

CAMPBELL-WALSH UROLOGY

TENTH EDITION

Volume One

WEIN
KAVOUSSI
NOVICK
PARTIN
PETERS

CAMPBELL-WALSH

Urology

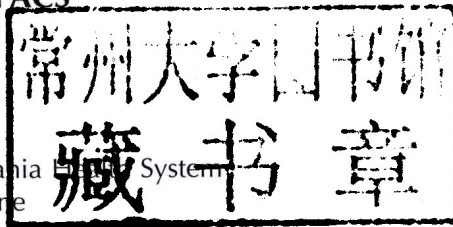
Tenth Edition

Volume 1

EDITOR-IN-CHIEF

Alan J. Wein, MD, PhD (Hon), FACS

Founders Professor of Urology
Perelman School of Medicine
University of Pennsylvania;
Chief of Urology
Penn Medicine/University of Pennsylvania Health System
Perelman Center for Advanced Medicine
Philadelphia, Pennsylvania



CAMPBELL-WALSH UROLOGY, TENTH EDITION
INTERNATIONAL EDITION

ISBN: 978-1-1460-6911-9
ISBN: 978-0-8089-2439-5

**Copyright © 2012, 2007, 2002, 1998, 1992, 1986, 1978, 1970, 1963, 1954 by
Saunders, an imprint of Elsevier Inc.**

Chapter 50: Treatment of Advanced Renal Cell Carcinoma by Ramaprasad Srinivasan, MD,
PhD, and W. Marston Linehan, MD, is in the Public Domain.

Chapter 103: Laparoscopic and Robotic-Assisted Laparoscopic Radical Prostatectomy and Pelvic
Lymphadenectomy by Li-Ming Su, MD, and Joseph A. Smith, Jr., MD: Li-Ming Su retains
copyright to his original figures and video.

No part of this publication may be reproduced or transmitted in any form or by any means,
electronic or mechanical, including photocopying, recording, or any information storage and
retrieval system, without permission in writing from the publisher. Details on how to seek
permission, further information about the Publisher's permissions policies and our
arrangements with organizations such as the Copyright Clearance Center and the Copyright
Licensing Agency, can be found at our website: www.elsevier.com/permissions.

This book and the individual contributions contained in it are protected under copyright by
the Publisher (other than as may be noted herein).

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

Campbell-Walsh Urology. – 10th ed. / editor-in-chief, Alan J. Wein ; editors, Louis R. Kavoussi

... [et al.].

p. ; cm.

Urology

Includes bibliographical references and index.

ISBN 978-1-4160-6911-9 (set : hardcover : alk. paper) – ISBN 978-0-8089-2439-5 (international
ed., hardcover : alk. paper) 1. Urology. I. Wein, Alan J. II. Kavoussi, Louis R.

III. Campbell, Meredith F. (Meredith Fairfax), 1894-1968. IV. Title: Urology.

[DNLM: 1. Female Urogenital Diseases. 2. Male Urogenital Diseases. 3. Urology–
methods. WJ 100]

RC871.C33 2012

616.6–dc22

2011015024

Acquisitions Editor: Stefanie Jewell-Thomas
Senior Developmental Editor: Jennifer Shreiner
Publishing Services Manager: Patricia Tannian
Senior Project Manager: Kristine Feeherty
Design Direction: Lou Forgione

Printed in the United States of America

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

Working together to grow
libraries in developing countries

www.elsevier.com | www.bookaid.org | www.sabre.org

ELSEVIER

BOOK AID
International

Sabre Foundation

CAMPBELL-WALSH

Urology

Tenth Edition

Editors

Louis R. Kavoussi, MD, MBA

Chairman and Waldbaum-Gardner Distinguished Professor
Smith Institute for Urology
Hofstra North Shore-LIJ School of Medicine
New York, New York

Andrew C. Novick, MD

Chairman, Glickman Urological Institute
Cleveland Clinic Foundation;
Professor of Surgery
Cleveland Clinic Lerner College of Medicine of Case
Western Reserve University
Cleveland, Ohio

Alan W. Partin, MD, PhD

Professor and Director of Urology
Johns Hopkins School of Medicine
Baltimore, Maryland

Craig A. Peters, MD, FACS, FAAP

Chief, Division of Surgical Innovation, Technology, and
Translation
Principal Investigator, Sheikh Zayed Institute for Pediatric
Surgical Innovation
Children's National Medical Center;
Professor of Urology and Pediatrics
The George Washington University
Washington, DC

Dedication

This edition of *Campbell-Walsh Urology* is dedicated to the memory and contributions of Andrew Carl Novick. Andy was world class in every way—as a scholar, a surgeon, an innovator, and a friend. Andy assumed the chairmanship of Urology at the Cleveland Clinic in 1985 at the age of 37 and died at the too young age of 60 from complications of lymphoma. His lifetime dream of a urologic and kidney institute at the Cleveland Clinic was realized approximately 1 month before his death, with Andy as its first director. He joined the *Campbell's* editorial staff as an associate for the 8th edition, was one of the five editors of the 9th edition, and was an equal contributor in organizing and selecting the authors for this 10th edition. Andy always strove for excellence and recognized and acknowledged quality. We hope he would have been proud of this edition.

