

C U R R E N T S U R G I C A L T H E R A P Y

15th
EDITION

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CONTENTS

THE ESOPHAGUS

Esophageal Function Tests	1
Richard J. Battafarano, MD, PhD	
Surgical Management of Gastroesophageal Reflux Disease	7
John W. Keyloun, MD, and Stephen Broderick, MD	
New Approaches to Gastroesophageal Reflux Disease (LINX)	15
Katie M. Galvin, MD, and John C. Lipham, MD	
Management of Barrett Esophagus	21
Andrei Gurau, MD, and Malcolm V. Brock, MD	
Management of Paraesophageal Hernia Repair	26
Mayen Gonzalez, DO, Deven Patel, MD, MS, and Stephen C. Yang, MD	
Management of Zenker Diverticulum	31
Emmanuel Robinson, MD, and Stephen R. Broderick, MD	
Esophageal Achalasia	36
Marco G. Patti, MD, and Fernando A. Herbella, MD	
Management of Disorders of Esophageal Motility	42
Frank Gleason, Benjamin Wei, and James Donahue	
Management of Esophageal Cancer	47
Melissa L. DeSouza, MD	
Use of Esophageal Stents	52
Alana Zanetti-Yabur, MD, and Anthony N. Kalloo, MD	
Management of Esophageal Perforation	65
Mayen Gonzalez, DO, Matthew Zeller, DO, and Mark R. Katlic, MD	

THE STOMACH

Benign Gastric Ulcer	71
Joshua Knopf, MD, David W. McFadden, MD, and Robert McLoughlin (J.), MD, MSCI	
Management of Duodenal Ulcers	76
Xiang Gao, MD, MPH, and Miral Sadaria Grandhi, MD	
Management of Zollinger-Ellison Syndrome	82
Daniel T. Dempsey, MD	
Management of Mallory-Weiss Syndrome	86
Michael A. Schweitzer, MD, and Luke K. Dombert, MD	

Management of Gastric Adenocarcinoma

88
Michael G. House, MD

Familial Gastric Cancer

93
Alexander C. Schulick, MD, Daniel T. Harris, MD, PhD, and Mark D. Duncan, MD

Management of Gastrointestinal Stromal Tumors

99
Marco Dal Molin, MD, and Fabian M. Johnston, MD, MHS

Management of Morbid Obesity

107
Dawda Jawara, MD, and Anne O. Lidor, MD, MPH, FACS

SMALL BOWEL

Management of Small Bowel Obstruction

113
Hao Wang, MD, PhD, and Sandra R. DiBrito, MD, PhD

Management of Crohn Disease of the Small Bowel

118
Lea Lowerfeld, MD, Heather L. Yeo, MD, and Fabrizio Michelassi, MD

Management of Small Bowel Tumors

125
Mark A. Talamini, MD, MBA, and Hardik Y. Patel, DO

Management of Diverticulosis of the Small Bowel

130
Amm Siddiqi, MBBS, Richard Zheng, MD, MS, and Richard Burkhardt, MD

Diagnosis and Management of Motility Disorders of the Stomach and Small Intestine

134
Nolan M. Winicki, MD, MS, and Jonathan B. Greer, MD

Management of Short Bowel Syndrome

138
Pooja M. Desai, MD, and Chady Atallah, MD

Management of Enterocutaneous Fistulae

140
Stephanie Heller, MD, and Michael Bannon, MD

Management of Radiation-Induced Injury to the Small and Large Bowel

145
John O. Hwabejire, MD, MPH, FACS

LARGE BOWEL

Preoperative Bowel Preparation: Is It Necessary and What Does It Entail?

151
Anyia Edwards, MD, and Elizabeth Wick, MD

Diverticular Disease of the Colon

155
Cynthia Araradian, MD, and Sandy Hwang Fang, MD

Management of Chronic Ulcerative Colitis	161	Management of Anal Fissure	272
Anne Macleod, MBChB, PhD, and Susan Galandiuk, MD		Sophia Y. Chen, MD, MPH, and Haniee Chung, MD	
Management of Toxic Megacolon	168	Management of Anorectal Abscess and Fistula	275
Teena Nerwal, MD, and James W. Fleshman, MD		Jimmie Knight III, MD, and Dana Hayden, MD	
Management of Crohn Colitis	172	Anal Stenosis	285
Jonathan E. Efron, MD, and Javier Salgado Pogacnik, MD		Matthew D. Price, MD, MPH, and Waed Alswealmeen, MD	
Ischemic Colitis	177	Pruritus Ani	289
Anjelli Wignakumar, MBBS, BSc (Hons), Stephen P. Sharp, MD, FACS, FASCRS, and Steven D. Wexner, MD, PhD (Hon)		Whitnee Broyles, DO, and Sarah Stringfield, MD	
<i>Clostridiooides difficile</i> Colitis	181	Surgical Management of Fecal Incontinence	292
Pamela A. Lipsett, MD, MHPE, FACS, MCCC		Nir Horesh, MD, Giovanna Da Silva, MD, and Eric G. Weiss, MD, FACS, FASCRS, FACG	
Management of Large Bowel Obstruction	184	Rectovaginal Fistula	301
Dimitrios N. Varvoglis, MD, and Jose G. Guillem, MD		Zachary J. Roberts, MD, and Alessandro Fichera, MD, FACS, FASCRS, FISS	
Enteral Stents in the Treatment of Colonic Obstruction	189	Condyloma Acuminata	310
Alec Faggen, MD, Clement Wu, MBBS, and Margaret G. Keane, MBBS		Carla Newton, MD, Jennifer Blake, MD, and Sarah Stringfield, MD	
Management of Acute Colonic Pseudoobstruction (Ogilvie Syndrome)	200	Management of Pilonidal Disease	314
David Hutcheon, MD		Sarah Kelso-O'Brien, MD, Alejandra M. Perez-Tamayo, MD, and Ariane M. Abcarian, MD	
Management of Colonic Volvulus	202	Pneumatosis Intestinalis and the Importance for the Surgeon	322
Sophia Zografas, DO, MS, and Rebecca Levine, MD		Gilad Alon, MD, Brian C. Brajcich, MD, MS, and Scott R. Steele, MD, MBA	
Management of Rectal Prolapse	206	Management of Rectal Cancer	327
Isabelle Le Leannec, MD, Emer O'Connell, MD, and Bashar Safar, MD		Kevin Chen, MD, and Jose G. Guillem, MD	
Surgical Management of Constipation	214	Management of Tumors of the Anal Region	333
Nicole Brooks, MD, MHPE, and Jeremy M. Lipman, MD, MHPE, FACS, FASCRS		Austin R. Dosch, MD, PhD, and Matthew G. Mutch, MD	
Surgical Management of the Polyposis Syndromes	220	 THE LIVER	
Epameinondas Dogeas, MD, and Michael A. Choti, MD			
Surgical Management of Colon Cancer	225	Cystic Disease of the Liver	337
Brooke Turnbaugh, OMS-III, and Jesus Esquivel, MD		Victor M. Zaydfudim, MD, MPH, and Reid B. Adams, MD	
Neoadjuvant and Adjuvant Therapy for Colorectal Cancer	230	Management of Echinococcal Cyst Disease of the Liver	345
H. Hande Aydinli, MD, and Chady Atallah, MD		Kelly M. Mahuron, MD, and Yuman Fong, MD	
Management of Colorectal Polyps	234	Management of Liver Hemangioma	350
Carrie E. Ryan, MD, and Peter Muscarella, MD		Brett L. Ecker, MD, and Henry A. Pitt, MD	
Management of Peritoneal Surface Malignancies	240	Management of Benign Liver Tumors	354
Joel M. Baumgartner, MD, MAS, Kaitlyn J. Kelly, MD, MAS, Jula Veerapong, MD, and Andrew M. Lowy, MD		Vasileios Tsagkalidis, MD, and Miral Sadaria Grandhi, MD	
Management of Lower Gastrointestinal Bleeding	248	Management of Malignant Liver Tumors	361
Gloria Chang, MD, Lai Xue, MD, FACS, and Genevieve B. Melton-Meaux, MD, PhD		Richard D. Schulick, MD, Sumaya Abdul Ghaffar, MD, and Ana Gleisner, MD	
Diagnosis and Management of Acute Appendicitis	257	Hepatocellular Carcinoma: Resection and Transplantation	367
Daniel Scheese, MD, Cody Tragesser, MD, Johannes Duess, MD, PhD, and David Hackam, MD, PhD		Christopher Shubert, MD, MHA, and Katherine Bingmer, MD	
Management of Hemorrhoids	263	Management of Colorectal Liver Metastases	372
Adam Studniarek, MD, and Heather L. Yeo, MD, FACS, FASCRS		Raja R. Narayan, MD, MPH, and Kenneth K. Tanabe, MD	
		Management of Liver Metastases From Colorectal Carcinoma With Ablation	380
		Yusuf Ciftci, BS, Nolan M. Winicki, MD, and Jonathan B. Greer, MD	

