectomy and Special Problems in Carotid Surgery

Keith D. Calligaro, MD
Clinical Professor of Surgery
Chief, Section of Vascular Surgery
University of Pennsylvania School of Medicine
Chief, Section of Vascular Surgery and Endovascular Therapy
Pennsylvania Hospital
Philadelphia, Pennsylvania
Chapter 63: Radial Artery–Cephalic Vein and Brachial Artery–Cephalic Vein Arteriovenous Fistula

Marc A. Camacho, BS, MD
Resident Physician
Division of Vascular Surgery
University of North Carolina
Chapel Hill, North Carolina
Chapter 22: Endovascular Treatment of Traumatic Thoracic Aortic Disruption

Richard P. Cambria, MD
The Robert R. Linton MD Professor of Vascular and Endovascular Surgery
Harvard Medical School
Chief, Division of Vascular and Endovascular Surgery
Department of Surgery
Massachusetts General Hospital
Boston, Massachusetts
Chapter 6: Carotid Endarterectomy

Elliot L. Chaikof, MD, PhD
Johnson and Johnson Professor of Surgery
Harvard Medical School
Chairman, Roberta and Stephen R. Weiner Department of Surgery
Surgeon-in-Chief
Beth Israel Deaconess Medical Center
Boston, Massachusetts
Chapter 6: Carotid Endarterectomy

Kenneth J. Cherry, MD
Edwin P. Lehman Professor of Surgery
Vascular and Endovascular Surgery
University of Virginia
Charlottesville, Virginia
Chapter 11: Direct Surgical Repair of Aortic Arch Vessels

Timothy A.M. Chuter, BM, BS, DM
Professor in Residence
University of California at San Francisco
Director, Endovascular Surgery
University of California at San Francisco Medical Center
San Francisco, California
Chapter 19: Endovascular Repair of the Aortic Arch and Thoracoabdominal Aorta

Daniel G. Clair, MD
Professor and Chairman
Department of Vascular Surgery
Cleveland Clinic
Lerner College of Medicine of Case Western Reserve University
Cleveland, Ohio
Chapter 31: Special Problems in the Endovascular Treatment of Aortoiliac Occlusive Disease

Thomas Conlee, MD
Vascular Surgery Fellow
Department of Vascular and Endovascular Surgery
Wake Forest Baptist Medical Center
Winston-Salem, North Carolina
Chapter 38: Endovascular Treatment of Renal Artery Stenosis

Mark F. Conrad, MD
Assistant Professor of Surgery
Massachusetts General Hospital
Boston, Massachusetts
Chapter 37: Extraanatomic Repair for Renovascular Disease

Robert S. Crawford, MD
Assistant Professor
Division of Vascular Surgery
University of Maryland Medical Center
Baltimore, Maryland
Chapter 28: Direct Surgical Repair of Aortoiliac Occlusive Disease

David L. Cull, MD
Department of Surgery
University of South Carolina School of Medicine – Greenville
Greenville, South Carolina
Chapter 66: Unconventional Venous Access Procedures for Chronic Hemodialysis

R. Clement Darling III, MD
Professor of Surgery
Department of Surgery
Albany Medical College
Chief, Division of Vascular Surgery
Albany Medical Center Hospital
Director, The Institute for Vascular Health and Disease
Albany, New York
Chapter 7: Eversion Endarterectomy and Special Problems in Carotid Surgery

Mark G. Davies, MD, PhD, MBA
Professor and Vice Chairman
Cardiovascular Surgery
Houston Methodist Hospital
Houston, Texas
Weill Cornell Medical College
New York, New York
Chapter 43: Endovascular Treatment of Hepatic, Gastroduodenal, Pancreaticoduodenal, and Splenic Artery Aneurysms

Christopher A. DeMaioribus, MD
Division of Vascular and Endovascular Surgery
St. Mary's Duluth Clinic Medical Center
Duluth, Minnesota
Chapter 34: Neoaortoiliac System Procedure for Treatment of an Aortic Graft Infection

Joel K. Deonanan, MD
Vascular and Endovascular Surgery
Wake Forest Baptist Medical Center
Winston Salem, North Carolina
Chapter 38: Endovascular Treatment of Renal Artery Stenosis

Hasan H. Dosluoglu, MD
Associate Professor of Surgery
State University at Buffalo
Chief, Department of Surgery
Chief, Division of Vascular Surgery
Veterans Affairs Western New York Healthcare System
Buffalo, New York
Chapter 67: Distal Revascularization Interval Ligation Procedure