Robert Abouassaly, MD, MSc

Assistant Professor, Department of Urology
Case Western Reserve University School of Medicine;
Urologic Oncologist
Urologic Institute
University Hospitals Case Medical Center
Cleveland, Ohio

Paul Abrams, MD

Professor, Department of Urology
Bristol Urologic Institute
Southmead Hospital
Bristol, United Kingdom

Mark C. Adams, MD, FAAP

Professor, Department of Urology and Pediatrics
Vanderbilt University Medical Center;
Division of Pediatric Urology
Monroe Carell Jr. Children's Hospital at Vanderbilt
Nashville, Tennessee

Ashok Agarwal, PhD

Professor of Surgery
Department of Urology
Case Western Reserve University;
Director of Andrology
Director, Center for Reproductive Medicine
Department of Urology
Cleveland Clinic
Cleveland, Ohio

Mohamad E. Allaf, MD

Associate Professor, Departments of Urology, Oncology, and
Biomedical Engineering
Johns Hopkins Medical Institutions;
Director of Minimally Invasive and Robotic Surgery
Johns Hopkins Hospital
Baltimore, Maryland

James Kyle Anderson, MD

Assistant Professor, Department of Urologic Surgery
University of Minnesota;
Staff Urologist, Department of Urologic Surgery
VA Medical Center
Minneapolis, Minnesota

Karl-Erik Andersson, MD, PhD

Professor, Department of Urology
Wake Forest University School of Medicine;
Professor, Institute for Regenerative Medicine
Wake Forest University Baptist Medical Center
Winston Salem, North Carolina

Kenneth W. Angermeier, MD

Associate Professor
Center for Genitourinary Reconstruction
Glickman Urological and Kidney Institute
Cleveland Clinic
Cleveland, Ohio

Emmanuel S. Antonarakis, MD

Assistant Professor of Oncology
Department of Medical Oncology
Johns Hopkins University;
Attending Physician, Department of Medical Oncology
Sidney Kimmel Comprehensive Cancer Center at John Hopkins
Baltimore, Maryland

Dean G. Assimos, MD

Professor of Surgical Sciences
Department of Urology
Wake Forest University School of Medicine;
Attending Physician, Department of Urology
Wake Forest University Baptist Medical Center
Winston-Salem, North Carolina

Anthony Atala, MD

W. Boyce Professor and Chair
Department of Urology
Wake Forest University School of Medicine;
Director, Wake Forest Institute for Regenerative Medicine
Winston Salem, North Carolina

Darius J. Bägli, MDCM, FRCSC, FAAP, FACS

Professor, Department of Surgery
Division of Urology and Institute of Medical Science
University of Toronto;
Senior Attending Urologist
Associate Surgeon-in-Chief
The Hospital for Sick Children;
Director of Urology Research
Senior Associate Scientist
Division of Developmental and Stem Cell Biology
The Hospital for Sick Children Research Institute
Toronto, Ontario, Canada

John Maynard Barry, MD

Professor Emeritus of Surgery
Divisions of Urology and Abdominal Organ Transplantation
The Oregon Health and Science University;
Staff Surgeon
University Hospital and Doernbecher Children's Hospital;
Consultant, Surgery
Veterans Affairs Medical Center
Portland, Oregon

Julia Spencer Barthold, MD

Professor of Urology and Pediatrics
 Jefferson Medical College at Thomas Jefferson University
 Philadelphia, Pennsylvania;
 Associate Chief and Head of Urology Research Laboratory
 Department of Surgery/Urology
 Nemours/Alfred I. DuPont Hospital for Children;
 Head, Urology Laboratory
 Nemours Biomedical Research
 Wilmington, Delaware

Stuart B. Bauer, MD

Professor of Surgery (Urology)
 Harvard Medical School;
 Senior Associate in Urology
 Children's Hospital Boston
 Boston, Massachusetts

Clair J. Beard, MD

Director, Testicular Cancer Center
 Department of Radiation Oncology
 Dana-Farber Cancer Institute and Brigham and Women's
 Hospital
 Boston, Massachusetts

Arie S. Belldegrun, MD

Roy and Carol Doumani Chair in Urologic Oncology
 Professor and Chief, Urologic Oncology
 Director, Institute of Urologic Oncology
 David Geffen School of Medicine at UCLA;
 Department of Urology
 Ronald Reagan UCLA Medical Center
 Los Angeles, California

Mitchell C. Benson, MD

Herbert & Florence Irving and George F. Cahill Professor
 and Chair
 Department of Urology
 Columbia University College of Physicians and Surgeons;
 Urologist-in-Chief, Department of Urology
 New York-Presbyterian Hospital, Columbia University Medical
 Center
 New York, New York

Brian M. Benway, MD

Assistant Professor, Department of Surgery
 Division of Urologic Surgery
 Washington University School of Medicine
 St. Louis, Missouri

Ryan Kent Berglund, MD

Assistant Professor of Surgery
 Glickman Urologic and Kidney Institute
 Cleveland Clinic Lerner College of Medicine at Case Western
 Reserve University
 Cleveland Clinic
 Cleveland, Ohio

David M. Berman, MD, PhD

Associate Professor, Departments of Pathology, Oncology, and
 Urology
 Johns Hopkins University School of Medicine;
 Attending Pathologist
 Johns Hopkins Hospital
 Baltimore, Maryland

Sam B. Bhayani, MD

Associate Professor, Department of Surgery
 Co-Director of Robotic Surgery
 Division of Urologic Surgery
 Washington University School of Medicine
 St. Louis, Missouri