Liver Transplantation for Colorectal Liver Metastases	385
Al-Faraaz Kassam, MD, MBA, and Russell N. Wesson, MBChB	
Management of Hepatic Abscess	389
Matthew J. Weiss, MD, and Oliver Standing, MD	
Transarterial Therapies for Primary and Metastatic Liver Tumors	393
Christos Georgiades, MD, PhD, and Carolina Lugo-Fagundo, MD	

PORTAL HYPERTENSION

Portal Hypertension: The Role of Shunting Procedures	401
Francis J. Tinney Jr., MD, and Benjamin Philosophe, MD, PhD	
The Role of Transplantation in Portal Hypertension	410
Sarah Shan, MD, and Elizabeth King, MD, PhD	
Endoscopic Therapy for Esophageal Variceal Hemorrhage	420
Iqra Arshad, MBBS, MD, MPH, ABIM Certified, and Sameer Khan, MD	
Transjugular Intrahepatic Portosystemic Shunt	427
Yasmeen Dhindsa, MD, and Joseph DiNorcia, MD	
Management of Refractory Ascites	434
Marisol Linares Bolsegui, MD, MPH, and Clifford R. Weiss, MD	
Management of Hepatic Encephalopathy	445
Sanjana Verma, MD, and James Hamilton, MD	
Management of Budd-Chiari Syndrome	450
Andrew M. Cameron, MD, and Muhammad Abdullah Arain, MD	

GALLBLADDER AND BILIARY TREE

Management of Asymptomatic Cholelithiasis	459
Michelle M. Holland, MD, and J. Bart Rose, MD, MAS	
Management of Functional Gallbladder Disorder	464
Alex Michaels, MD, and Theodore N. Pappas, MD	
Management of Acute Cholecystitis	465
Mark Antkowiak, MD, and Jason K. Sicklick, MD	
Management of Common Bile Duct Stones	471
Bryan J. Sandler, MD, FACS, and Bryan Clary, MD, FACS	
Management of Acute Cholangitis	477
Anna Axentiev, MD, and Steven Clark Cunningham, MD, MLA, FACS	
Management of Benign Biliary Strictures	482
Nicholas J. Zyromski, MD	
Management of Cystic Disorders of the Bile Ducts	487
Yasaman Naemi Baghshomali, MSc, PhD, and Steven A. Ahrendt, MD	
Management of Primary Sclerosing Cholangitis	490
Sagar Dipak Patel, DO, and William R. Burns, MD	
Management of Intrahepatic, Perihilar, and Distal Extrahepatic Cholangiocarcinoma	495
Montana Morris, MD, and Christopher L. Wolfgang, MD	

Surgical Management of Gallbladder Cancer	503
---	-----

Elizabeth J. Trimble, MD, Barish H. Edil, MD, and Ajay Jain, MD	
---	--

Pathogenesis, Diagnosis, and Management of Gallstone Ileus	508
--	-----

Joseph R. Habib, MD, and Ammar A. Javed, MD	
---	--

THE PANCREAS

Management of Acute Necrotizing Pancreatitis	511
--	-----

Casey M. Luckhurst, MD, Katherine Albutt, MD, and Andrew L. Warshaw, MD	
---	--

Gallstone Pancreatitis	518
------------------------	-----

Avinoam Nevler, MD, and Charles J. Yeo, MD, FACS	
--	--

Pancreas Divisum: Etiology, Endotherapies, and Surgical Management	523
--	-----

Benjamin Tran, MD, Alireza Sedarat, MD, and O. Joe Hines, MD	
--	--

Diagnosis and Management of Autoimmune Pancreatitis	530
---	-----

Richard Zheng, MD, MS, and Richard A. Burkhart, MD	
--	--

Management of Pancreatic Necrosis	536
-----------------------------------	-----

Bryan C. Szeglin, MD, Colin M. Fadzen, MD, PhD, Jeffrey K. Jopling, MD, MSHS, and Mark D. Duncan MD	
---	--

Management of Pancreatic Pseudocyst	541
-------------------------------------	-----

Ibrahim Nassour, MD, MSCS, Aleksey Novikov, MD, and Kevin E. Behrns, MD	
---	--

Pancreatic Ductal Disruptions Leading to Pancreatic Fistula, Pancreatic Ascites, or Pancreatic Pleural Effusion	545
---	-----

William Lancaster, MD, FACS, and Katherine Morgan, MD, FACS	
---	--

Management of Chronic Pancreatitis	550
------------------------------------	-----

Katherine Bingmer, MD, and Martin A. Makary, MD, MPH	
--	--

Genetic Testing and High-Risk Pancreatic Cancer Screening	554
---	-----

Ammar A. Javed, MD, Joseph R. Habib, MD, and Kelly J. Lafaro, MD	
--	--

Management of Periampullary Cancer	556
------------------------------------	-----

Zhi Ven Fong, MD, MPH, DrPH, and Keith D. Lillemoe, MD	
--	--

Management of Complications After Pancreaticoduodenectomy	567
---	-----

McKenzie Schaefer, MD, and Susan Tsai, MD, MHS	
--	--

Vascular Reconstruction During the Whipple Operation	574
--	-----

Benedict Kinny-Köster, MD, and Jin He, MD, PhD	
--	--

Palliative Interventions for Patients With Operable and Advanced Pancreatic and Periampullary Cancer	578
--	-----

Basheer Elsoll, MD, MPH, FRCSC, James Sun, MD, and Sanjay S. Reddy, MD, FACS	
--	--

Neoadjuvant and Adjuvant Chemotherapy for Pancreatic Cancer	585
---	-----

Norman G. Nicolson, MD, MHS, and Richard A. Burkhart, MD	
--	--

Rare and Unusual Pancreatic Tumors	589
------------------------------------	-----