Matthew J. Dougherty, MD
Clinical Professor of Surgery
Section of Vascular Surgery
Pennsylvania Hospital
University of Pennsylvania
Philadelphia, Pennsylvania
Chapter 63: Radial Artery–Cephalic Vein and Brachial Artery–Cephalic Vein Arteriovenous Fistula

Adam J. Doyle, MD
Vascular Surgery Resident
Division of Vascular Surgery
University of Rochester Medical Center
Rochester, New York
Chapter 17: Endovascular Therapy for Subclavian-Axillary Vein Thrombosis

Yazan M. Duwayri, MD
Assistant Professor of Surgery
Division of Vascular Surgery and Endovascular Therapy
Emory University School of Medicine
Atlanta, Georgia
Chapter 15: Supraclavicular Approach for Surgical Treatment of Thoracic Outlet Syndrome

Matthew S. Edwards, MD, MS, RVT, FACS
Associate Professor of Surgery and Public Health Sciences
Chairman, Department of Vascular and Endovascular Surgery
Wake Forest Baptist Medical Center
Winston Salem, North Carolina
Chapter 38: Endovascular Treatment of Renal Artery Stenosis

John F. Eidt, MD
Vascular Surgery
Greenville Health System University Medical Center
Greenville, South Carolina
Chapter 51: Above- and Below-Knee Amputation

Mark K. Eskandari, MD
James S.T. Yao, MD Professor of Education in Vascular Surgery
Professor of Surgery, Radiology, and Medicine
Chief and Program Director, Division of Vascular Surgery
Northwestern University Feinberg School of Medicine
Chicago, Illinois
Chapter 13: Endovascular Treatment of Aortic Arch Vessels—Innominate, Carotid, and Subclavian Arteries

Anthony L. Estrera, MD
Professor
Cardiothoracic and Vascular Surgery
The University of Texas Health Science Center
Houston, Texas
Chapter 18: Direct Surgical Repair of Aneurysms of the Thoracic and Thoracoabdominal Aorta

Ronald M. Fairman, MD
The Clyde F. Barker – William Maul Measey Professor of Surgery
Chief, Division of Vascular Surgery and Endovascular Therapy
Vice-Chairman for Clinical Affairs, Department of Surgery
Professor of Surgery in Radiology
Hospital of the University of Pennsylvania
Philadelphia, Pennsylvania
Chapter 27: Endovascular Treatment of Aneurysms of the Juxtarenal and Pararenal Aorta

Mark A. Farber, MD
Associate Professor
Director, University of North Carolina Aortic Center
Department of Surgery and Radiology
University of North Carolina
Chapel Hill, North Carolina
Chapter 22: Endovascular Treatment of Traumatic Thoracic Aortic Disruption

Peter L. Faries, MD, FACS
Professor of Surgery
Chief, Division of Vascular Surgery
Mount Sinai School of Medicine
New York, New York
Chapter 49: Endovascular Treatment of Tibial-Peroneal Arterial Occlusive Disease

Thomas L. Forbes, MD, FRCSC, FACS
Professor of Surgery and Chair
Division of Vascular Surgery
London Health Sciences Centre
The University of Western Ontario
London, Ontario, Canada
Chapter 47: Direct Surgical Repair of Popliteal Entrapment

Julie Ann Freischlag, MD
William Steward Halsted Professor
Chair, Department of Surgery
Johns Hopkins Medical Institutions
Baltimore, Maryland
Chapter 16: Transaxillary Rib Resection for Thoracic Outlet Syndrome

Michael J. Gaffud, MD
Fellow, Section of Vascular Surgery and Endovascular Therapy
University of Alabama
Birmingham, Alabama
Chapter 35: Surgical Treatment of Pseudoaneurysm of the Femoral Artery

Shawn M. Gage, PA-C
Senior Vascular Physician Assistant
Division of Vascular Surgery
Duke University Medical Center
Durham, North Carolina
Chapter 64: Forearm Loop Graft and Brachial Artery–Axillary Vein Interposition Graft

Manuel Garcia-Toca, MD
Assistant Professor of Surgery
Alpert Medical School of Brown University
Providence, Rhode Island
Chapter 13: Endovascular Treatment of Aortic Arch Vessels—Innominate, Carotid, and Subclavian Arteries