Jay Todd Bishoff, MD, FACS

Clinical Professor of Surgery
 Department of Urology
 University of Utah School of Medicine;
 Director, Intermountain Urological Institute
 Intermountain Healthcare;
 Director, Department of Urology
 LDS Hospital
 Salt Lake City, Utah;
 Director, Department of Urology
 Intermountain Medical Center
 Murray, Utah

Michael L. Blute, Sr., MD

Professor, Department of Surgery
 Mary C. DeFeudis Chair, Cancer Care and Research
 University of Massachusetts Memorial Medical School;
 Director, Cancer Center of Excellence
 Interim Chief, Department of Urology
 UMass Memorial Medical Center
 Worcester, Massachusetts

Joseph G. Borer, MD

Assistant Professor, Department of Surgery
 Harvard Medical School;
 Assistant in Urology
 Department of Urology
 Children's Hospital Boston
 Boston, Massachusetts

George J. Bosl, MD

Professor, Department of Medicine
 Weill Cornell Medical College;
 Chair, Department of Medicine
 Memorial Sloan-Kettering Cancer Center
 New York, New York

Charles B. Brendler, MD

Clinical Professor, Department of Surgery
 Division of Urology
 University of Chicago Medical Center
 Chicago, Illinois;
 Vice Chairman, Research and Development
 Department of Surgery
 North Shore University Health System
 Evanston, Illinois

Gregory A. Broderick, MD

Professor, Department of Urology
Mayo Clinic College of Medicine;
Consultant, Department of Urology
Mayo Clinic
Jacksonville, Florida

James D. Brooks, MD

Associate Professor, Department of Urology
Stanford University School of Medicine
Stanford, California

Arthur L. Burnett, MD, MBA, FACS

Patrick C. Walsh Professor of Urology
Department of Urology
Johns Hopkins Medical Institutions
Baltimore, Maryland

Jeffrey A. Cadeddu, MD

Professor, Departments of Urology and Radiology
University of Texas Southwestern Medical Center
Dallas, Texas

Anthony A. Caldamone, MD, MMS, FAAP, FACS

Professor of Surgery (Urology) and Pediatrics
Division of Urology
Warren Alpert Medical School of Brown University
Rhode Island Hospital;
Head of Pediatric Urology
Hasbro Children's Hospital
Providence, Rhode Island

Steven C. Campbell, MD, PhD

Professor of Surgery
Department of Urology
Cleveland Clinic Lerner College of Medicine at Case Western
Reserve University;
Professor of Surgery
Director, Urology Residency Program
Vice Chairman, Urology
Center for Urologic Oncology
Cleveland Clinic
Cleveland, Ohio

Douglas A. Canning, MD

Professor, Department of Urology
University of Pennsylvania School of Medicine;
Director, Division of Pediatric Urology
The Children's Hospital of Philadelphia
Philadelphia, Pennsylvania

Michael A. Carducci, MD

AEGON Professor in Prostate Cancer Research
Departments of Oncology and Urology
Sidney Kimmel Comprehensive Cancer Center at Johns Hopkins
Baltimore, Maryland

Michael C. Carr, MD, PhD

Associate Professor, Department of Urology
University of Pennsylvania School of Medicine;
Attending Surgeon, Division of Pediatric Urology
The Children's Hospital of Philadelphia
Philadelphia, Pennsylvania

Peter R. Carroll, MD, MPH

Professor and Chair, Department of Urology
University of California, San Francisco
UCSF Medical Center
San Francisco, California

Herbert Ballentine Carter, MD

Professor, Departments of Urology and Oncology
Johns Hopkins School of Medicine
Baltimore, Maryland

Anthony J. Casale, MD

Professor and Chairman, Department of Urology
University of Louisville;
Chief of Urology
Kosair Children's Hospital;
Chief of Urology and Surgery (Urology)
University of Louisville Hospital
Louisville, Kentucky

Pasquale Casale, MD

Assistant Professor, Department of Urology
University of Pennsylvania School of Medicine;
Attending Surgeon, Division of Pediatric Urology
The Children's Hospital of Philadelphia
Philadelphia, Pennsylvania

William J. Catalona, MD

Professor, Department of Urology
Northwestern University Feinberg School of Medicine;
Director, Clinical Prostate Cancer Program
Robert H. Lurie Comprehensive Cancer Center
Northwestern Memorial Hospital
Chicago, Illinois

R. Duane Cespedes, MD

Associate Professor, Department of Urology
Johns Hopkins School of Medicine;
Co-Director, Women's Center for Pelvic Health
James Buchanan Brady Urological Institute
Johns Hopkins Medical Institutions
Baltimore, Maryland

Michael B. Chancellor, MD

Clinical Professor, Department of Urology
Oakland University William Beaumont School of Medicine;
Director, Neurourology Program
William Beaumont Hospital
Royal Oak, Michigan

Christopher R. Chapple, MD, FRCS (Urol), FEBU

Honorary Professor, Faculty of Health and Wellbeing
Sheffield Hallam University;
Honorary Senior Lecturer of Urology
University of Sheffield;
Consultant Urological Surgeon
Department of Urology
Sheffield Teaching Hospitals NHS Foundation Trust
Sheffield, United Kingdom;
Adjunct Secretary General for Education
European Association of Urology
Arnhem, The Netherlands