Nicholas Galouzis, MD, MBA, and Taylor Sohn Riall, MD, PhD	
--	--

Intraductal Papillary Mucinous Neoplasms of the Pancreas	599
Jonah D. Thomas, MD, and Carlos Fernandez-del Castillo, MD	
Management of Pancreatic Islet Cell Tumors Excluding Gastrinoma	604
John C. McVey, MD, Charles M. Vollmer, MD, and Robert E. Roses, MD	
Radiation Therapy for Pancreatic Cancer	610
Amol Kumar Narang, MD	
Transplantation of the Pancreas	616
Jonathan A. Fridell, MD, Joseph R. Scalea, MD and Santosh Nagaraju, MD	
Islet Autotransplantation for Chronic Pancreatitis	623
James F. Markmann, MD, PhD, and Ji Lei, MD, MSc, MBA	

THE SPLEEN

Splenectomy for Hematologic Diseases	633
Samuel E. Okum, BA, Nicole Lunardi, MD, MSPH, and Joseph V. Sakran, MD, MPH, MPA	
Splenic Function and Pathology	642
S. Daniel Leyforf, MD, and Adrian Park, MD	

HERNIA

Management of Inguinal Hernia	649
Tiffany Brocke, MD, MHPE, and Bethany C. Sacks, MD, MEd	
Management of Recurrent Inguinal Hernia	656
Luke K. Domber, MD, and Gina Adrales, MD	
Incisional, Epigastric, and Umbilical Hernias	659
Samer Sbayi, MD, David Pechman, MD, and Agostino Cervone, MD	
Management of Spigelian, Obturator, and Lumbar Hernias	667
Ife T. Shoyombo, MD, MS, MPH, and Hien Nguyen, MD, MBA, MPH	
Athletic Pubalgia	673
Zachary Obinna Enumah, MD, PhD, MA, and Hien Nguyen, MD, MBA, MPH	
Abdominal Wall Reconstruction	677
R. Dustin Rawlinson, MD, and Kent A. Stevens, MD, MPH	
Loss of Domain in Hernia Repair	684
Zachary Gala, MD, Alan T. Makhoul, MD, and John P. Fischer, MD	
Use of Various Meshes in Hernia Repair	690
Artem Shmelev, MD, and Konstantinos Spaniolas, MD	

THE BREAST

Benign Breast Disease	695
Michele A. Gadd, MD	
Screening for Breast Cancer	699
Halley Vora, MD, FACS	

Image-Guided Biopsy in the Assessment and Management of Breast Disease	704
--	-----

 David Euhus, MD, and Joseph Dux, MD

Molecular Targets in Breast Cancer	707
------------------------------------	-----

 Julie R. Lange, MD, ScM

Breast Cancer: Surgical Therapy	710
---------------------------------	-----

 Olutayo Sogunro, DO, Joseph Dux, MD, and Lisa K. Jacobs, MD

Management of Breast Cancer During Pregnancy	716
--	-----

 Jordan E. Jackson, MD, and Armando E. Giuliano, MD

Ablative Techniques in the Treatment of Breast Cancer	720
---	-----

 Julie R. Lange, MD

Lymphatic Mapping and Sentinel Lymph Node Biopsy	723
--	-----

 Julia M. Chandler, MD, MS, Regina Matar-Ujvary, MD, and Mary L. Gemignani, MD, MPH

Management of the Axilla in Breast Cancer	728
---	-----

 V. Suzanne Klimberg, MD, PhD, MHSCT, FACS, MAMSE, Nicole C. Nelson, DO, FACS, and Jennifer Den, MD

Inflammatory Breast Cancer	734
----------------------------	-----

 Melissa S. Camp, MD, MPH

Ductal and Lobular Carcinoma in Situ	738
--------------------------------------	-----

 Julia Tchou, MD, PhD, FACS, Jessica Rose, DO, and Gary M. Freedman, MD

Advances in Neoadjuvant and Adjuvant Therapy for Breast Cancer	744
--	-----

 Mehran Habibi, MD, MBA, Katherine J. Zhu, BS, and Safa Najafi, MD

Management of Recurrent and Metastatic Breast Cancer	749
--	-----

 Olivia W. Galloway, MD, Katherine J. Tardy, MD, Tyler Fox, MD, and Ned Z. Carp, MD

Management of Male Breast Cancer	756
----------------------------------	-----

 Malia Brennan, MD, and Kristine Calhoun, MD

Genetic Counseling and Testing for Breast Cancer	758
--	-----

 Michael D. Grant, MD, FACS, and Ronald C. Jones, MD

Contralateral Prophylactic Mastectomy	761
---------------------------------------	-----

 Patricia A. Cronin, MD, and Richard J. Gray, MD

Breast Reconstruction After Mastectomy: Indications, Techniques, and Results	764
--	-----

 Michele Ann Manahan, MD, MBA, FACS

Breast Implant-Associated Anaplastic Large Cell Lymphoma	768
--	-----

 Mehran Habibi, MD, Matthew J. Heron, BS, and Kristen Parker Broderick, MD

ENDOCRINE GLANDS

Adrenal Incidentaloma	773
-----------------------	-----

 Adriana Ramirez, MD, MPH, Cambia Rome, MD, and Nita Ahuja, MD

Management of Adrenocortical Tumors	781
-------------------------------------	-----

 Sophia Diaz, MD, MSE, Lilah F. Morris-Wiseman, MD, and Aarti Mathur, MD, PhD

Management of Pheochromocytoma	791
Jessica W. Thiesmeyer, MD, and Quan-Yang Duh, MD	
Management of Thyroid Nodules	800
Carolyn D. Seib, MD, MAS, and Electron Kebebew, MD	
Nontoxic Goiter	803
Ramiro E. Cadena Semanate, MD, and Christopher R. McHenry, MD, FACS	
Management of Thyroiditis	810
Gerard M. Doherty, MD	
Management of Hyperthyroidism	816
Taylor C. Brown, MD, MHS, and John A. Olson, MD, PhD	
Surgical Management of Thyroid Cancer	821
Timothy M. Ullmann, MD, and Julie Ann Sosa, MD	
Primary Hyperparathyroidism	828
Ashley K. Cayo, MD, and Nancy D. Perrier, MD	
Evaluation and Management of Recurrent and Persistent Hyperparathyroidism	833
Stacy Sebastian, MD, and Jason D. Prescott, MD, PhD	
Surgical Management of Secondary and Tertiary Hyperparathyroidism	839
Yinin Hu, MD, and John A. Olson Jr., MD, PhD	
Metabolic Changes After Bariatric Surgery	843
Michael A. Schweitzer, MD, Thomas Magnuson, MD, and Luke Kenneth Dombert, MD	

SKIN AND SOFT TISSUE

Nonmelanoma Skin Cancers	849
Anamika Veeramani, MD, and Richard J. Redett III, MD	
Management of Cutaneous Melanoma	857
Kayleigh M. Herrick-Reynolds, MD, and Michele M. Gage, MD, FACS, FSSO	
Management of the Isolated Neck Mass	862
Anthony P. Tufaro, DDS, MD, FACS, and Mark D. DeLacure, MD, FACS	
Hand Infections	865
Vivien S. Forthman, BS, and Christopher L. Forthman MD	
Management of Peripheral Nerve Injuries	873
Nicholas A. Calotta, MD, and Jaimie T. Shores, MD, FACS	
Necrotizing Skin and Soft Tissue Infections	877
Nicole Lunardi, MD, MSPH, and Joseph V. Sakran, MD, MPH, MPA	

