
Essential Echocardiography

Timothy M. Maus
Christopher R. Tainter
Editors

Essential Echocardiography

A Review of Basic Perioperative TEE
and Critical Care Echocardiography

Second Edition

 Springer

Editors

Timothy M. Maus
Department of Anesthesiology
University of California
San Diego Health
La Jolla, CA
USA

Christopher R. Tainter
Department of Anesthesiology
University of California
San Diego Health
La Jolla, CA
USA

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To Molly, for your unwavering love; to my Dad, for your caring love and support throughout my life; and to William, Owen, Winston, and Porter, for the overwhelming joy you bring to our lives.

– Timothy M. Maus

To my loving wife, who tolerated countless hours of writing and editing, to my supportive family who created and developed me, and to all of the patient people who have learned from or taught me anything.

– Christopher R. Tainter

Preface

Echocardiography and point-of-care ultrasound play an invaluable role in the management of hemodynamically unstable patients. Transesophageal echocardiography (TEE) has a well-established history of utility in cardiac operating rooms, and the advances and increased availability of TEE, along with the portability of transthoracic echocardiography (TTE), have propelled both modalities outside of the cardiac operating room realm. Whether in the emergency department, intensive care unit, inpatient unit, or operating room with high-risk surgical patients, echocardiography's ability to monitor cardiac function, assess response to interventions, and quickly diagnose causes of hemodynamic instability have made it a necessary skill for practitioners in this era of medicine.

Utilizing both two-dimensional echocardiography and Doppler imaging, numerous causes of hemodynamic compromise can be identified that may warrant immediate intervention. Recognizing myocardial ischemia, pericardial tamponade, left ventricular outflow tract obstruction, severe valvular abnormalities, hypovolemia, venous air embolism, and pulmonary emboli can directly affect patient management and outcomes. In addition, important extra-cardiac causes of instability can be identified with ultrasound as well, including pneumothorax and other lung pathology, aortic aneurysm or dissection, intraperitoneal or intrathoracic hemorrhage, and deep vein thromboses.

The editors of this textbook hope to encourage and educate interested practitioners regarding the utility of basic echocardiography in everyday practice. The intention is to create an easily approachable and well-illustrated text as a resource to learn the principles of perioperative and critical care echocardiography and integrate its use into clinical practice. While numerous comprehensive echocardiography textbooks exist, this text differs by offering a unique perspective for emergency and critical care providers as well as non-cardiac anesthesiologists. Therefore, advanced topics such as determinations for valvular repair versus replacement are omitted. Instead, there is a distinct emphasis on identifying normal versus abnormal anatomic and physiologic states, commonly encountered pathologies, and emergent causes of hemodynamic instability.

Essential Echocardiography, 2nd Edition: A Review of Basic Perioperative TEE and Critical Care Echocardiography contains several key additions while staying true to the intention of the first edition serving as a guide and providing a framework for the readers as they are introduced to the application of critical care and basic perioperative echocardiography. The addition

and integration of transthoracic echocardiography within the core echocardiography topics allows a unified approach to both image interpretation and identification of pathology regardless of the modality. The textbook concludes with a section on critical care ultrasonography including lung, abdominal, and vascular imaging as well as assessments of volume status and detection of hemodynamic shock. Understandably, it is often intimidating to learn a new skill such as echocardiography. The gentle approach of the authors helps to allay those fears and minimize the frustration that often comes with learning a new skillset. Material is presented in an understandable fashion, building upon basic physiologic principles. It is also important to remember that a multimodal approach to learning echocardiography is key, including echocardiography simulation and repetitive hands-on application during patient care. Often valuable insight can be gained by performing even a portion of an exam, and the learner doesn't have to be an expert to acquire relevant information.

In addition to helping the practitioner who is seeking to implement the use of TTE and TEE into their clinical practice, this text is intended as an aid for those who are seeking certification in echocardiography, including passing the Basic PTEeXAM® and the CCEeXAM®. Each chapter in this book is designed to address the core competencies that are tested in these exams and prepare the practitioner for either or both certifications. Each chapter now concludes with board review style questions to further cement core concepts and aid in retention. In addition to being a valuable and practical guide to obtaining certification, we hope that this textbook becomes a practical resource for the application of echocardiography into your clinical practice.