Christopher J. Chermansky, MD

Assistant Professor, Department of Urology
Louisiana State University Health Sciences Center
New Orleans School of Medicine
New Orleans, Louisiana

Robert L. Chevalier, MD

Harrison Professor of Pediatrics
Department of Pediatrics
University of Virginia;
Pediatric Nephrologist
University of Virginia Health System
Charlottesville, Virginia

George K. Chow, MD

Assistant Professor, Department of Urology
Consultant in Urology
Mayo Clinic
Rochester, Minnesota

Jeanne S. Chow, MD

Assistant Professor, Department of Radiology
Harvard Medical School;
Pediatric Radiologist
Children's Hospital Boston
Boston, Massachusetts

Benjamin I. Chung, MD

Assistant Professor, Department of Urology
Stanford University School of Medicine;
Director, Laparoscopic and Minimally Invasive Urologic Surgery
Department of Urology
Stanford Hospital and Clinics
Stanford, California

Ralph V. Clayman, MD

Dean, University of California, Irvine School of Medicine
Professor, Department of Urology
University of California, Irvine;
Professor, Department of Urology
UC Irvine Medical Center
Orange, California
Professor, Department of Urology
Long Beach Veterans Administration Hospital
Long Beach, California

Michael Joseph Conlin, MD, FACS

Associate Professor of Urology
Department of Surgery
Oregon Health & Science University
Portland, Oregon

Raymond A. Costabile, MD

Senior Associate Dean for Clinical Strategy
Professor, Department of Urology
University of Virginia
Charlottesville, Virginia

Paul L. Crispen, MD

Assistant Professor, Department of Surgery
Division of Urology
University of Kentucky
Lexington, Kentucky

Juanita M. Crook, MD, FRCPC

Professor, Department of Radiation Oncology
University of British Columbia;
Active Medical Staff
Department of Radiation Oncology
Kelowna General Hospital;
Radiation Oncologist
British Columbia Cancer Agency
Kelowna, British Columbia, Canada

Douglas M. Dahl, MD

Assistant Professor of Surgery (Urology)
Harvard Medical School;
Associate Urologist
Massachusetts General Hospital
Boston, Massachusetts

Anthony V. D'Amico, MD, PhD

Professor and Chief, Genitourinary Radiation Oncology
Brigham and Women's Hospital and Dana-Farber Cancer Institute
Boston, Massachusetts

John W. Davis, MD

Assistant Professor, Department of Urology
University of Texas MD Anderson Cancer Center
Houston, Texas

G. Joel DeCastro, MD, MPH

Assistant Professor, Department of Urology
Columbia University College of Physicians and Surgeons
New York, New York

John D. Denstedt, MD, FRCSC, FACS

Richard Ivey Professor and Chair, Department of Surgery
Schulich School of Medicine & Dentistry
The University of Western Ontario
Richard Ivey Professor and Chair, Division of Urology
Department of Surgery
London Health Sciences Centre and St. Joseph's Health Care
London
London, Ontario, Canada

Theodore L. DeWeese, MD

Professor and Chair, Department of Radiation Oncology and
Molecular Radiation Sciences
Johns Hopkins University School of Medicine;
Radiation Oncologist-in-Chief
Johns Hopkins Hospital and Health System
Baltimore, Maryland

David Andrew Diamond, MD

Associate Professor of Surgery (Urology)
Harvard Medical School;
Senior Associate in Urology
Department of Urology
Children's Hospital Boston
Boston, Massachusetts

Roger R. Dmochowski, MD, FACS

Professor of Urologic Surgery
Vanderbilt University School of Medicine;
Director, Vanderbilt Continence Center
Director, Vanderbilt Female Reconstructive Fellowship
Executive Physician, Safety
Vanderbilt University Hospital
Nashville, Tennessee

Leo R. Doumanian, MD

Assistant Professor, Department of Urology
Temple University School of Medicine
Philadelphia, Pennsylvania

Marcus Drake, DM, MA, FRCS (Urol)

Senior Lecturer in Urology
School of Clinical Sciences
University of Bristol;
Consultant Surgeon
Urology Department
Southmead Hospital
Bristol, United Kingdom

Branden Duffey, DO

Endourology Fellow
Department of Urology
University of Minnesota and University of
Minnesota Medical Center
Minneapolis, Minnesota

Daniel D. Dugi III, MD

Assistant Professor, Department of Urology
Oregon Health & Science University
Portland, Oregon

James A. Eastham, MD

Chief, Urology Service
Department of Surgery
Memorial Sloan-Kettering Cancer Center
New York, New York

Louis Eichel, MD

Clinical Assistant Professor, Department of Urology
University of Rochester Medical Center;
Director, Minimally Invasive Surgery
Center For Urology
Rochester, New York

Mario A. Eisenberger, MD

R. Dale Hughes Professor of Oncology and Urology
Johns Hopkins University and The Johns Hopkins Hospital
Baltimore, Maryland

Jonathan I. Epstein, MD

Reinhard Professor of Urological Pathology
Departments of Pathology, Urology, and Oncology
Johns Hopkins Medical Institutions;
Director, Surgical Pathology
Department of Pathology
Johns Hopkins Hospital
Baltimore, Maryland

Carlos R. Estrada, Jr., MD

Assistant Professor, Department of Surgery
Harvard Medical School;
Assistant in Urology
Department of Urology
Children's Hospital Boston
Boston, Massachusetts

