

Contents

Foreword	I
<i>Eric Su, MD; Mark Hamlin, MD, MS</i>	
SECTION I: PHYSICS AND INSTRUMENTATION	
Basics: Physics, Modalities, and Image Acquisition	1
<i>Keith S. Boniface, MD</i>	
Transthoracic Echocardiography Examination	11
<i>Michael J. Lanspa, MD, FCCM, FASE</i>	
Transesophageal Echocardiography Examination in the ICU	25
<i>John C. Klick, MD, FCCM</i>	
Lung Ultrasonography Fundamentals	35
<i>Peter Croft, MD; David Mackenzie, MDCM, FRCPC</i>	
Abdominal Ultrasound Fundamentals	45
<i>Christopher K. Schott MD, MS, RDMS, FACEP; Karthik Vadamalai, MD</i>	
SECTION II: EVALUATION OF SHOCK AND ACUTE RESPIRATORY FAILURE	
Left Ventricular Systolic Function and Cardiac Output	63
<i>Brooks Ohlson, MD; R. Eliot Fagley, MD</i>	
Right Ventricular Function	71
<i>José L. Díaz-Gómez, MD, FCCM, FASE; Isabel C. Mira-Avendano, MD; Antoine Vieillard-Baron, MD, PhD; Paul K. Mohabir, MD</i>	
Fluid Management by Critical Care Echocardiography	91
<i>Antoine Vieillard-Baron, MD, PhD</i>	
Pulmonary Embolism and Deep Vein Thrombosis	97
<i>Paul K. Mohabir, MD; Joshua B. Wenner, MD</i>	
Cardiac Tamponade	107
<i>Jan Kasal, MD, FCCM, FASE; Chakradhar Venkata, MD</i>	
Assessment and Implications of Diastolic Dysfunction in Critical Illness	119
<i>Rebecca E. Burk, MD; Meghan M. Cirulis, MD; Samuel M. Brown, MD, MS, FASE, FCCM</i>	
SECTION III: MONITORING APPLICATIONS	
Ultrasound-Driven Approach to Patients in Shock	129
<i>Sarah Bain, MD</i>	
Ultrasound-Driven Approach to Patients With Acute Respiratory Failure	141
<i>Raid Shaarbaf, MD; Aditi Jain, MD; Alberto Goffi, MD</i>	
Failure to Wean From Mechanical Ventilatory Support	157
<i>Silvia Mongodi, MD, PhD, MSc; Francesco Mojoli, MD; Bélaïd Bouhemad, MD, PhD</i>	
Extracorporeal Membrane Oxygenation Support	169
<i>Shaun L. Thompson, MD; Daniel W. Johnson, MD</i>	
Neurocritical Care	181
<i>Aarti Sarwal, MD, FNCS, FAAN</i>	
The Extended Focused Assessment With Sonography in Trauma (E-FAST)	195
<i>Thomas Carver, MD, FACS</i>	
Acute Coronary Syndrome	207
<i>Sumit Kapoor, MD, FCCP; Anne-Sophie Beraud, MD</i>	
Assessment of Valvular Heart Disease in Critical Illness	217
<i>James A. Nelson, MBBS; Brandon M. Wiley, MD, MS</i>	
Infective Endocarditis	245
<i>James A. Nelson, MBBS; Brandon M. Wiley, MD, MS</i>	

Acute Respiratory Distress Syndrome: Role and Interest of Critical Care Echocardiography	261
<i>Mathieu Godement, MD; Xavier Repessé, MD; Antoine Vieillard-Baron, MD, PhD</i>	
Severe Pneumonia, Cardiogenic Pulmonary Edema, and Acute Respiratory Distress Syndrome	269
<i>Andrew T. Levinson, MD, MPH; Mohammad Arabiat, MD; Andrew E. Foderaro, MD</i>	
Septic Shock and Its Echocardiographic Mimickers	279
<i>Sara Nikravan, MD</i>	
Focused Point of Care Ultrasound in Cardiac Arrest	287
<i>Nibras Bughrara, MD; Stephanie Cha, MD; Aliaksei Pustavoitau, MD, MHS, FCCM</i>	
SECTION IV: PROCEDURAL GUIDANCE APPLICATIONS	
Vascular Access	297
<i>Enyo Ablordeppey, MD, MPH</i>	
Thoracentesis and Thoracostomy Tube Placement	315
<i>Kristin Cushenbery, APRN, MSN; Ashley V. Fritz, DO; Carla P. Venegas-Borsellino, MD</i>	
Airway Management	325
<i>Adi Osman, MD; Kok Meng Sum, MD</i>	
Paracentesis	335
<i>Jason Parente, MS, PA-C</i>	
Ultrasound-Guided Pericardiocentesis	341
<i>Cesar Castillo, MD; Vikas Bansal, MBBS, MPH; Salman Bandekali, MD</i>	
SECTION V: COMPETENCE, CREDENTIALING, AND CERTIFICATION	
Competence, Proficiency, and Training	357
<i>Venkatarishna Rajajee, MBBS</i>	
Quality Assurance, Documentation, and Billing	369
<i>Nova Panebianco, MD, MPH</i>	
SECTION VI: PEDIATRICS	
General Considerations in Pediatric and Neonatal Critical Care Point-of-Care Ultrasound	379
<i>Eliotte L Hirshberg, MD, MS, FCCM; Belinda Chan, MD; Sasha Gordon, BS, RMDS, RVT</i>	
Pediatric Ultrasound-Driven Approach to Shock and Hypotension	389
<i>Sarah Ginsburg, MD; Adam S. Himebauch, MD</i>	
Neonatal Hemodynamic Considerations: Assessment of the Patent Ductus Arteriosus and Beyond	397
<i>María Victoria Fraga, MD; Shazia Bhombal, MD</i>	
Pediatric and Neonatal Thoracic Procedural and Diagnostic Applications	407
<i>Christie Glau, MD; Nadya Yousef, MD, MSc</i>	
Pediatric and Neonatal Abdominal Diagnostic Applications	415
<i>Grace Chong, MD</i>	
Ophthalmic and Neurologic Ultrasound for Pediatric and Neonatal Neurocritical Care	429
<i>Becky J. Riggs, MD</i>	
Special Considerations in Pediatric and Neonatal Procedural Applications	439
<i>Tara L. Petersen, MD, MEd; Sonali Basu, MD; Jason Z. Stoller, MD; Amelie von Saint Andre-von Arnim, MD; Jesse Wenger, MD</i>	
Point-of-Care Ultrasound in the Operating Room	455
<i>David B. Kantor, MD, PhD; Andrea Gomez-Morad, MD; Karen Boretsky, MD</i>	
INDEX	469