Elena Lazzeri · Alberto Signore
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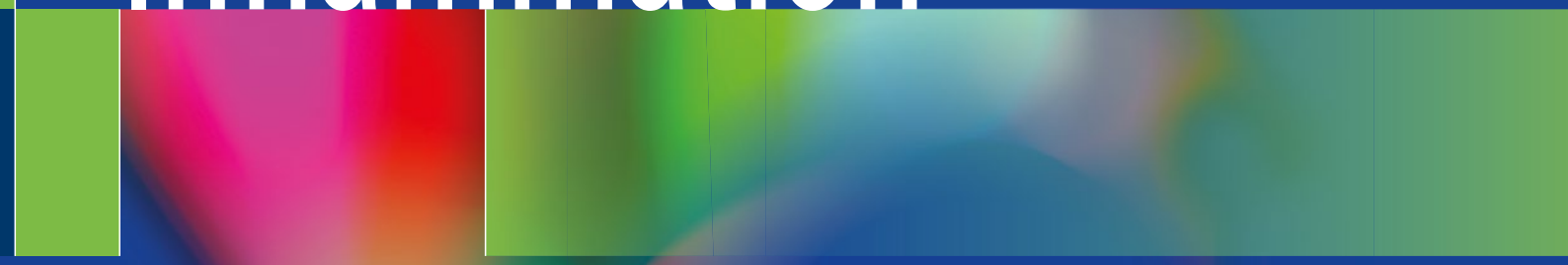
Giuliano Mariani *Editors*

Radionuclide Imaging of Infection and Inflammation



A Pictorial Case-Based Atlas

Second Edition

Springer

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Elena Lazzeri • Alberto Signore
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Foreword

Molecular imaging with positron emission tomography (PET) and single-photon computed tomography (SPECT) combined with computed tomography (CT) is increasingly being used in Nuclear Medicine to diagnose, characterize, and monitor disease activity in the setting of infections and inflammatory disorders. Hybrid PET/CT and SPECT/CT both produce images based on the biodistribution of radiopharmaceuticals able to localize the inflammatory changes and to describe their response to therapy. Although several textbooks have been published on this subject, the most successful so far has been *Radionuclide Imaging of Infection and Inflammation: A Pictorial Case-Based Atlas* (published by Springer in 2013) that presented and discussed a whole host of clinical cases and imaging examples illustrating the manifestations of the commonly encountered infectious and inflammatory conditions.

This new textbook is the second edition of the same Atlas, still edited by *Elena Lazzeri, Alberto Signore, Paola Anna Erba, Napoleone Prandini, Annibale Versari, Giovanni D'Errico, and Giuliano Mariani*. Until now the first edition has been considered an important and successful reference for medical students, residents in nuclear medicine and radiology, and for all physicians involved in the management of patients with infection and inflammation. The main added value of the Atlas was both the high level of its scientific contents and the original structure of its educational contents. Alongside the description of the most important inflammatory and infectious diseases, the authors presented in each chapter a series of illustrated teaching cases with images of the most frequent scintigraphic findings, as well the anatomic variants and technical pitfalls. Thus, the reader had the opportunity to understand the pathophysiologic basis of infections and inflammation and to learn how to correctly interpret the images obtained with these studies.

Several years have now elapsed since that first very lucky edition, which received the general appreciation of the clinical and scientific community. Over this period scientific knowledge of the molecular mechanisms and biology of the inflammatory response has changed. The same happened for infections, which today show different patterns versus those most frequently observed previously; in particular, the spectrum of pathogen agents, including viruses, has changed over time and new infections have emerged. New guidelines and recommendations have been developed by scientific societies, some of them with direct or indirect effects on the indications for some nuclear medicine imaging procedures. Furthermore, important technological advances have taken place in nuclear medicine concerning both imaging instrumentation and radiopharmaceuticals.

The above reasons stimulated the authors to implement, integrate, and enlarge the first edition of the Atlas to become this textbook. This second edition maintains the same excellent original structure based on accurate information on the diseases, technologies, and case reports with a high number of associated images, addressing the common questions and problems that arise in the daily practice. Furthermore, the number of chapters has been increased from 13 to 16, the new chapters being devoted to miscellaneous bone and joint conditions, to inflammatory vessels' disease (vasculitis and atherosclerosis), and to infections and inflammation in pediatrics. All the chapters have been modified and/or rewritten to address the latest advancements in the field. References have been carefully updated and new clinical cases have been included and discussed according to the most recent protocols and guidelines.

