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# Medical Radiology

## Diagnostic Imaging

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Mariano Scaglione • Ulrich Linsenmaier  
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# Emergency Radiology of the Abdomen

Imaging Features and Differential  
Diagnosis for a Timely Management  
Approach



Mariano Scaglione  
Department of Diagnostic Imaging  
Pineta Grande Medical Center  
Castel Volturno  
Italy

Prof. Dr. Gerd Schueller, MBA  
Department of Radiology  
Medical University of Vienna  
General Hospital of Vienna  
Vienna  
Austria

Ulrich Linsenmaier  
Department of Clinical Radiology  
Ludwig-Maximilians-University  
Munich  
Germany

and

Director Institute of Diagnostic Radiology  
and Interventional Therapy Klinikum  
München Pasing & Perlach (KMPP)  
Munich  
Germany

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*To my beloved sons, Pietro e Ruben, for their love, encourage and support*

Mariano Scaglione

*My thanks go to my family, my beloved children Laura and Lukas, my brother Jörg and all friends for supporting me and encouraging my scientific work*

Ulrich Linsenmaier

*For Claudia, my wife, whose constant support is a great asset in my life: and to my daughters Nadja, Mona, and Linda, who tried but eventually did not preclude the writing of this book*

Gerd Schueller

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## Foreword

Emergency Radiology of the Abdomen

Imaging Features and Differential Diagnosis for a Timely Management Approach

Things may at the same time become more difficult and easier. This very general remark also applies to the topic of this book “Emergency Radiology of the Abdomen”. On one hand state-of-the-art imaging technologies allow for a straight forward diagnosis in many cases of acute abdomen, trauma to the abdomen and other emergency conditions related to diseases of abdominal organs. On the other hand, radiologists have to be more and more aware of clinical entities and pathological conditions in order to fulfil their duty, namely to provide our clinical partners with practically useful information.

It is not so long ago, that surgeons had to perform laparotomy in order to make a definite diagnosis in cases of ambiguous clinical findings concerning the status of the abdominal organs. Nowadays, imaging has become so precise and reliable, that in almost all cases a definitive diagnosis can be established before patients undergo surgery or in order to prevent unnecessary surgical procedures.

Since we talk about potentially life threatening disorders and diseases, the diagnostic imaging is a critical issue. Therefore, radiologists have to be aware of the clinical needs, the great variability of disorders, which may only be categorized correctly in view of the clinical history and clinical findings. Consequently, close cooperation and common understanding with emergency physicians are indispensable.

I would like to thank the editors of this edition of Medical Radiology/ Diagnostic Imaging for their initiative and for bringing together experts in the field. Considering the steadily increasing importance of diagnostic imaging in the management of patients with acute symptoms of the abdomen, this work may become an indispensable guide for many radiologists and clinicians. I would also like to thank all authors of the various chapters of this edition for their contribution and for the willingness to share their expertise with the readers of this book.

Prof. Dr. med. Dr. h.c. Maximilian Reiser  
Department of Clinical Radiology  
University Hospitals  
Ludwig-Maximilians-University of Munich

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## Foreword

Over the last 25 years Emergency Radiology has evolved into a specialty of Diagnostic Imaging. Several major Emergency Radiology societies have arisen in many countries, there are now specialty journals on the subject, and many radiology departments throughout the world now have dedicated sections of Emergency Radiology often providing full-time coverage to their institutions. Of course, there has been and continues to be a need to organize this distinctive body of knowledge, which has grown so rapidly, and to educate the radiology community at large on this subject. Fortunately, diagnostic imaging technology has advanced over the last two decades to make the rapid and accurate diagnosis of emergent pathology practical. The evolution of multi-row detector CT has, in the most urgent clinical scenarios, provided a near perfect diagnostic modality.

In this text, the emphasis is on emergent imaging in the abdomen. The origin of the word *abdomen* is not known with certainty. It is possibly derived from the Latin *abdere* meaning to hide, thus it might mean a cavity in which odds and ends are hidden away. This definition alludes to the fact that knowing what's in abdomen and retroperitoneum, as regards acute pathology, is quite difficult making accurate diagnosis of pathology highly challenging. Given that failure to identify and quickly treat life-threatening pathology can permit a patient's death and unnecessarily opening the abdomen surgically to directly see what's inside can lead to morbidity and occasionally mortality. The value of imaging to reveal "truth without intervention" has been of inestimable value.