CHEST WALL, MEDIASTINUM, AND TRACHEA

Management of Spontaneous Primary and Secondary Pneumothorax	881
Jinny S. Ha, MD, and Richard J. Battafarano, MD	
Management of Primary Chest Wall Tumors	885
James Nawalaniec, MD, and Christopher Morse, MD	
Mediastinal Masses	889
Douglas E. Wood, MD, and Richard Dubois, MD	

Primary Tumors of the Thymus	897
Andrei Gurau, MD, and Malcolm V. Brock, MD	
Management of Tracheal Stenosis	903
Nikhil Panda, MD, MPH, and Cameron D. Wright, MD	
Management of Acquired Esophageal Respiratory Tract Fistula	909
Lise N. Tchouta, MD, MS, MHS, Christina L. Costantino, MD, and Douglas J. Mathisen, MD	
Management of Pectus Excavatum	913
Cody Tragesser, MD, Daniel Scheese, MD, Kristin Wharton, CRNP, and David J. Hackam, MD, PhD	

VASCULAR SURGERY

Open Repair of Abdominal Aortic Aneurysms	919
Alexis L. Lauria, MD, and Caitlin W. Hicks, MD	
Endovascular Treatment of Abdominal Aortic Aneurysm	924
James H. Black III, MD, FACS	
Management of Ruptured Abdominal Aortic Aneurysms	930
Rebecca A. Sorber, MD, and Benjamin W. Starnes, MD	
Management of Abdominal Aortic Aneurysm With Concomitant Nonvascular Abdominal Pathology	935
Qingwen Kawaji, MD, ScM, and Caitlin W. Hicks, MD, MS	
Management of Thoracic and Thoracoabdominal Aortic Aneurysms	938
Valeria Robayo, BS, and Kim de la Cruz, MD	
Management of Acute Aortic Dissection	950
Karen M. Kim, MD, MS, and Thomas E. MacGillivray, MD	
Carotid Endarterectomy	958
Mirinal Shukla, MD, and Charles S. O'Mara, MD, MBA	
Management of Recurrent Carotid Stenosis	964
Bruce A. Perler, MD, MBA	
Balloon Angioplasty and Stents in Carotid Artery Occlusive Disease	969
Julia Boll, MD, and Jeffery B. Dattilo, MD	
Management of Aneurysms of the Extracranial Carotid and Vertebral Arteries	973
Avinash Ganti, MD, and Li Ting Tan, MD	
Brachiocephalic Reconstruction	978
Shannon N. Radomski, MD, and Rebecca Sorber, MD	

Upper Extremity Arterial Disease	990
Agustin Sibona, MD, and Mahmoud B. Malas, MD, MHS, RPVI, FACS	
Aortoiliac Occlusive Disease	999
Maryam Ali Khan, MD, Claire Janssen, MD, and Mahmoud B. Malas, MD, MHS, RPVI, FACS	

Femoropopliteal Occlusive Disease	1010
Mohammed Hamouda, MD, and Mahmoud B. Malas, MD, MHS, RPVI, FACS	
Management of Tibioperoneal Arterial Occlusive Disease	1020
Winona W. Wu, MD, and Elliot L. Chaikof, MD, PhD	
Popliteal and Femoral Artery Aneurysm	1028
Darshan S. Randhawa, MD, James R. Martinson, MD, and Margaret W. Arnold, MD	
Treatment of Claudication	1033
Qingwen Kawaji, MD, ScM, and Margaret W. Arnold, MD	
Pseudoaneurysms and Arteriovenous Fistulas	1038
Britt Hansen Tonnessen, MD, and Alan Dardik, MD, PhD	
Management of Peripheral Arterial Thromboembolism	1044
Elliot L. Chaikof, MD, PhD, and Sharjeel A. Chaudhry, MD	
Acute Peripheral Arterial and Bypass Graft Occlusion	1052
Joseph M. White, MD, and Andrew H. Schulick, MD	
Management of Infected Grafts	1058
Charles Marquardt, MD, Pavitra Ravishankar, MD, and Matthew R. Smeds, MD	
Atherosclerotic Renal Artery Stenosis	1066
Eric E. Hammond, MD, and Joseph S. Giglia, MD	
Raynaud Phenomenon	1072
David Seth Strosberg, MD, MS, and Alan Dardik, MD, PhD	
Thoracic Outlet Syndrome	1077
Andrea Doris Kim, MD, and Ying Wei Lum, MD	
The Diabetic Foot	1082
Samuel I. Schwartz, MD, and Glenn M. LaMuraglia, MD	
Gangrene of the Foot	1088
Roberto G. Aru, MD, and Christopher J. Abularrige, MD	
Thromboangiitis Obliterans (Buerger Disease)	1096
James Clune, MD, and Alan Dardik, MD, PhD	
Takayasu Arteritis	1099
Ashley A. Peters, MD, MS, Michael Parker, MD, Carlos F. Bechara, MD, and Vivian Gahtan, MD	
Acute Mesenteric Ischemia	1102
David P. Stonko, MD, and Thomas Reifsnyder, MD	
Chronic Mesenteric Ischemia	1107
Alik Farber, MD, and Elizabeth G. King, MD	
Hemodialysis Access Surgery	1115
Sarah M. Jabour, MD, and Courtenay M. Holscher, MD, PhD	
Venous Thromboembolism: Prevention, Diagnosis, and Treatment	1120
Elliott R. Haut, MD, PhD, and Daniel Kakish, DO	
Treatment of Varicose Veins	1124
Andrew H. Schulick, MD, MBA, FACS, Joseph M. White, MD, FACS, and David R. Whittaker, MD, FACS	

Lymphedema

Joani Christensen, MD, George Kokosis, MD, Halley Darrach, MD, and Justin M. Sacks, MD, MBA	
---	--

Lower Extremity Amputation

Dar M. Chung, MD, and Justin M. Simmons, DO, FSVS	
---	--

 TRAUMA AND EMERGENCY CARE

Initial Assessment and Resuscitation of the Trauma Patient

C. Yvonne Chung, MD, MPH, and Thomas M. Scalea, MD	
--	--

Prehospital Management of the Trauma Patient

Samantha Olafson, MD, and David T. Efron, MD, FACS	
--	--

Use of Resuscitative Endovascular Balloon Occlusion of the Aorta in Resuscitation of the Trauma Patient

Sai Krishna Bhogadi, MD, Joseph V. Sakran, MD, MPH, MPA, FACS, and Bellal Joseph, MD, FACS	
--	--

The Surgeon's Use of Ultrasound in the Trauma and Critical Care Settings

Elliot S. Bishop, MD, Joshua Guttman, MD, and Ryan B. Fransman, MD	
--	--

Emergency Department Resuscitative Thoracotomy

Michael Martyak, MD, Jessica Burgess, MD, and L.D. Britt, MD	
--	--

Management of Traumatic Brain Injury

Patrick T. Lee, MD, PhD, and Deborah M. Stein, MD, MPH	
--	--

Chest Wall Trauma, Hemothorax, and Pneumothorax

Joseph D. Forrester, MD, and Jeffrey K. Jopling, MD	
---	--

Management of Pulmonary Parenchymal Injury

Ashley J. McCormack, MD, Robert J. Cerfolio, MD, MBA, and H. Leon Pachter, MD	
---	--