Robert L. Fairchild, PhD

Professor, Department of Molecular Medicine
Cleveland Clinic;
Professor, Department of Pathology
Case Western Reserve University School of Medicine
Cleveland, Ohio

Amr Fergany, MD, PhD

Staff Sections of Oncology, Minimally Invasive Surgery,
and Robotics
Glickman Urological and Kidney Institute
Cleveland Clinic
Cleveland, Ohio

Michael N. Ferrandino, MD

Assistant Professor, Department of Surgery
Division of Urology
Duke University and Duke University Medical Center
Durham, North Carolina

Lynne R. Ferrari, MD

Associate Professor, Department of Anesthesia
Harvard Medical School;
Medical Director, Preoperative Services and Operating Rooms
Chief, Division of Perioperative Anesthesia
Department of Anesthesiology, Perioperative, and Pain
Management
Children's Hospital Boston
Boston, Massachusetts

James H. Finke, PhD

Professor of Molecular Medicine
 Department of Pathology
 Case Western Reserve University School of Medicine;
 Professor of Immunology
 Joint-Appointment, Glickman Urological Institute and Taussig
 Cancer Institute
 Cleveland Clinic
 Cleveland, Ohio

**John M. Fitzpatrick, MCh, FRCSI, FC Urol (SA),
FRCSGlas, FRCS**

Professor and Chairman, Department of Surgery
 University College Dublin;
 Professor of Surgery and Consultant Urologist
 Department of Urology
 Mater Misericordiae University Hospital
 Dublin, Ireland

Robert C. Flanigan, MD

Albert J. Jr. and Claire R. Speh Professor and Chair
 Department of Urology
 Loyola University Medical Center and Stritch School of
 Medicine;
 Professor, Department of Urology
 Loyola University Health System
 Maywood, Illinois

Stuart M. Flechner, MD, FACS

Professor, Department of Surgery
 Cleveland Clinic Lerner College of Medicine at Case Western
 Reserve University;
 Director of Clinical Research
 Section of Renal Transplantation
 Glickman Urological and Kidney Institute
 Cleveland Clinic
 Cleveland, Ohio

Tara Lee Frenkl, MD, MPH

Clinical Associate, Department of Surgery
 Division of Urology
 University of Pennsylvania Medical Center
 Philadelphia, Pennsylvania

Dominic C. Frimberger, MD

Associate Professor, Department of Urology
 University of Oklahoma Health Sciences Center;
 Department of Urology
 Children's Hospital and Presbyterian Hospital
 Oklahoma City, Oklahoma

Pat F. Fulgham, MD, DABU, FACS

Clinical Professor, Department of Urology
 University of Texas Southwestern Medical School;
 Surgical Director, Oncology Services
 Texas Health Presbyterian Dallas
 Dallas, Texas

John P. Gearhart, MD

Professor and Director
 Division of Pediatric Urology
 Johns Hopkins University School of Medicine
 Baltimore, Maryland

Glenn S. Gerber, MD

Associate Professor of Surgery/Urology
 University of Chicago Pritzker School of Medicine;
 Director, Endourology
 University of Chicago Medical Center
 Chicago, Illinois

Jason L. Gerboc, DO

Staff Urologist
 Department of Urology
 Wilford Hall Medical Center
 Lackland Air Force Base, Texas

Robert H. Getzenberg, PhD

The Donald S. Coffey Professor of Urology, Pharmacology,
 and Molecular Sciences
 Department of Urology
 Johns Hopkins University School of Medicine;
 Director, James Buchanan Brady Urological Institute
 Johns Hopkins Hospital
 Baltimore, Maryland

Islam A. Ghoneim, MD, PhD

Staff, Urology Department
 Cairo University
 Cairo, Egypt;
 Fellow, Department of Urology
 Glickman Urologic and Kidney Institute
 Cleveland Clinic
 Cleveland, Ohio

Inderbir S. Gill, MD, MCh

Professor and Chairman, Department of Urology
 Keck School of Medicine
 University of Southern California
 Director, USC Institute of Urology
 Los Angeles, California

Timothy D. Gilligan, MD, MS

Director, Late Effects Clinic
 Program Director, Hematology/Oncology Fellowship
 Department of Solid Tumor Oncology
 Taussig Cancer Institute;
 Deputy Editor, Cleveland Clinic Journal of Medicine
 Cleveland Clinic
 Cleveland, Ohio

David A. Goldfarb, MD

Professor of Surgery
 Department of Urology
 Cleveland Clinic Lerner College of Medicine at Case Western
 Reserve University;
 Surgical Director, Renal Transplantation
 Department of Urology
 Glickman Urological and Kidney Institute
 Cleveland Clinic
 Cleveland, Ohio

Marc Goldstein, MD, DSc (Hon)

Matthew P. Hardy Distinguished Professor, Urology and
 Reproductive Medicine
 Weill Cornell Medical College;
 Surgeon-in Chief, Male Reproductive Medicine and Surgery
 Attending Urologist, Department of Urology
 New York-Presbyterian Hospital, Weill Cornell Medical Center;
 Senior Scientist, Center for Biomedical Research
 The Population Council
 New York, New York

Leonard G. Gomella, MD, FACS

Chairman, Department of Urology
 The Bernard W. Godwin Jr. Professor of Prostate Cancer
 Jefferson Medical College at Thomas Jefferson University;
 Associate Director, Kimmel Cancer Center;
 Director, Kimmel Cancer Center Network;
 Chairman, Department of Urology
 Thomas Jefferson University Hospital
 Philadelphia, Pennsylvania