I have known Editors Uli Linsenmaier, MD and Dr. Mariano Scaglione, MD for many years and I know they bring a wealth of experience and knowledge to their subject. You will find this text comprehensive, current, well-written, well illustrated, and reflective of their personal insights and opinions concerning complex and controversial issues relevant to the topic. You may note some variation between the U.S. and European perspective in the early diagnostic approach to assessing emergent abdominal conditions with a stronger emphasis on sonography in initial imaging in Europe, but less so in the U.S. with greater reliance on immediate CT. They deal with the challenging issue of when to bypass imaging in favor of immediate surgery and how to integrate information obtained from the bedside and lab with imaging data in deciding optimal management. Controversies concerning the most appropriate

use of diagnostic imaging are elaborated upon and personal opinions supported.

This book will be a standard for trainees and those needing to both refresh their knowledge of the subject and stay current in the field and will be a reference source to resolve “at the moment” diagnostic uncertainty when time for “quiet reflection” is not available. The information contained herein is very “digestible”, that is, easy to assimilate. I fully expect that it will help you resolve many problematical acute abdominal imaging cases.

Stuart E. Mirvis  
Professor and Director Section of Emergency Radiology  
University of Maryland School of Medicine

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## Preface

We, as radiologists, face a time in which rapid emergency radiology (ER) diagnosis and intervention are mandatory for the proper management of serious abdominal emergencies. Indeed, the demand for diagnostic imaging in ER departments has risen dramatically over the last decade, with an exponential increase in the use of multi-detector computed tomography (MDCT) of up to 25% per year. In the USA, between 1996 and 2007, MDCT use during ER department visits grew by 330%, with the largest increase in older patients and for the diagnosis of abdominal or chest pain. These rates are a direct result of the technical and methodological improvements in the use of MDCT. Moreover, diagnostic imaging has, at least in part, virtually replaced physical examination for many emergency patients. Particularly in severely injured or critically ill patients referred to an emergency unit, immediate cross-sectional imaging is used as an adjunct to the primary patient survey (ATLS) and has proven to be of substantial benefit in establishing an adequate, timely, and individual therapy.

In order to achieve excellent professional co-operation with referring physicians, it is indispensable that radiologists have a concise understanding of the specific pathologies that are seen in the emergency setting, including appropriate clinical knowledge of acute abdominal disorders.

Our aim in writing this book was to provide a comprehensive review of the traumatic as well as the non-traumatic emergency scenarios of the acute abdomen. The style of the presentation reflects the belief that improved timelines and greater accuracy in diagnostic and interventional imaging lead to improved clinical management and better patient outcomes. Thus, the book focuses on the imaging features that are relevant to a timely management approach.

It is a pleasure for us to offer this book to an international readership, with the support of the new European Society of Emergency Radiology (ESER), which was founded as a subspecialty society under the auspices of the European Society of Radiology (ESR). In our opinion, emergency radiology requires comprehensive specialized training, consistent with the shift in radiologic education from a modality-based approach to organ—and process-specific practices. Dedicated abdominal emergency radiology training is a remarkable endeavor—one that not only has become an integral part of the core curriculum for residents and fellows but which is also very much in demand in postgraduate training.



We truly believe that this book could help fulfilling the unique demands of modern emergency radiology.

Mariano Scaglione, MD  
Ulrich Linsenmaier, MD  
Gerd Schueller, MD, MBA



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## Contributors

**F. E. Avni** Department of Radiology, Erasme Hospital, Brussels, Belgium, e-mail: Freddy.Avni@erasme.ulb.ac.be

**F. H. Berger** Department of Radiology, VU University Medical Center Amsterdam, Amsterdam, The Netherlands

**Gianpaolo Carrafiello** Department of Radiology, University of Insubria, Varese, Italy, e-mail: gcarraf@gmail.com

**M. Cassart** Department of Radiology, Medical University of Vienna, General Hospital Vienna, Vienna, Austria

**Garry Choy** Department of Radiology, Division of Emergency Radiology and Teleradiology, Massachusetts General Hospital, Boston, MA, USA, e-mail: gchoy@partners.org