Blunt Abdominal Trauma

Zachary Obinna Enumah, MD, PhD, MAI, and Joseph V. Sakran, MD, MPH, MPA	
---	--

Penetrating Abdominal Trauma

Carrie Sims, MD	
-----------------	--

Management of Diaphragmatic Injuries

Alison M. Bales, MD, and Mary C. McCarthy, MD, FACS	
---	--

Management of Traumatic Liver Injuries

Mariuxi C. Manukyan, MD, and Omesh S. Qsaba, MD	
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Pancreatic and Duodenal Injuries

Jerome Byam, MD, FACS, and Lisbi Rivas Ramirez, MD	
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Injuries to the Small and Large Bowel

Valentine Nofong, MD, and Edward Cornwell III, MD	
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Current Management of Rectal Injury

Shannon N. Radomski, MD, and Joseph V. Sakran, MD, MPH, MPA	
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The Injured Spleen

John Nguyen, DO, Mario Rueda, MD, FACS, and Faris Azar, MD, FACS	
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Renal and Ureteral Traumatic Injuries	1242	Common Pediatric Surgical Emergencies	1360
Jill C. Buckley, MD, and Michael W. Witthaus, MD		Stephen Niemiec, MD, and Mark B. Slidell, MD	
Tenets of Damage Control	1251	Surgery in the Geriatric Patient	1367
Mohammad Aref, MD, PhD, and Joseph V. Sakran, MD, MPH, MPA		Sarah M. Jabour, MD, Solimar Santiago Del Rosario, and Susan Gearhart MD, MEd	
Early Management of Pelvic Ring Disruption	1255	Perioperative Optimization	1374
J. Greg Mawn, MD, and Greg M. Osgood, MD		Jessica Katsiroubas, MD, and Michael E. Zenilman, MD	
Urologic Complications of Pelvic Fracture	1264	Is Nasogastric Intubation Necessary After Alimentary Tract Surgery?	1380
Mark Alshak, MD, and Misop Han, MD		Brenda M. Zosa, MD	
Spine and Spinal Cord Injuries	1267	Surgical Site Infections	1382
Ahmed Sulieman, MD, Andrew Harris, MD, and Khaled M. Kebaish, MD, FRCSC		Robel T. Beyene, MD, and Adrian Barbul, MD	
Evaluation and Management of the Patient With Craniomaxillofacial Trauma	1274	Management of Intraabdominal Infections	1387
Michael Grant, MD, PhD, Paul N. Manson, MD, and Bashar Hassan, MD, MPH		Daniel L. Eisenson, MD, and Joseph V. Sakran, MD, MPH, MPA	
Penetrating Neck Trauma	1284	Epidemiology, Prevention, and Management of Occupational Exposure to Bloodborne Infections	1390
Saskya Byerly, MD, and Timothy Fabian, MD		Shmuel Shoham, MD, and Ethel D. Weld, MD, PhD	
Abdominal Compartment Syndrome	1288	Antifungal Therapy for Surgical Patients	1394
Anna M. Ledgerwood, MD, and Charles E. Lucas, MD		Pamela A. Lipsett, MD, MHPE, FACS, MCCC	
Abdominal Wall Reconstruction for Refractory Open Abdomen	1292	Use of Opioids in the Postoperative Period	1402
Charles E. Lucas, MD, and Anna M. Ledgerwood, MD		Ryan Howard, MD, MS, and Justin B. Dimick, MD, MPH	
Management of Vascular Injuries	1298	Management of Postoperative Delirium	1405
David Dexter, MD, Fletcher Pierce, MD, and Christopher Sciotino, MD		Frederick E. Sieber, MD	
Endovascular Management of Vascular Injuries	1309	 SURGICAL CRITICAL CARE	
Joseph V. Lombardi, MD, and Marissa Famularo, DO		COVID-19 and Healthcare Delivery in a Pandemic	1409
Management of Extremity Compartment Syndrome	1315	Michael S. Burnim, MD, and Brian T. Garibaldi, MD	
Dane C. Paneitz, MD, MPH, and James E. Harris Jr., MD		Surgical Palliative Care	1414
Burn Wound Management	1322	Ivy Akid, MD, Avani Amin, MD, Brenda Smith Nettles, DNP, ACNP-BC, and Thomas J. Smith, MD	
Madhu Subramanian, MD		Cardiovascular Pharmacology	1419
Medical Management of the Burn Patient	1327	Leslie Kruse, PharmD, Parker Richard Mullen, MD, and Jay G. Shake, MD	
Daniel Kakish, DO, and Alistair J. Kent, MD, MPH		Glucose Control in the Postoperative Period	1425
Cold-Induced Injuries and Hypothermia	1334	Hanghang Wang and Glenn Whitman	
Alexandra B. Roginsky, MD, FACS		Postoperative Respiratory Failure	1428
Electrical and Lightning Injuries	1338	Rebecca B. Hasley, MD, MPH, and Pauline K. Park, MD, FACS, FCCM	
Stephanie L. Martinez, MD, and Raymond Fang, MD		Ventilator-Associated Pneumonia	1435
Building an Academic Global Surgery Program	1345	James P. Byrne, MD, PhD	
Zachary Obinna Enumah, MD, PhD, MA, and Kent A. Stevens, MD, MPH, FACS		Extracorporeal Membrane Oxygenation for Respiratory Failure	1438
ERAS Protocols for General Surgery	1349	Nkosi H. Alvarez, MD, and Errol L. Bush, MD	
Bryan Szeglin, MD, and Kent Stevens, MD MPH FACS		Tracheostomy	1446
Fluid and Electrolyte Therapy	1353	Brandon M. White, MD, MSE, and Joseph V. Sakran, MD, MPH, MPA	
Tiffany Lian, MD, and Albert Chi, MD		Acute Kidney Injury in the Injured and Critically Ill	1451
		Samir C. Gautam, MBBS, and Derek M. Fine, MD	

1 PREOPERATIVE AND POSTOPERATIVE CARE

ERAS Protocols for General Surgery	1349
Bryan Szeglin, MD, and Kent Stevens, MD MPH FACS	
Fluid and Electrolyte Therapy	1353
Tiffany Lian, MD, and Albert Chi, MD	

Acid-Base Homeostasis	1459	Nutrition Therapy in the Critically Ill Surgical Patient	1489
Natasha Houshmand, MD, Zachary Enumah, MD, PhD, and James Harris, Jr, MD		Mae Lindner, MD, Joseph Minalt, MD, and Nabil Issa, MBChB	
Catheter Sepsis in the Intensive Care Unit	1461	Coagulation Issues and the Trauma Patient	1494
Daisy Manzo, MD, and Christine S. Cocanour, MD, FACS		Christopher R. Reed, MD, and Jason Sperry, MD, MPH	
Septic Response and Management	1467	Postintensive Care Syndrome	1499
James Joseph Whitbread Jr, MD, and Joseph V. Sakran, MD, MPH, MPA		Katherine L. Florecki, MD, and Slee L.Yi, MD	
Multiple Organ Dysfunction and Failure	1470	 THE AMERICAN BOARD OF SURGERY CERTIFYING EXAM (CE) (THE ORAL BOARDS)	
Christopher Marfo, MD, and Scott C. Brakenridge, MD			
Antibiotics in Surgical Critical Care	1476	The American Board of Surgery Certifying (Oral) Examination	1503
James Juhng, MD, Zachary Obinna Enumah, MD, PhD, MA, and Joseph V. Sakran, MD, MPH, MPA		Daniel L. Dent, MD, Alison J. Robinson, MD, and Peter S. Yoo, MD	
Endocrine Changes in Critical Illness	1484		
Alyssa C. MacLean, MD, William D. Rieger, MD, and Lillian S. Kao, MD			