Patrick J. Geraghty, MD
Associate Professor of Surgery and Radiology
Department of Surgery
Section of Vascular Surgery
Washington University School of Medicine
Saint Louis, Missouri
Chapter 50: Endovascular Treatment of Popliteal Aneurysm

Sidney Glazer, MD
Clinical Associate Professor
Department of Surgery
University of California at Irvine
Orange, California
Chapter 65: Basilic and Femoral Vein Transposition

Peter Gloviczki, MD
Joe M. and Ruth Roberts Professor of Surgery
Chair Emeritus, Division of Vascular and Endovascular Surgery
Director Emeritus, Gonda Vascular Center
Mayo Clinic
Rochester, Minnesota
Chapter 55: Surgical Reconstruction for Superior Vena Cava Syndrome

Christopher J. Godshall, MD
Assistant Professor of Surgery
Wake Forest University
Winston-Salem, North Carolina
Chapter 36: Direct Surgical Repair of Renovascular Disease

Kaoru R. Goshima, MD
Assistant Professor of Surgery
Department of Vascular and Endovascular Surgery
The University of Arizona Medical Center
Tucson, Arizona
Chapter 44: Open Surgical Bypass of Femoral-Popliteal Arterial Occlusive Disease

Wayne S. Gradman, MD
Attending
Department of Surgery
Cedars Sinai Medical Center
Los Angeles, California
Chapter 65: Basilic and Femoral Vein Transposition

Ryan T. Hagino, MD, FACS
Section Head, Vascular and Endovascular Surgery
Essentia Health Duluth Clinic
Duluth, Minnesota
Chapter 34: Neoaortoiliac System Procedure for Treatment of an Aortic Graft Infection

Eugene Hagiwara, MD
Interventional Radiology
University of California – San Francisco
San Francisco, California
Chapter 57: Transjugular Intrahepatic Portosystemic Shunt Procedure

Kimberley J. Hansen, MD
Professor of Surgery
Department of Vascular and Endovascular Surgery
Wake Forest University School of Medicine
Winston-Salem, North Carolina
Chapter 36: Direct Surgical Repair of Renovascular Disease

Jeremy R. Harris, MD, FRCSC
Assistant Professor of Surgery
Division of Vascular Surgery
London Health Sciences Center
London, Ontario, Canada
Chapter 47: Direct Surgical Repair of Popliteal Entrapment

Linda M. Harris, MD, FACS
Associate Professor of Surgery
Chief, Division of Vascular Surgery
Program Director, Vascular Surgery Residency and Fellowship
State University of New York at Buffalo
Medical Director, Noninvasive Vascular Lab
University at Buffalo Surgeons, Inc.
Buffalo, New York
Chapter 67: Distal Revascularization Interval Ligation Procedure

Ravishankar Hasanadka, MD
Vascular and Endovascular Surgery
OSF/HeartCare Midwest
Peoria, Illinois
Chapter 3: General Principles of Endovascular Therapy: Access Site Management

Mounir J. Haurani, MD
Assistant Professor of Surgery
Division of Vascular Diseases and Surgery
The Ohio State University Medical Center
Columbus, Ohio
Chapter 37: Extraanatomic Repair for Renovascular Disease
Chapter 39: Endovascular Treatment of Renal Artery Aneurysms

Daniel J. Hayes, Jr., MD
Vascular Fellow
Section of Vascular Surgery
Pennsylvania Hospital
University of Pennsylvania
Philadelphia, Pennsylvania
Chapter 63: Radial Artery–Cephalic Vein and Brachial Artery–Cephalic Vein Arteriovenous Fistula

Thomas S. Huber, MD, PhD
Professor of Surgery
Chief, Division of Vascular and Endovascular Surgery
University of Florida College of Medicine
Attending Surgeon
Shands Hospital at the Unversity of Florida
Gainesville, Florida
Chapter 40: Direct Surgical Repair for Celiac Axis and Superior Mesenteric Artery Occlusive Disease

Zhen S. Huang, MD
Fellow
New York-Presbyterian Hospital/Weill Cornell Medical Center
New York, New York
Chapter 48: Endovascular Treatment of Femoral-Popliteal Arterial Occlusive Disease

Mark D. Iafrati, MD
Associate Professor of Surgery
Tufts University School of Medicine
Chief, Division of Vascular Surgery
Tufts Medical Center
Boston, Massachusetts
Chapter 59: Varicose Vein Stripping and Ambulatory Phlebectomy