**E. Cotta** Department of Radiology, University of Insubria, Varese, Italy

**N. Damry** Pediatric Imaging, Children's Hospital Queen Fabiola, Brussels, Belgium

**V. Di Mizio** Radiology Service, Santa Maria della Misericordia Hospital, Rovigo, Italy

**M. K. Dighe** Department of Radiology, University of Washington, Seattle, WA, USA

**C. Fugazzola** Department of Radiology, University of Insubria, Varese, Italy

**L. L. Geyer** Department of Clinical Radiology, University Hospital LMU Munich, Munich, Germany, e-mail: lucas.geyer@med.uni-muenchen.de

**R. Grassi** Department of Radiology, Second University, Naples, Italy

**J. A. Gross** Department of Radiology, Harborview Medical Center, University of Washington, Seattle, WA, USA, e-mail: jagross@uw.edu

**A. M. Ierardi** Department of Radiology, University of Insubria, Varese, Italy

**P. N. Khalil** Division of General and Visceral Surgery, Department of Surgery, Campus Innenstadt, Ludwig-Maximilians University (LMU), Munich, Germany, e-mail: philipe@me.com

**D. R. Kool** Department of Radiology, Jeroen Bosch Hospital, S Hertogenbosch, The Netherlands

**B. E. Lehnert** Department of Radiology, Harborview Medical Center, University of Washington, Seattle, WA, USA

**U. Linsenmaier** Department of Clinical Radiology, University Hospital LMU Munich, Ludwig-Maximilians-University, Munich, Germany, e-mail: ulrich.linsenmaier@med.lmu.de; Director Institute of Diagnostic Radiology and Interventional Therapy Klinikum München Pasing & Perlach (KMPP), Munich, Germany, e-mail: ulrich.linsenmaier@kliniken-pasing-perlach.de

**M. Mangini** Department of Radiology, University of Insubria, Varese, Italy

**L. Mannelli** Department of Radiology, Harborview Medical Center, University of Washington, Seattle, WA, USA

**M. A. Mazzei** Department of Radiology, University of Siena, Siena, Italy

**V. Miele** Department of Emergency Radiology, S. Camillo Hospital, Rome, Italy, e-mail: vittoriomiele@alice.it

**R. A. Novelline** Department of Radiology, Division of Emergency Radiology and Teleradiology, Massachusetts General Hospital, Boston, MA, USA

**F. Piacentino** Department of Radiology, University of Insubria, Varese, Italy

**A. Pinto** Department of Radiology, Cardarelli Hospital, Naples, Italy

**C. Recaldini** Department of Radiology, University of Insubria, Varese, Italy

**L. Romano** Department of Radiology, Cardarelli Hospital, Naples, Italy

**A. Rotondo** Department of Radiology, Second University, Naples, Italy

**C. T. Sadro** Department of Radiology, Harborview Medical Center, University of Washington, Seattle, WA, USA

**M. Scaglione** Department of Radiology, Pineta Grande Medical Center, Castel Volturno, Italy, e-mail: mscaglione@tiscali.it

**M. K. Scherr** Department of Clinical Radiology, University Hospital LMU Munich, Ludwig-Maximilians-University, Munich, Germany, e-mail: michael.scherr@med.uni-muenchen.de

**G. Schueller** Department of Radiology, Medical University of Vienna, General Hospital of Vienna, Vienna, Austria, e-mail: gerd.schueller@meduniwien.ac.at

**A. K. Singh** Department of Radiology, Division of Emergency Radiology and Teleradiology, Massachusetts General Hospital, Boston, MA, USA

**J. A. Soto** Department of Radiology, Boston Medical Center, Boston University School of Medicine, Boston, MA, USA, e-mail: Jorge.Soto@bmc.org

**M. Treitl** Department of Clinical Radiology, University Hospital LMU Munich, Munich, Germany, e-mail: marcus.treitl@med.uni-muenchen.de

---

**P. M. Vos** Department of Radiology, St. Pauls Hospital Vancouver BC, Vancouver, BC, Canada

**S. Wirth** Department of Clinical Radiology, University Hospital LMU Munich, Munich, Germany, e-mail: [swirth@med.lmu.de](mailto:swirth@med.lmu.de)