THE AMERICAN BOARD OF SURGERY

CERTIFYING EXAM (CE) (THE ORAL BOARDS)

The American Board of Surgery Certifying (Oral) Examination 1503

 Daniel L. Dent, MD, Alison J. Robinson, MD, and Peter S. Yoo, MD

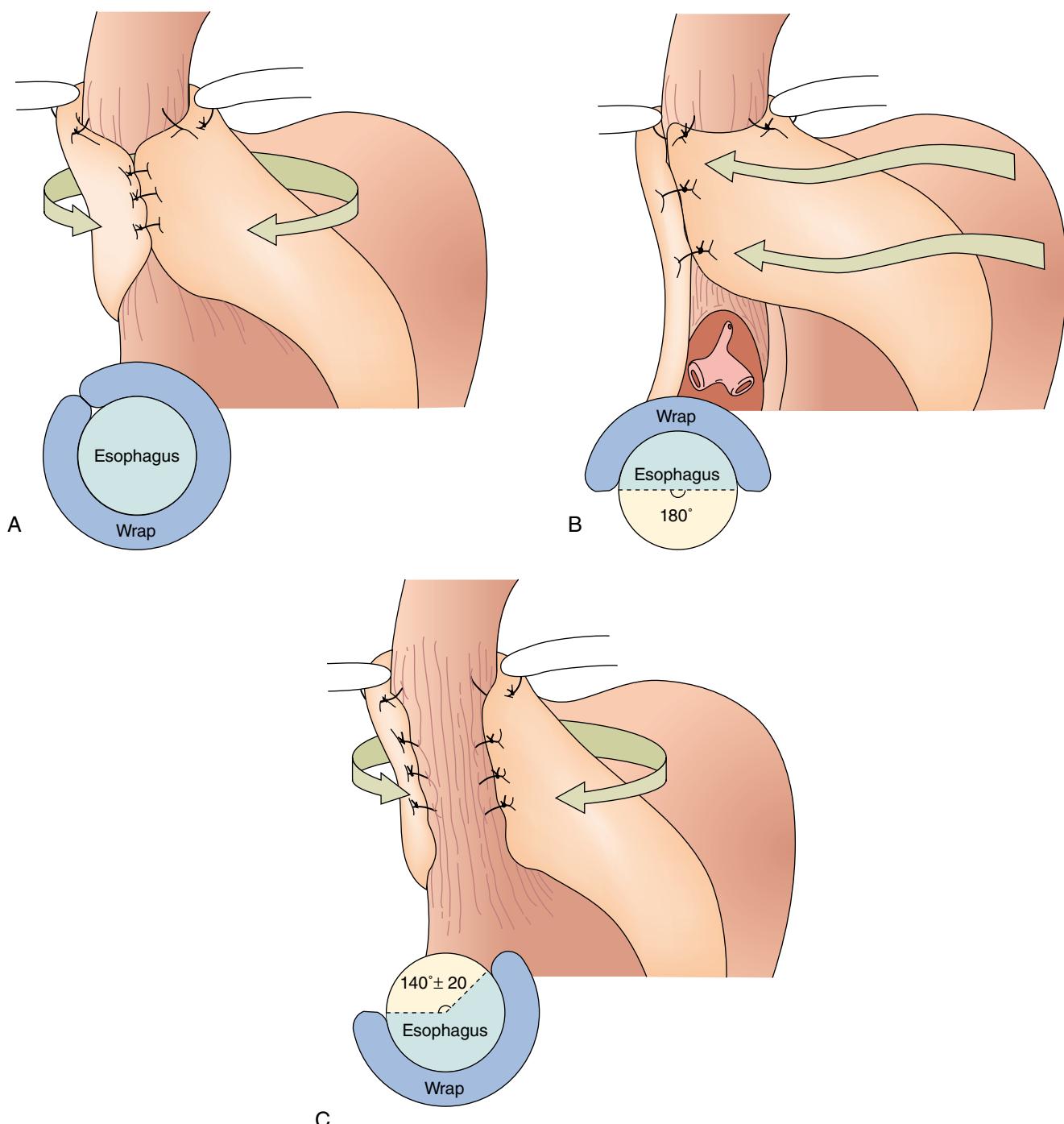


FIG. 2 The most common types of fundoplication. (A) 360-degree Nissen fundoplication. (B) 180-degree anterior Dor fundoplication. (C) 270-degree posterior Toupet fundoplication. (From Yates RB, Oelschlager BK, Pellegrini CA. Gastroesophageal reflux disease and hiatal hernia. In: Townsend et al., eds. *Sabiston Textbook of Surgery*. 20th ed. Elsevier; 2017:1043-1064.)

ultrasonic or bipolar electrocautery device. Once the correct plane is identified, the left phrenoesophageal membrane is continually placed on stretch as it is divided, progressing anteriorly and sweeping tissue away from the membrane toward the esophagus to avoid injury to the anterior vagus nerve. Care is taken not to denude the peritoneum off the crus, as this can weaken the crural closure.

d. The dissecting instrument can then be used to create a retroesophageal window from the left side.

3. Exposing and opening the hiatus on the right side:
 - a. The gastrohepatic ligament is divided starting at the pars flaccida and continuing cephalad toward the anterior aspect of the esophageal hiatus to expose the right crus. If a sizeable accessory or replaced left hepatic artery is encountered, this should be preserved.
 - b. The retroperitoneal fat attached to the right crus above the left gastric artery can be retracted toward the patient's left to expose the right phrenoesophageal membrane. This should

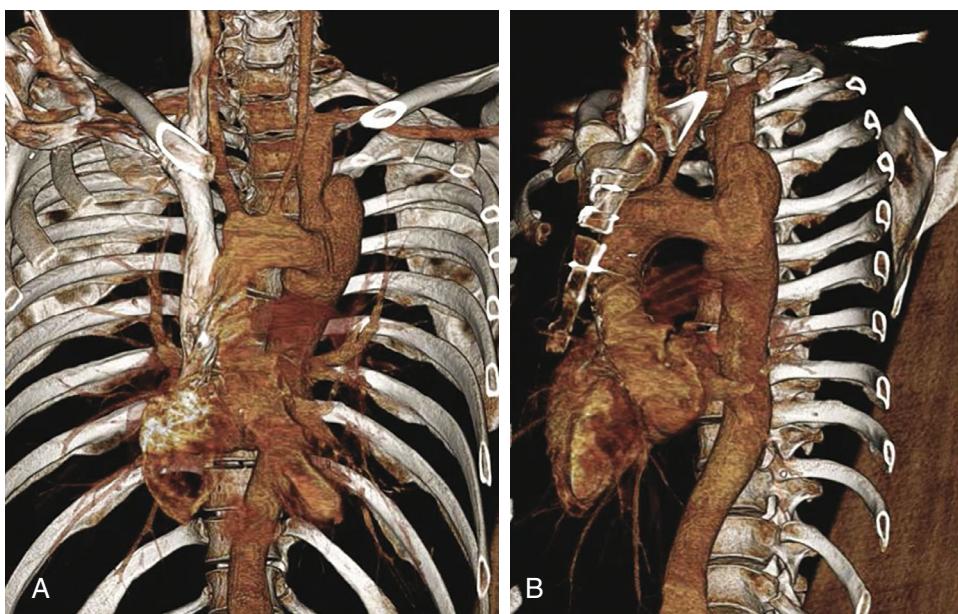


FIG. 3 3D reconstruction of computed tomography angiographic imaging of a patient with Loeys-Dietz syndrome and a large left subclavian artery aneurysm in coronal (A) and sagittal projections (B). (Courtesy Dr. Matthew Sweet, Seattle, WA.)