This new edition of the Atlas is still organized by clinical entity, and all issues are clearly presented, well illustrated, and referenced. Clinical cases at the end of each chapter offer a good teaching tool that refreshes and supports the concepts discussed in the main text. The illustrations are of very high quality, most of them being illustrated with hybrid imaging. The contents of the textbook cover all indications of nuclear medicine imaging in the current scenario of infections and inflammation. The book begins with the normal findings by using different radiopharmaceuticals and techniques, discussing variants and pitfalls. The following three chapters are devoted to imaging of soft tissue infections, bone and joint infections, and imaging of miscellaneous bone and joint conditions. Joint prosthesis infections and peripheral bone infections, vascular prosthesis infections, and nonorthopedic or cardiovascular implantable device infections are discussed in the following chapters. Other chapters are dedicated to some less known or less frequent conditions, such as inflammation of the head and neck region (including the central nervous system), infective endocarditis and cardiovascular implantable electronic devices, and fever of unknown origin. The textbook also presents abdominal infections and inflammations, diabetic foot infections, lung infections, chronic inflammatory diseases, inflammatory vascular diseases, vasculitis and atherosclerosis, and finally infections and inflammation in pediatrics.

In conclusion, this renewed Atlas continues to offer an excellent example of a modern and educational textbook, which is intended to disseminate worldwide the most up-to-date knowledge on the current role of nuclear medicine in the field. The authors, among the most experienced and distinguished professionals in this field, accomplished a great work to keep the contents of this text at the highest level, and through a multidisciplinary approach they have implemented an exceptional learning tool very useful for all physicians with interest in radionuclide imaging of infection and inflammation.

Bergamo, Italy
May 2020

Emilio Bombardieri

Preface

Why a second edition of *Radionuclide Imaging of Infection and Inflammation: A Pictorial Case-Based Atlas*? This is the question that most people looking at this textbook will wonder about. The answer is easy: being an atlas of images and interesting cases, there are always more cases and more educational images to add, in order to improve the understanding of the role of nuclear medicine imaging in the field of infection and inflammation. Furthermore, in the time elapsed since the first edition the role of [^{18}F]FDG PET/CT for imaging infection and/or inflammation has greatly expanded. At the same time, hybrid imaging with SPECT/CT has revived interest in single-photon imaging for infection, and new radiotracers are being developed for imaging of infection/inflammation.

It comes as a second consideration that this new edition is not intended to merely replace the first one, but rather to integrate it—so that the two editions will constitute a unicum, a full educational tool for all physicians with interest in radionuclide imaging of infection and inflammation.

As in the first edition of the book, we kept the same chapters, but raised the number from 13 to 16 in order to address the growing applications of radionuclide imaging for infection and inflammation, with particular emphasis on inflammatory vessels' conditions, such as vasculitis and atherosclerosis and on infection and inflammation in pediatrics.

Furthermore, the structure of each chapter has been modified to include learning objectives for each chapter and key learning points for each condition. This is an important modification that provides to the reader the possibility to quickly focus on the most relevant aspects for correct interpretation of images.

Finally, the most relevant feature of this second edition is that text and images have been prepared according to the multidisciplinary guidelines developed by the European Association of Nuclear Medicine (EANM) in conjunction with several other European societies of clinicians and radiologists; a list of the most relevant of such joint guidelines is reported in the next page. Therefore, this textbook is not the mere result of the experience of a group of Italian nuclear medicine physicians, but rather the summary of a wide international experience in the field. Indeed, some of the authors have been involved for several years in international task groups or committees of several world leading scientific societies.

This upgrade makes the book a modern and up-to-date reference manual for students and physicians who are approaching or already working in this field of nuclear medicine.

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April 2020

List of International Guidelines on Radionuclide Imaging of Infection/ Inflammation Imaging (Most Recent Publications Listed First)

Dorbala S, Ando Y, Bokhari S, Dispenzieri A, Falk RH, Ferrari VA, et al. ASNC/AHA/ASE/EANM/HFSA/ISA/SCMR/SNMMI expert consensus recommendations for multimodality imaging in cardiac amyloidosis: part 2 of 2—diagnostic criteria and appropriate utilization. J Nucl Cardiol. 2020;27:659–73.

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