Karl A. Illig, MD
Professor of Surgery
Director, Division of Vascular Surgery
Department of Surgery
University of South Florida
Tampa, Florida
Chapter 17: Endovascular Therapy for Subclavian-Axillary Vein Thrombosis

Mihaiela Ilves, MD
Research Assistant
Department of Vascular and Endovascular Surgery
The University of Texas Southwestern Medical Center
Dallas, Texas
Chapter 58: Endovascular Treatment of Iliofemoral and Femoral-Popliteal Deep Vein Thrombosis

William D. Jordan, Jr., MD
Professor and Chief
Section of Vascular Surgery and Endovascular Therapy
University of Alabama at Birmingham
Birmingham, Alabama
Chapter 35: Surgical Treatment of Pseudoaneurysm of the Femoral Artery

Venkat R. Kalapatapu, MD, FRCS, FACS
Assistant Professor
Department of Vascular Surgery
University of Pennsylvania Health Sysytem
Philadelphia, Pennsylvania
Chapter 51: Above- and Below-Knee Amputation

Manju Kalra, MBBS
Associate Professor of Surgery
Division of Vascular and Endovascular Surgery
Mayo Clinic
Rochester, Minnesota
Chapter 55: Surgical Reconstruction for Superior Vena Cava Syndrome

Vikram S. Kashyap, MD, FACS
Professor of Surgery
Case Western Reserve University
Chief, Division of Vascular Surgery and Endovascular Therapy
Co-Director, Harrington Heart and Vascular Institute
University Hospitals Case Medical Center
Cleveland, Ohio
Chapter 2: General Principles of Sedation, Angiography, and Intravascular Ultrasound

Karthikeshwar Kasirajan, MD
Division of Vascular Surgery
Department of Surgery
Emory University School of Medicine
Atlanta, Georgia
Chapter 21: Endovascular Treatment of Aortic Dissection

Rebecca Kelso, MD
Department of Vascular Surgery
Cleveland Clinic Foundation
Cleveland, Ohio
Chapter 2: General Principles of Sedation, Angiography, and Intravascular Ultrasound

Ali Khoobehi, MD
Vascular Surgery Fellow
Department of Surgery
Vanderbilt University Medical Center
Nashville, Tennessee
Chapter 9: Carotid Body Tumor

Alexander Kulik, MD, MPH, FRCSC, FACC, FAHA
Cardiovascular Surgeon
Christine E. Lynn Heart and Vascular Institute
Boca Raton Regional Hospital
Affiliate Associate Professor
Charles E. Schmidt College of Medicine
Florida Atlantic University
Boca Raton, Florida
Chapter 20: Endovascular Treatment of Thoracic Aneurysms

Christopher J. Kwolek, MD
Director, Vascular and Endovascular Surgery Training Program
Department of Surgery
Massachusetts General Hospital
Associate Professor of Surgery
Harvard Medical School
Boston, Massachusetts
Chapter 39: Endovascular Treatment of Renal Artery Aneurysms

Jeffrey H. Lawson, MD, PhD
Professor of Surgery
Vascular Division
Department of Surgery
Duke University Medical Center
Durham, North Carolina
Chapter 64: Forearm Loop Graft and Brachial Artery-Axillary Vein Interposition Graft

W. Anthony Lee, MD, FACS
Director, Endovascular Program
Christine E. Lynn Heart and Vascular Institute
Boca Raton, Florida
Chapter 4: General Principles of Endovascular Therapy: Guidewire and Catheter Manipulation

Layla C. Lucas, MD
Attending Vascular Surgeon
Tucson Medical Center
Tucson, Arizona
Chapter 44: Open Surgical Bypass of Femoral-Popliteal Arterial Occlusive Disease

Alan B. Lumsden, MD
Professor of Cardiovascular Surgery
Chairman, Department of Cardiovascular Surgery
Houston Methodist Hospital
Houston, Texas
Chapter 43: Endovascular Treatment of Hepatic, Gastroduodenal, Pancreaticoduodenal, and Splenic Artery Aneurysms

Harry Ma, MD, PhD
Assistant Professor of Surgery
Department of Surgery
Division of Vascular and Endovascular Surgery
University of Oklahoma
Tulsa, Oklahoma
Chapter 59: Varicose Vein Stripping and Ambulatory Phlebectomy

