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# Emergency Radiology of the Chest and Cardiovascular System



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# Emergency Radiology of the Chest and Cardiovascular System



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*To ESER members, supporters, contributors and friends who are making the ESER Society bigger and bigger! To the ESER founding members who shared with me the dream of setting up a Society of Emergency Radiologists in Europe.*

*To my parents, Pietro and Ida, and my sons, Pietro and Ruben, with all my love...*

Mariano Scaglione

*I thank my family and my friends for encouraging and supporting me to work in academic emergency radiology, which is the music of life.*

*I dedicate this book to my family and my beloved great children, Lukas and Laura, being so nice and understanding to me.*

Uli Linsenmaier

*This one is for my beloved daughters Nadja, Mona, and Linda. Perhaps one day, you will consider it as helpful in your life.*

Gerd Schueller

*To my parents and family for their everlasting support.*

Ferco Berger

*I would like to thank all the active ESER members, the Emergency Radiology community, the other editors, the various authors and the whole Springer Lecture team and editorial staff for making this book possible.*

*My dedication goes to my family for always having ears for me, supporting me, supplying me with tips and altogether for just being there for me.*

Stefan Wirth

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## Preface

It was only in early January 2011 that a couple of European radiologists sat in Munich, Germany, and aimed to propagate an international platform for a comprehensive academic, scientific, methodologic interdisciplinary communication in emergency radiology. Eventually, the European Society of Emergency Radiology (ESER) was founded under the umbrella of the European Society of Radiology (ESR). From the beginning, this society's aim has on the one hand been transformed and highlighted by annual scientific meetings throughout Europe, serving the needs for a stringent, continuous education and communication regarding our discipline.

On the other hand, it came into light already at an early stage, that annual meetings, as a matter of fact, do not entirely cover intrinsic education in all fields of traumatic as well as nontraumatic emergencies. However, since we face potentially life threatening conditions, imaging the emergencies is a critical issue. Consequently, radiologists must be aware of the great variability of trauma and internal diseases and their adequate characterization in the light of clinical information. In order to share the knowledge in emergency radiology, we initiated a series of dedicated textbooks in 2012 with a publication about abdominal emergencies. We were more than happy having brought together many experts in the field, and up to now the book succeeds in both to immediately resolve diagnostic uncertainties and as a reference source for radiologists interested in the broad field of emergency imaging. In addition, we just started to offer an ongoing series of webinars and began to develop a dedicated European Emergency Radiology training with the aim of offering an European Diploma in Emergency Radiology (EDER).

We are now ready for the next step. It is our pleasure to introduce this new book in your hands about emergent thoracic and cardiovascular disorders to an international readership. Once again it is our true belief that this book will continue to help organize this distinctive body of knowledge in emergency radiology. As compared to its predecessor, this one has an unchanged comprehensively structured outline. The book is divided in three parts: blunt chest trauma, nontraumatic, nonvascular chest emergencies, and vascular chest emergencies which is completed by an emphasis of pulmonary embolism. We aimed to bring as many illustrations as feasible to the reader. Moreover, all chapters provide reflections of the authors' personal insights and opinions about complex and sometimes controversially discussed issues.

In our opinion, it is not by fortune that in this book most disorders introduced are described and discussed on the basis of computed tomography (CT) images. CT has actually changed our insights into emergency-related disorders not later as by the advent of multidetector machines. Indeed, this book provides latest state-of-the art knowledge of a mindset that is considered as the result of a shift of paradigm from modality-based approaches to process-specific practices. In this regard, this book is dedicated to all radiologists who understand emergency imaging as a continuous training as well as an integral part of their highly sophisticated and specialized profession.

We truly believe that this new book continues to help fulfilling the unique demands of modern emergency radiology and thus bringing the European Community of Emergency Radiology both together and forward.

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Amsterdam, The Netherlands  
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**Part I**

**Blunt Chest Trauma**

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# Lung Injury

Vittorio Miele, Grazia Loretta Buquicchio,  
Claudia Lucia Piccolo, Alessandro Stasolla,  
and Michele Galluzzo

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## Abstract

Thoracic trauma is the most common injury in polytrauma patients, with an incidence rate of 45–65%, and the most common cause of trauma deaths (about 20 % of all deaths), second only to head injuries.

In the time-sensitive acute care setting, efficiency and rapidity are basic. The Chest-X-Ray (CXR) may be considered as an adjunct to the initial assessment or primary survey of unstable traumatic patients. It helps to identify a tension pneumothorax (PNX) and pleural effusions that may suggest a hemothorax, until further evidence.

MultiSlice Computed Tomography (MSCT) is always the last step of the diagnostic procedures for stable patients, regardless of the positive or negative results on CXR, being the gold standard for the radiologic evaluation of the chest in traumatic patients.

This chapter will review the wide spectrum of radiographic and MSCT findings in patients undergoing a thoracic trauma, both blunt and penetrating, with a particular focus on the role of the radiologist in the management of major trauma, together with the “trauma team”.

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