

Medical Radiology

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U. Joseph Schoepf  
Felix G. Meinel *Editors*

# Multidetector-Row CT of the Thorax

*Second Edition*

 Springer

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# Medical Radiology

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U. Joseph Schoepf • Felix G. Meinel  
Editors

# Multidetector-Row CT of the Thorax

Second Edition

 Springer

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*To Our Patients*



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## Foreword

The first edition of “MDCT of the Thorax” was published in 2004 when the new capabilities and clinical applications of MDCT were met with excitement and explored with great enthusiasm. Since then, much has happened – the excitement has persisted and has even grown. While 16-row scanners were once celebrated as the peak of innovation in 2004, 64-row computed tomography is now considered to be standard technology with 128 and even 320-row scanners available in the high-end sector. However, the technical innovations are by no means limited to the number of detector rows. Iterative reconstruction methods, new detector materials, automated tube current modulation and tube voltage selection have substantially reduced the radiation exposure to patients. These improvements mitigate and perhaps invalidate the primary argument against the widespread use of CT angiography of the coronary arteries in particular.

For the second edition, editors Joseph Schoepf and Felix Meinel have kept important features essential to the success of the first edition while revising and updating each chapter to capture the rapidly advancing developments in CT and their clinical applications. New chapters have been added, including: “Dual Energy CT of the Thorax”, “Comprehensive CT Imaging in Acute Chest Pain”, and “Imaging of the Heart-Lung Axis”. In contrast, chapters from the first edition which have since lost their importance have been excluded.

The editors are to be congratulated on assembling an authorial team of highly recognized, international experts. Furthermore, one has to thank the authors for illustrating that the technical and methodological advancements of the recent past are not just improvement for improvement’s sake, but significantly increase the clinical applicability and the diagnostic value of MDCT.

It can be asserted with good reason that MDCT of the thorax is one of the most interesting and exciting fields of radiology. Few topics in medical imaging arouse such heated discussion as lung cancer screening with CT or the use of CT in acute chest pain. This work provides detailed, comprehensive information on these and many other topics that capture the cutting-edge of innovation while remaining valuable for everyday practice.

I would like to sincerely thank the editors, authors, and Springer for promoting this important work and I wish them much deserved success. I have no doubt that readers will not only enjoy the book, but also find it a significant help in their daily practice.

Munich, Germany  
March 2016

Maximilian F. Reiser





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## Preface

...δὶς ἐς τὸν αὐτὸν ποταμὸν οὐκ ἂν ἐμβαίῃς...

It has been more than a decade since the first edition of this tome – and what an amazing 12 years it has been for a spectacular medical imaging modality and those who harness its power! Not only is CT not dead, as it was quite ubiquitously predicted and accepted at the eve of the last millennium, but rather it has piled triumph upon roaring triumph in our conquest of disease. And hardly any other area of CT imaging has seen more dramatic evolution, more spectacular victories, or more profound disruption than the evaluation of the cardiothoracic system. The scourges of the past were utterly and effectively vanquished: Pulmonary embolism has found its match, eradicating the diagnostic uncertainties from days past. Heart disease is increasingly tackled by the new, imposing kid on the block – cardiac CT. Doubts over the effectiveness of CT lung cancer screening have all but disappeared and this test is shaping up as a powerful weapon in our war on cancer. And the list goes on...

Our exploits can in part be ascribed to the ingenuity, curiosity, and zeal of the radiological community in the pursuit of ever more refined strategies to better the fate of our patients. But our intellect and our passion alone would have stood little chance to overcome our formidable adversaries. To our aid came the brilliance of engineers, thinkers, technical innovators, who gave us the means, gave us the tools, the very instruments of success. Zooming through the chest in a split second, freezing the heart's motion, obtaining tissue signatures of organs healthy and diseased, smoking out pathology with micrometer precision – what a feat!

As with the first edition, we were able to assemble a stellar team of global experts, fabled bards to sing the stories of our exploits, to chronicle our journey, and to take tally of the spoils of war on human ailment. Again, the result of our collective musing has become a shining testimony to the prowess of our profession and a reflection of our ever increasing abilities in medicine. Our deep gratitude goes out to our many friends who dedicated their precious time and their genius to the success of this work. We thank the editorial team at Springer, who again so expertly steered the publication of this new edition. Lastly, we salute our patients, who are the reason for it all.

Charleston, South Carolina, USA  
Munich, Germany  
March 2016

U. Joseph Schoepf  
Felix G. Meinel



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# MDCT – Technical Background, Radiation Protection