Mark L. Gonzalgo, MD, PhD

Associate Professor, Department of Urology
 Stanford University School of Medicine
 Stanford, California

Ethan J. Halpern, MD, MSCE

Professor, Departments of Radiology and Urology
 Jefferson Medical College at Thomas Jefferson University
 Philadelphia, Pennsylvania

Misop Han, MD, MS

Associate Professor, Department of Urology
 Johns Hopkins University School of Medicine;
 Staff Surgeon, Department of Urology
 Johns Hopkins Medical Institutions
 Baltimore, Maryland

Philip M. Hanno, MD, MPH

Professor of Urology
 Department of Surgery
 University of Pennsylvania School of Medicine;
 Attending Urologist, Department of Surgery
 Hospital of the University of Pennsylvania and the Veterans
 Administration Medical Center
 Philadelphia, Pennsylvania

Harry W. Herr, MD

Professor, Department of Urology
 Weill Cornell Medical College;
 Attending Surgeon, Department of Urology
 Memorial Sloan-Kettering Cancer Center
 New York, New York

Sender Herschorn, MDCM, FRCSC

Professor and Chairman, Division of Urology
 Martin Barkin Chair, Urological Research
 University of Toronto;
 Attending Urologist, Division of Urology
 Sunnybrook Health Sciences Centre
 Toronto, Ontario, Canada

Thomas H.S. Hsu, MD

Director of Laparoscopic, Robotic, and Minimally Invasive
 Urologic Surgery
 Northern California Kaiser Permanente Medical Center
 Santa Clara, California

Mark Hurwitz, MD

Department of Radiation Oncology
 Harvard Medical School;
 Director, Regional Program Development
 Department of Radiation Oncology
 Dana-Farber/Brigham and Women's Cancer Center
 Boston, Massachusetts

Douglas A. Husmann, MD

Professor and Chair, Department of Urology
 Mayo Clinic
 Rochester, Minnesota

Thomas W. Jarrett, MD

Professor and Chairman, Department of Urology
 George Washington University School of Medicine
 Washington, DC

J. Stephen Jones, MD, MBA

Professor of Surgery
 Department of Urology
 Cleveland Clinic Lerner College of Medicine at Case Western
 Reserve University;
 Chairman, Department of Regional Urology
 Glickman Urological and Kidney Institute
 Cleveland Clinic
 Cleveland, Ohio

**Gerald H. Jordan, MD, FACS, FAAP (Hon),
FRCS (Hon)**

Professor, Department of Urology
 Eastern Virginia Medical School;
 Urology of Virginia
 Norfolk, Virginia

David B. Joseph, MD, FACS, FAAP

Professor, Department of Surgery
Chief, Pediatric Urology
University of Alabama at Birmingham;
Beverly P. Head Endowed Chair in Pediatric Urology
Children's Hospital
Birmingham, Alabama

Martin Kaefer, MD, FAAP, FACS

Professor, Department of Urology
Division of Pediatric Urology
Indiana University School of Medicine
Indianapolis, Indiana

Jihad H. Kaouk, MD

Professor, Department of Surgery
Cleveland Clinic Lerner College of Medicine;
Director, Laparoscopic and Robotic Surgery
Department of Urology
Cleveland Clinic
Cleveland, Ohio

Irving D. Kaplan, MD

Assistant Professor, Department of Radiation Oncology
Harvard Medical School;
Staff Radiation Therapist
Beth Israel Deaconess Medical Center
Boston, Massachusetts

Louis R. Kavoussi, MD, MBA

Chairman and Waldbaum-Gardner Distinguished Professor
Smith Institute for Urology
Hofstra North Shore-LIJ School of Medicine
New York, New York

Parviz K. Kavoussi, MD

Andrology Fellow
Department of Urology
University of Virginia
Charlottesville, Virginia;
Andrologist/Urologist
Austin Fertility & Reproductive Medicine
Austin, Texas

Patrick A. Kenney, MD

Clinical Associate, Department of Urology
Tufts University School of Medicine
Boston, Massachusetts;
Chief Resident, Institute of Urology
Lahey Clinic
Burlington, Massachusetts

Antoine E. Khoury, MD, FRCSC, FAAP

Professor, Department of Urology
Chief, Pediatric Urology
University of California, Irvine;
Medical Director, Pediatric Urology
Children's Hospital of Orange County;
Chief, Pediatric Urology
UCI Medical Center
Orange, California

Roger Sinclair Kirby, MD, MA, FRCS

Professor, Department of Urology
University of London;
The Prostate Centre
London, United Kingdom

Eric A. Klein, MD

Professor, Department of Surgery
Cleveland Clinic Lerner College of Medicine at Case Western
Reserve University;
Chairman, Glickman Urological and Kidney Institute
Cleveland Clinic
Cleveland, Ohio

Kathleen C. Kobashi, MD

Associate Clinical Professor, Department of Urology
University of Washington School of Medicine;
Head, Section of Urology and Renal Transplantation
Department of Surgery
Virginia Mason Medical Center
Seattle, Washington

Michael O. Koch, MD

Chairman and John P. Donohue Professor
Department of Urology
Indiana University School of Medicine
Indianapolis, Indiana