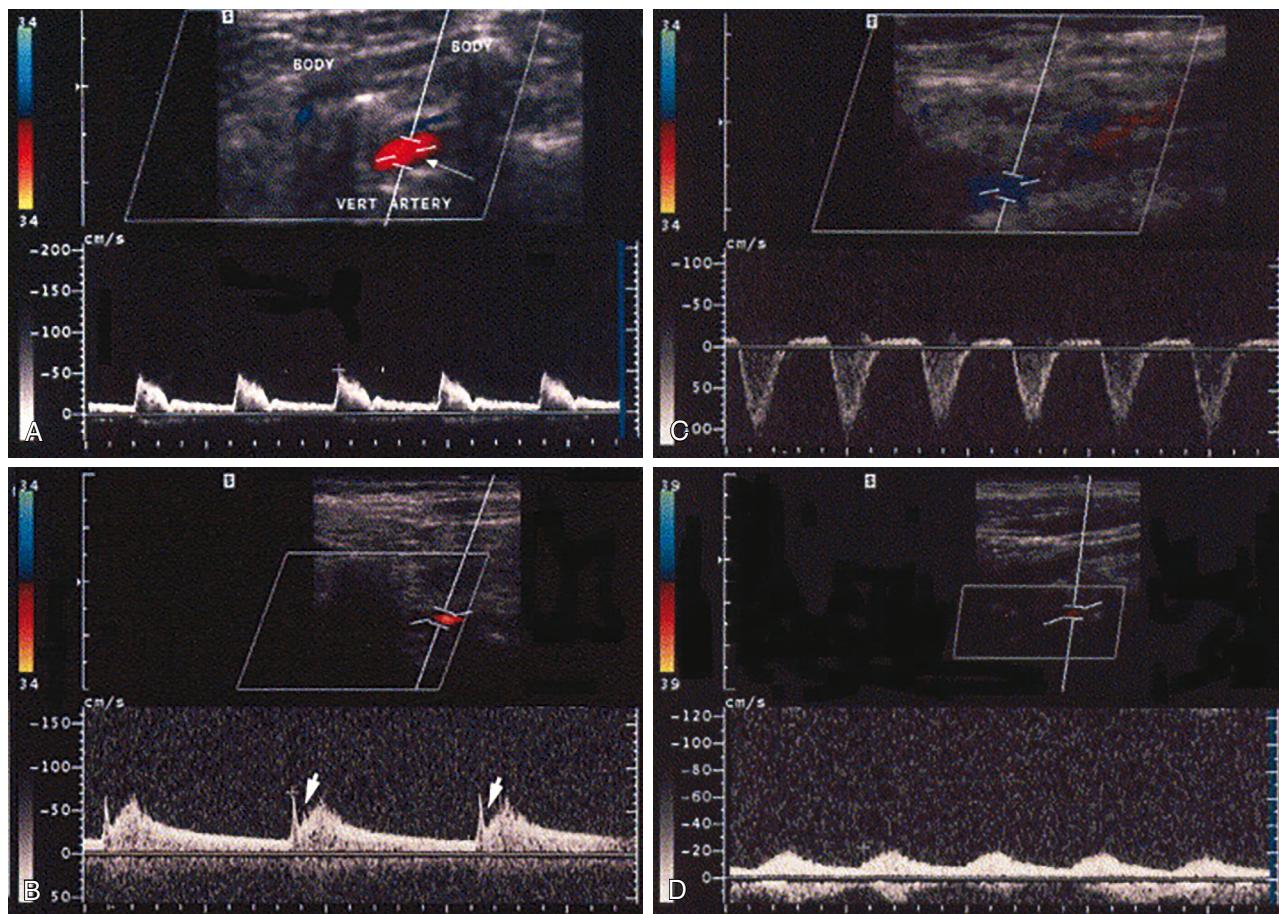


FIG. 4 Doppler waveforms typical of subclavian artery stenosis. (A) Normal antegrade vertebral waveform. (B) Latent subclavian steal demonstrating a presteal or "bunny" waveform characterized by an early to midsystolic dip in the Doppler waveform. (C) Retrograde systolic flow in the vertebral artery seen in hemodynamically significant subclavian stenosis. (D) Dampened Doppler waveform indicative of proximal obstruction within the ultrasounded artery. (Adapted from Kalaria VG, Jacob S, Irwin W, et al. Duplex ultrasonography of vertebral and subclavian arteries. J Am Soc Echocardiogr. 2005;18(10):1107-1111.)



FIG. 5 (A) Computed tomographic (CT) 3D surface rendering of the aortic arch showing severe calcific disease of the origins of the innominate and left subclavian arteries (arrows). (B) Maximum intensity projection images of the same patient reconstructed from the CT scan. (From Cronenwett JL, Johnston KW, eds. Rutherford's Vascular Surgery, 8th ed. Elsevier Saunders; 2014.)

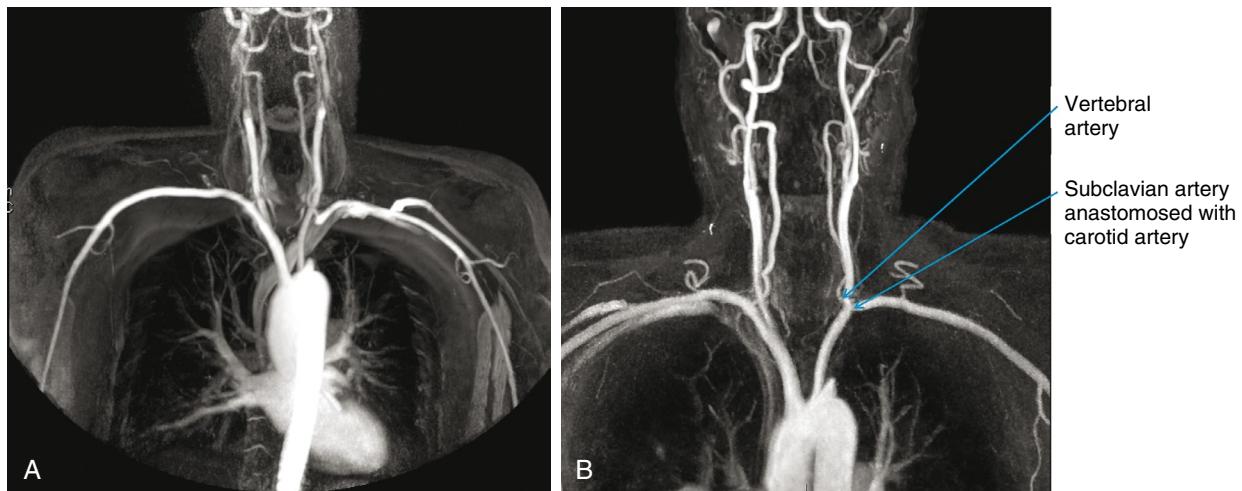


FIG. 6 Magnetic resonance angiography demonstrating occlusion of the proximal left subclavian artery (A), the pathology underlying subclavian steal syndrome; note the vertebral artery remains patent just distal to the occlusive lesion. (B) Status post revascularization with a carotid subclavian transposition procedure. (Salman R, Hornsby J, Wright J, et al. Treatment of subclavian artery stenosis: a case series. Int J Surg Case Rep. 2016;19:69-74.)