Michel S. Makaroun, MD
Professor and Chief
Division of Vascular Surgery
University of Pittsburgh School of Medicine
Chief, Vascular Surgery
University of Pittsburgh Medical Center
Pittsburgh, Pennsylvania
Chapter 25: Endovascular Treatment of Aneurysms of the Infrarenal Aorta

Thomas S. Maldonado, MD
Associate Professor of Surgery
Vascular Surgery
New York University
Chief of Vascular Surgery
Department of Surgery
Bellevue Hospital
New York, New York
Chapter 42: Direct Surgical Repair of Visceral Artery Aneurysms

Jon S. Matsumura, MD
Professor of Surgery
Chair, Division of Vascular Surgery
University of Wisconsin School of Medicine and Public Health
Madison, Wisconsin
Chapter 5: General Principles of Endovascular Therapy: Angioplasty, Stenting, Recanalization, and Embolization

Robert B. McLafferty
Chief of Surgery
Department of Surgery
Portland Veterans Affairs Medical Center
Professor of Surgery
Division of Vascular Surgery
Department of Surgery
Oregon Health Sciences University
Portland, Oregon
Chapter 3: General Principles of Endovascular Therapy: Access Site Management

George H. Meier, MD, RVT, FACS
Professor and Chief
Department of Vascular Surgery
University of Cincinnati College of Medicine
Cincinnati, Ohio
Chapter 68: Surgical and Endovascular Intervention for Arteriovenous Graft Thrombosis

Joseph L. Mills, Sr., MD
Professor of Surgery and Chief
Vascular and Endovascular Surgery
Co-Director, Southern Arizona Limb Salvage Alliance
Tucson, Arizona
Chapter 44: Open Surgical Bypass of Femoral-Popliteal Arterial Occlusive Disease

Ross Milner, MD
Associate Professor of Surgery
The University of Chicago School of Medicine
Chicago, Illinois
Chapter 41: Endovascular Treatment of Occlusive Superior Mesenteric Artery Disease

Renee C. Minjarez, MD
Fellow, Vascular and Endovascular Surgery
Division of Vascular Surgery
Oregon Health and Science University
Portland, Oregon
Chapter 45: Direct Surgical Repair of Tibial-Peroneal Arterial Occlusive Disease

Gregory L. Moneta, MD
Professor and Chief
Division of Vascular Surgery
Department of Surgery
Oregon Health and Science University
Portland, Oregon
Chapter 45: Direct Surgical Repair of Tibial-Peroneal Arterial Occlusive Disease

Mark D. Morasch, MD, FACS
Department of Cardiovascular Surgery
St. Vincent Healthcare
Billings, Montana
Chapter 10: Surgical Treatment of the Vertebral Artery
Chapter 12: Extraanatomic Repair of Aortic Arch Vessels

Eric Mowatt-Larssen, MD
Assistant Professor, Phlebology
Department of Vascular Surgery
Duke University
Durham, North Carolina
Chapter 62: Sclerotherapy

Erin H. Murphy, MD
Assistant Professor of Clinical Surgery
Division of Vascular Surgery and Endovascular Interventions
New York-Presbyterian Hospital/Columbia University Medical Center
New York, New York
Chapter 58: Endovascular Treatment of Iliofemoral and Femoral-Popliteal Deep Vein Thrombosis

Thomas C. Naslund, MD
Professor of Surgery
Division of Vascular Surgery
Vanderbilt University School of Medicine
Nashville, Tennessee
Chapter 9: Carotid Body Tumor

Peter Naughton, MD
Beaumont Hospital
Dublin, Ireland
Chapter 13: Endovascular Treatment of Aortic Arch Vessels—Innominate, Carotid, and Subclavian Arteries

James L. Netterville, MD
Professor of Otolaryngology
Mark C. Smith Chair in Head and Neck Surgery
Vanderbilt University Medical Center
Nashville, Tennessee
Chapter 9: Carotid Body Tumor

Marc A. Passman, MD
Professor of Surgery
Section of Vascular Surgery and Endovascular Therapy
University of Alabama at Birmingham
Birmingham, Alabama
Chapter 54: Placement of Vena Cava Filter

David A. Peterson, MD
Fellow in Vascular Surgery
Department of Surgery
Duke University
Durham, North Carolina
Instructor, Department of Surgery
Stanford University
Stanford, California
Chapter 64: Forearm Loop Graft and Brachial Artery-Axillary Vein Interposition Graft