John N. Krieger, MD

Professor, Department of Urology
University of Washington School of Medicine;
Chief, Department of Urology
VA Puget Sound Health Care System;
Attending Surgeon, Department of Urology
University of Washington Medical Center and Harborview
Medical Center
Seattle, Washington

Bradley P. Kropp, MD, FAAP

Professor and Vice Chairman, Department of Urology
Chief, Pediatric Urology
University of Oklahoma Health Science Center
Oklahoma City, Oklahoma

Alexander Kutikov, MD

Assistant Professor of Urologic Oncology
Department of Surgical Oncology
Fox Chase Cancer Center
Philadelphia, Pennsylvania

Sarah M. Lambert, MD

Assistant Professor, Department of Surgery
The University of Pennsylvania;
Staff Urologist, Department of Surgery
The Children's Hospital of Philadelphia
Philadelphia, Pennsylvania

Raymond S. Lance, MD

The Paul F. Schellhammer Professor of Cancer Research
Associate Professor, Departments of Urology and Microbiology
and Cancer Biology
Eastern Virginia Medical School;
Sentara Norfolk General Hospital
Sentara Medical Group—Urology of Virginia
Norfolk, Virginia

Brian R. Lane, MD, PhD

Clinical Associate Professor, Department of Surgery
Michigan State University;
Attending Physician, Department of Urology
Spectrum Health Hospital System
Grand Rapids, Michigan

William A. Larchian, MD

Associate Professor, Department of Surgery
Case Western Reserve University School of Medicine;
Center for Urologic Oncology
Urological Institute
University Hospitals Case Medical Center
Cleveland, Ohio

Richard S. Lee, MD

Assistant Professor of Surgery (Urology)
Harvard Medical School;
Assistant in Urology
Children's Hospital Boston
Boston, Massachusetts

Herbert Lepor, MD

Professor and Martin Spatz Chairman, Department of Urology
Professor of Pharmacology
New York University School of Medicine;
Director, Urology
NYU Langone Medical Center
New York, New York

Seth P. Lerner, MD, FACS

Professor, Department of Urology
Baylor College of Medicine;
Medical Staff, Department of Urology
The Methodist, St. Luke's Episcopal Hospital and Ben Taub
General Hospital
Houston, Texas

John A. Libertino, MD

Professor, Department of Urology
Tufts University School of Medicine
Boston, Massachusetts;
Chair, Institute of Urology
Director, Sophia Gordon Cancer Center
Lahey Clinic Medical Center
Burlington, Massachusetts

W. Marston Linehan, MD

Chief, Urologic Oncology Branch
National Cancer Institute;
Physician-in-Chief, Urologic Surgery
Clinical Research Center
National Institutes of Health
Bethesda, Maryland

James E. Lingeman, MD

Volunteer Clinical Professor, Department of Urology
Indiana University School of Medicine
Indianapolis, Indiana

Richard Edward Link, MD, PhD

Associate Professor, Department of Urology
Director, Division of Minimally Invasive Surgery
Scott Department of Urology
Baylor College of Medicine
Houston, Texas

Mark S. Litwin, MD, MPH

Professor of Urology and Health Services
UCLA School of Medicine and Public Health
University of California, Los Angeles
Los Angeles, California

Stacy Loeb, MD

Resident, Department of Urology
James Buchanan Brady Urological Institute
Johns Hopkins Medical Institutions
Baltimore, Maryland

Yair Lotan, MD

Associate Professor, Department of Urology
University of Texas Southwestern Medical Center
Dallas, Texas

Tom F. Lue, MD, ScD (Hon), FACS

Professor and Vice Chairman
Department of Urology
University of California, San Francisco
San Francisco, California

Dawn Lee MacLellan, MD, FRCSC

Assistant Professor, Departments of Urology, Surgery,
and Pathology
Izaak Walton Killam Health Centre
Dalhousie University
Halifax, Nova Scotia, Canada

Stanley Bruce Malkowicz, MD

Co-Director, Urologic Oncology
 Department of Urology
 University of Pennsylvania
 Philadelphia, Pennsylvania

Vitaly Margulis, MD

Assistant Professor, Department of Urology
 The University of Texas Southwestern Medical Center
 Dallas, Texas

Ranjiv I. Mathews, MD

Associate Professor, Pediatric Urology
 James Buchanan Brady Urological Institute
 Johns Hopkins Medical Institutions
 Baltimore, Maryland

Surena F. Matin, MD

Associate Professor, Department of Urology
 The University of Texas MD Anderson Cancer Center
 Houston, Texas

Brian R. Matlaga, MD, MPH

Associate Professor, Department of Urology
 Johns Hopkins University School of Medicine;
 Director, Stone Disease
 James Buchanan Brady Urological Institute
 Baltimore, Maryland

Steven D. Mawhorter, MD, DTM&H

Associate Professor, Department of Medicine
 Cleveland Clinic Lerner College of Medicine at Case Western
 Reserve University;
 Staff Physician, Infectious Disease
 Cleveland Clinic
 Cleveland, Ohio

Kurt A. McCammon, MD, FACS

Assistant Professor and Chairman, Department of Urology
 Eastern Virginia Medical School;
 Chief, Department of Urology
 Sentara Norfolk General Hospital;
 Urology of Virginia
 Norfolk, Virginia