The preferred threshold for brachiocephalic artery aneurysm repair is somewhat controversial. The rationale for intervention is to prevent aneurysm growth and subsequent rupture. Brownstein et al. examined 147 brachiocephalic aneurysms and observed an average growth rate of 0.04 cm/year, with 59% demonstrating no growth over 4 years of follow-up. There were no instances of aneurysm rupture during the follow-up period. Based on these data, the authors recommended a repair threshold of 3.0 cm for asymptomatic brachiocephalic aneurysms but noted overall they tended to have a benign course. It should be noted that brachiocephalic aneurysms associated with dissection or genetic aortopathy are associated with faster rates of growth and may warrant repair at a lower size threshold.

Intervention Options

Broadly, the treatment options for brachiocephalic disease can be categorized into two groups: open surgical reconstruction and endovascular intervention. Open surgical reconstruction is further divided into direct (anatomic) and indirect (extraanatomic) reconstruction. These approaches are not mutually exclusive, as some patients with complex disease will require a combination of techniques. The choice of approach is complex and related to a variety of factors including patient (age, history of prior sternotomy or mediastinal radiation, and comorbidities), anatomic (number of vessels involved, location and distribution of lesions, underlying pathogenesis, and symptoms at presentation), and surgeon (endovascular experience and skill).

INDEX

A

AAA. *See* Abdominal aortic aneurysm
ABCDE. *See* Airway, breathing, circulation, disability, and exposure
Abdomen
autologous reconstruction and, 765
open, nutrition therapy for, 1493
penetrating trauma, 1204–1210
 anterior, 1207
 assessment and initial management, 1204–1205, 1205f
 damage control laparotomy, 1208b
 exploratory laparotomy (or laparoscopy), 1207–1208
 laparotomy for, 1205, 1205b
 penetrating anterior stab wound/
 hemodynamically stable, 1206f
 penetrating flank or back trauma/
 hemodynamically stable, 1207
 possible penetrating thoracoabdominal trauma/hemodynamically stable, 1206f
 postoperative management, 1208,
 1209–1210t, 1209f
 thoracoabdominal penetrating trauma, 1207
vascular injury in, 1305–1306, 1305f, 1307f
Abdominal aortic aneurysm (AAA)
anatomic evaluation in, 924, 925f
appendicitis and, 937
cholecystitis/symptomatic cholelithiasis and, 936–937
 with colorectal cancer, 936
 with concomitant abdominal malignancies, 935–936
 with concomitant intraabdominal pathology, 937
 with concomitant nonmalignant disease, 936–937
 with concomitant nonvascular abdominal pathology, 935–937
descending thoracic, 938–949, 938f, 939f
 aortic exposure, 942–943
 clamping, 942–943
 closure and postoperative care of, 943
 endovascular management of, 940t,
 945–950, 945f
 branched graft reconstruction, 948
 in connective tissue disorders, 948
 factors affecting outcomes, 950
 indications and patient selection, 945, 946t
 open repair vs., 940t, 948
 operative technique, 946–948, 947f
 outcomes, 948
 preoperative planning, 945–946
 graft implantation for, 943, 944f

Abdominal aortic aneurysm (Continued)

 indications, 939
 operative technique for, 941
 organ protection adjuncts, 941
 outcomes, 943–944
 patient preparation for, 941
 patient selection and preoperative risk assessment, 939–941, 940f
 strategies for, 941–944
 surgical approach for, 941–942, 942f
diverticulitis and, 937
endovascular repair, 924–929
 complex aortic, 927, 929f
 endoleak after, 926–927, 928f
 Johns Hopkins approach to, 925–926,
 926f, 927f
 selection for, 924, 924f
open repair, 919–923, 920t
 operative technique of, 921–922
 postoperative management and surveillance of, 922–923
 postoperative outcomes in, 923
 preoperative evaluation and optimization of, 919–920
 preoperative planning of, 920–921
 retroperitoneal approach of, 921, 922f
 special considerations for ruptures in, 922
 transperitoneal approach of, 922, 923f
pancreatic cancer and, 936
ruptured, 930–934
 diagnostic evaluation of, 930, 930f
 endovascular management of, 933–934
 open surgical management of, 932–933,
 933f, 934f
 operative management of, 931–932, 931f, 932f
 postoperative care of, 934–935
 preoperative counseling, 930–931, 931f
 preoperative management of, 930–931
symptomatic, 924
thoracic and thoracoabdominal, 938–949,
 938f, 939f
urologic malignancies and, 936
Abdominal closure, in enterocutaneous fistula, 145
Abdominal compartment syndrome (ACS), 1288–1291
abdominal wall pack in, 1288–1291, 1290f, 1291f
definitive fascial closure in, 1291
etiology of, 1288
intraabdominal hypertension in, 1288
 damage control resuscitation and, 1288, 1289f
 extraabdominal effects of, 1288
Abdominal drains, 1223
Abdominal pain, colonic obstruction and, 198–199

Abdominal pressure, normal, 1288

Abdominal radiography, of colonic obstruction, 197–198, 198f
Abdominal sepsis, antibiotics for, 1479–1480
Abdominal stab wounds, 1228, 1231f
Abdominal ultrasound
 for acute cholangitis, 478
 of ileocolic intussusception, 1365
Abdominal wall
 anatomy of, 677–679, 678f
 nerve supply of, 679
 reconstruction
 combined tissue loss of thoracic and, 1296–1297, 1297f
 large defects with infected mesh and enterocutaneous fistulae, 1293–1295,
 1294f
 large juxtaabdominal thoracic defect, 1295–1296, 1296f
 lateral abdominal wall defects, 1295, 1295f
 preparation for, 1292–1293, 1292f, 1293f,
 1294f
 for refractory open abdomen, 1292–1297
 vascular supply of, 678–679
 Abdominal wall flap closure over drains, 142, 142f
Abdominal wall pack, in abdominal compartment syndrome, 1288–1291, 1290f, 1291f
Abdominal wall reconstruction, 677–683
 acute management of, 679
 combined tissue loss of thoracic and abdominal walls, 1296–1297, 1297f
 large defects with infected mesh and enterocutaneous fistulae, 1293–1295,
 1294f
 large juxtaabdominal thoracic defect, 1295–1296, 1296f
 lateral abdominal wall defects, 1295, 1295f
 loss of domain in, 684–689
 anterior component separation in, 684–686,
 685f, 686f
 botulinum toxin A in, 688, 689f
 definition of, 684
 etiology of, 684
 follow-up of, 688
 interpositional mesh in, 688
 operative repair for, 684
 perioperative management of, 688
 posterior component separation in,
 686–687, 687f
 postoperative management of, 688
 surveillance for, 688
 transversus abdominis release in, 687–688,
 688f

Note: Page numbers followed by “f” indicate figures, “t” indicate tables, and “b” indicate boxes.