La Jolla, CA, USA
La Jolla, CA, USA

Timothy M. Maus
Christopher R. Tainter

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Contributors

Dalia Banks Department of Anesthesiology, University of California San Diego Health, La Jolla, CA, USA

Michael Benggon Department of Anesthesiology, Loma Linda University, Loma Linda, CA, USA

Kenneth Chen Department of Medicine, Division of Pulmonary, Critical Care, and Sleep Medicine, University of California San Diego Health, La Jolla, CA, USA

Christine Choi Department of Anesthesiology, University of California San Diego Health, La Jolla, CA, USA

Brett Cronin Department of Anesthesiology, University of California San Diego Health, La Jolla, CA, USA

Michele Curtis Department of Anesthesiology, University of Utah School of Medicine, Salt Lake City, UT, USA

Byron Fergerson Department of Anesthesiology, University of California San Diego Health, La Jolla, CA, USA

Kirill Gelfenbeyn Department of Anesthesiology, University of California San Diego Health, La Jolla, CA, USA

Neal Gerstein Department of Anesthesiology and Critical Care Medicine, University of New Mexico School of Medicine, Albuquerque, NM, USA

Andrew Goodrich Department of Anesthesiology, University of California San Diego Health, La Jolla, CA, USA

Patricia Guan Department of Anesthesiology, University of California San Diego Health, La Jolla, CA, USA

Seth T. Herway Department of Anesthesiology, University of California San Diego Health, La Jolla, CA, USA

Diana Hylton Department of Anesthesiology, University of California San Diego Health, La Jolla, CA, USA

Ian Joel Department of Medicine, Los Robles Regional Medical Center, Thousand Oaks, CA, USA

Swapnil Khoche Department of Anesthesiology, University of California San Diego Health, La Jolla, CA, USA

Perin Kothari Division of Cardiothoracic Anesthesiology, Department of Anesthesiology, Perioperative, and Pain Medicine Stanford University School of Medicine, Stanford, CA, USA

Gerard Manecke Department of Anesthesiology, University of California San Diego Health, La Jolla, CA, USA

Timothy M. Maus Department of Anesthesiology, University of California San Diego Health, La Jolla, CA, USA

Tariq Naseem Department of Anesthesiology, Cedars-Sinai Medical Center, Los Angeles, CA, USA

Liem Nguyen Department of Anesthesiology, University of California San Diego Health, La Jolla, CA, USA

Quoc-Sy Nguyen Department of Anesthesiology, University of California San Diego Health, La Jolla, CA, USA

Sonia Nhieu Department of Anesthesiology, Kaiser Permanente Santa Clara Medical Center, Santa Clara, CA, USA

E. Orestes O'Brien Department of Anesthesiology, University of California San Diego Health, La Jolla, CA, USA

Sophia P. Poorsattar Department of Anesthesiology and Perioperative Medicine, University of California, Los Angeles Medical Center, Los Angeles, CA, USA

Ramon Sanchez Department of Anesthesiology, University of California San Diego Health, La Jolla, CA, USA

Christopher R. Tainter Department of Anesthesiology, University of California San Diego Health, La Jolla, CA, USA

Suraj Trivedi Department of Anesthesiology, University of California San Diego Health, La Jolla, CA, USA

Eric Tzeng Department of Anesthesiology, University of California San Diego Health, La Jolla, CA, USA

Gabriel Wardi Department of Emergency Medicine and Department of Medicine, Division of Pulmonary, Critical Care, and Sleep Medicine, University of California San Diego Health, La Jolla, CA, USA

Joshua Zimmerman Department of Anesthesiology, University of Utah, Salt Lake City, UT, USA

Department of Anesthesiology, University of Utah School of Medicine, Salt Lake City, UT, USA