W. Scott McDougal, MD, MA (Hon)

Professor of Urology
 Harvard Medical School;
 Chief, Urology
 Massachusetts General Hospital
 Boston, Massachusetts

James M. McKiernan, MD

John and Irene Given Associate Professor of Urology
 Department of Urology
 Columbia University College of Physicians and Surgeons;
 Associate Attending Urologist
 New York-Presbyterian Hospital, Columbia University Medical
 Center
 New York, New York

Alan W. McMahon, MD

Associate Professor, Department of Medicine
 University of Alberta
 Edmonton, Alberta, Canada

Thomas Anthony McNicholas, MBBS, FRCS, FEBU

Visiting Professor, Faculty of Health and Human Services
 University of Hertfordshire;
 Consultant Urological Surgeon
 Department of Urology
 Lister Hospital
 Hertfordshire, United Kingdom;
 Honorary Senior Lecturer
 Institute of Urology
 University College London
 London, United Kingdom

Alan Keith Meeker, PhD, MA

Assistant Professor, Departments of Pathology, Urology,
 and Oncology
 Johns Hopkins University School of Medicine
 Baltimore, Maryland

Cathy Mendelsohn, PhD

Associate Professor, Departments of Urology, Pathology,
 and Genetics and Development
 Columbia University College of Physicians and Surgeons
 New York, New York

Carlos E. Méndez-Probst, MD

Fellow in Endourology
 Department of Surgery
 Schulich School of Medicine and Dentistry
 The University of Western Ontario and St. Joseph's Health Care
 London
 London, Ontario, Canada

Maxwell V. Meng, MD

Associate Professor, Department of Urology
 University of California, San Francisco
 San Francisco, California

David C. Miller, MD, MPH

Assistant Professor, Department of Urology
 University of Michigan Medical School
 Ann Arbor, Michigan

Ian Milsom, MD, PhD

Professor, Department of Obstetrics and Gynecology
Institute of Clinical Sciences
Sahlgrenska Academy at Gothenburg University;
Consultant Gynecologist
Sahlgrenska University Hospital
Gothenburg, Sweden

Manoj Monga, MD, FACS

Professor, Department of Surgery
The Cleveland Clinic Lerner College of Medicine at Case
Western Reserve University;
Director, Steven Stroom Center for Endourology & Stone Disease
Glickman Urological Institute
Cleveland Clinic
Cleveland, Ohio

Drogo K. Montague, MD

Professor, Department of Surgery
Cleveland Clinic Lerner College of Medicine at Case Western
Reserve University;
Director, Center for Genitourinary Reconstruction
Glickman Urological and Kidney Institute
Cleveland Clinic
Cleveland, Ohio

Courtenay Kathryn Moore, MD

Assistant Professor, Department of Surgery
Cleveland Clinic Lerner College of Medicine at Case Western
Reserve University;
Staff Physician
Glickman Urological and Kidney Institute
Cleveland Clinic
Cleveland, Ohio

Alvaro Morales, MD, FACS, FRCS

Professor, Department of Urology
Director, Centre for Applied Urological Research
Queen's University;
Attending, Department of Urology
Kingston General Hospital and the Hotel Dieu Hospital
Kingston, Ontario, Canada

Allen F. Morey, MD, FACS

Professor and Paul C. Peters MD Chair of Urology
Department of Urology
University of Texas Southwestern Medical Center;
Chief, Urology Service
Parkland Health and Hospital System
Dallas, Texas

Michael J. Morris, MD

Assistant Professor, Department of Medicine
Weill Cornell Medical College;
Assistant Member, Genitourinary Oncology Service
Department of Medicine
Memorial Sloan-Kettering Cancer Center
New York, New York

John P. Mulhall, MD, MSc (Anat)

Professor, Department of Urology
Weill Cornell Medical College;
Director, Sexual and Reproductive Medicine
Department of Urology Service
Memorial Sloan-Kettering Cancer Center
New York, New York

Stephen Y. Nakada, MD

David T. Uehling Professor and Chairman
Department of Urology
University of Wisconsin, Madison;
Professor and Chairman, Department of Urology
University of Wisconsin Hospital and Clinics
Madison, Wisconsin

Joel B. Nelson, MD

Frederic N. Schwenker Professor and Chairman
Department of Urology
University of Pittsburgh School of Medicine;
Chairman, Department of Surgery
UPMC Shadyside Hospital
Pittsburgh, Pennsylvania

J. Curtis Nickel, MD, FRCSC

Professor, Department of Urology
Queen's University;
Staff Urologist
Kingston General Hospital;
Canada Institute of Health Research Tier One
Canada Research Chair in Urologic Pain and Inflammation
Kingston, Ontario, Canada

Victor W. Nitti, MD

Professor and Vice Chairman, Department of Urology
New York University School of Medicine;
Attending Physician, Department of Urology
NYU Langone Medical Center
New York, New York

[†]Andrew C. Novick, MD

Chairman, Glickman Urological Institute
Cleveland Clinic Foundation;
Professor of Surgery
Cleveland Clinic Lerner College of Medicine of Case Western
Reserve University
Cleveland, Ohio

Michael C. Ost, MD

Associate Professor, Department of Urology
University of Pittsburgh School of Medicine;
Associate Professor, Department of Urology
Children's Hospital of Pittsburgh
Magee-Women's Hospital
University of Pittsburgh Medical Center
Pittsburgh, Pennsylvania

[†]Deceased.