Tremendous improvements in ultrasound electronics and computer technology have led to development of one of the most impressive advancements of the use of ultrasounds to assess cardiac morphology and function: three-dimensional echocardiography (3DE). During the last decade, 3DE has made a dramatic transition from predominantly a research tool used in few large academic medical centers to a technology available in most echo labs, cardiac surgery operating rooms and catheterization and/or electrophysiology labs to address everyday clinical practice and guide interventional procedures.

Nowadays, 3DE is an established technique able to provide intuitive recognition of cardiac structures from any spatial point of view and complete information about absolute heart chamber volumes and function. In particular, 3DE has demonstrated its superiority over current echocardiographic modalities in several clinical applications: (1) assessment of left ventricular size and function whose accuracy compete with cardiac magnetic resonance; (2) Reliable and accurate assessment of right ventricular size and function; (3) Comprehensive visualization and quantitation of heart valve morphology and function leading to improved understanding of their function; (4) Improved display of complex spatial relationships between structures in patients with congenital heart lesions; (5) Guiding and monitoring surgical interventions and interventional procedures in the catheterization and electrophysiology lab.

However, there have been few comprehensive books to introduce this new echocardiographic technique. Therefore we planned this book to summarize the experiences collected by several scientists who have contributed to the development of 3DE to provide you with the most recent developments in this emerging field, focusing on the clinical value of transthoracic 3DE and on the expanding role of transesophageal 3DE in guiding and monitoring surgical and interventional procedures. We hope that this book can serve multiple purposes. For echocardiographers who already use 3DE, we have tried to present the more advanced applications of 3DE and also some future developments which are expected to enter soon in the clinical arena. For those who have not yet experience the “third dimension,” we have provided hundreds of images and videos in an accompanying DVD to show the beauty and the added clinical value of 3D imaging of cardiac structures. For clinicians, who may want to understand the added clinical value of this new echo modality, we tried to demonstrate the potential values of 3DE in the everyday clinical setting of cardiology practice. We are sure that 3D echo will help them to better understand and diagnose their patients.

The contributors to this book have all been selected for their special expertise in their own fields, their access to outstanding material and their ability to describe the significance of it in an effective and concise way. The Editors are grateful to the outstanding group of Authors for their extraordinary and timely contributions, and pleased to present such a truly international authorship.
Textbook of Real-Time Three Dimensional Echocardiography
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2011, XII, 198 p. 400 illus., 300 illus. in color., Hardcover
ISBN: 978-1-84996-494-4