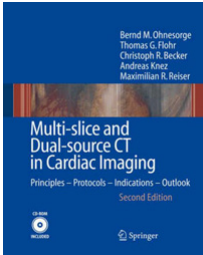


MULTI-SLICE & DUAL-SOURCE CT IN CARDIAC IMAGING, Principles, Protocols, Indications

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DESCRIPTION:

Cardiac diseases, and in particular coronary artery disease, are the leading cause of death and morbidity in industrialized countries. The development of non-invasive imaging techniques for the heart and the coronary arteries has been considered a key element in improving patient care. A breakthrough in cardiac imaging using CT occurred in 1998, with the introduction of multi-slice computed tomography (CT). Since then, amazing advances in performance have taken place with scanners that acquire up to 64 slices per rotation. This book discusses the state-of-the-art developments in multi-slice CT for cardiac imaging as well as those that can be anticipated in the future. It serves as a comprehensive work that covers all aspects of this technology, from the technical fundamentals and image evaluation all the way to clinical indications and protocol recommendations. This fully reworked second edition draws on the most recent clinical experience obtained with 16- and 64-slice CT scanners by world-leading experts from Europe and the United States. It also includes "hands-on" experience in the form of 10 representative clinical case studies, which are included on the accompanying CD. As a further highlight, the latest results of the very recently introduced dual-source CT, which may soon represent the CT technology of choice for cardiac applications, are presented. This book will not only convince the reader that multi-slice cardiac CT has arrived in clinical practice, it will also make a significant contribution to the education of radiologists, cardiologists, technologists, and physicists_whether newcomers, experienced users, or researchers.

CONTENTS:

Introduction: Basic principles of CT. Established imaging modalities for cardiac imaging. Clinical goals for CT in the diagnosis of cardiac and thoracic diseases. History and evolution of CT in cardiac imaging.- Cardiac and cardio-thoracic anatomy in CT: Topography. Standard views. Coronary arteries and veins. Pericardium. Cardiac chambers. Cardiac valves. Great vessels.- Multi-slice CT technology basics: Evolution of spiral CT from 1 to 64 slices. Principles of multi-slice CT system design. Multi-slice CT acquisition and reconstruction for whole-body imaging.- Technical principles of multi-slice cardiac imaging: Basic performance requirements for CT imaging of the heart. CT imaging with optimized temporal resolution: The principle of half-scan reconstruction. Prospectively ECG-triggered multi-slice CT. Retrospectively ECG-gated multi-slice CT. Synchronization to the ECG and cardiac motion. Radiation exposure considerations.- Clinical examination protocols with 4- to 64-slice CT: Quantification of coronary artery calcification. CT angiography of the cardiac anatomy and the coronary arteries. Cardiac function imaging. Cardio-thoracic examination protocols.- Image visualization and postprocessing techniques: Trans-axial image slices. Multi-planar reformation (MPR). Maximum intensity projection (MIP). Volume rendering technique (VRT). Vessel segmentation and vessel analysis. 4D visualization and functional parameter assessment. Dynamic evaluation of myocardial perfusion. Quantification of coronary calcification.- Clinical Indications: Current and future clinical potentials. Risk assessment with coronary artery calcium screening. Detection and exclusion of coronary artery stenosis. Assessment and interpretation of atherosclerotic coronary plaque. Usefulness in patients with chest pain. Evaluation of coronary artery bypass grafts. Patency control of coronary stents. Evaluation of non-atherosclerotic coronary disease. Diagnosis of congenital heart disease in adults and children. Evaluation of ventricular function parameters. Imaging and diagnosis of cardiac valves. Visualization of cardiac tumors and masses. Imaging of the pulmonary veins. Potential of myocardial perfusion and viability studies. Cardio-thoracic multi-slice CT in the emergency department.- Future technical developments in cardiac CT: Limitations and pitfalls with today's multi-slice CT. A future for electron beam CT? Future possibilities with area detector CT. New frontiers with dual-source CT.

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