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BOOK REVIEW

# Habib Zaidi: Quantitative Analysis in Nuclear Medicine Imaging

**Springer, New York, 2006, 594 pp, 110 illustrations, hardcover, ISBN-10: 0-387-23854-9, ISBN-13: 978-0387-23854-8**

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While quantitation has always had a clear role in therapeutic nuclear medicine (NM), it has often been considered almost an optional feature in many diagnostic applications of NM. In the past few years, however, partly driven by the increase in computing power achievable at a reasonable cost, image processing techniques aiming to derive quantitative measures from NM studies have experienced exponential growth. This tendency has also been boosted by the need for more objective criteria for diagnosis and monitoring of disease progression, coupled with the exponential growth in clinical applications of PET in oncology.

Given the large number of complex and heterogeneous approaches to "quantitative imaging", this book represents a timely tool, as it provides a general framework for understanding the basis of most quantitative approaches to NM imaging and for appreciating their pros and cons.

After the unavoidable introductory chapter on NM imaging principles and a nice chapter on dual-modality imaging (including a section on scanners for small-animal imaging), the book considers the basics of quantitation in NM. Separate chapters discuss all those issues in the fields of image reconstruction (analytic and iterative image reconstruction methods, correction for collimator–detector response, attenuation and scatter) and post-processing (correction for partial volume effects, multi-modality image registration and image segmentation) that must be understood in order to properly grasp the quantitative aspects of NM imaging.

The use of Monte Carlo methods in different areas of NM (ranging from detector modelling to dosimetry planning) is then assessed separately in a clear and concise manner in a chapter written by the Editor, who is an expert in this field. Tracer kinetic modelling issues are summarised in a further well-focussed chapter. In an effort to cover all aspects of quantitative analysis in NM activities, an interesting chapter is also devoted to planar image quantification techniques.

Finally, individual chapters cover introductory aspects of quantitative analysis in functional brain imaging studies (including both ROI- and voxel-based methods), myocardial SPECT studies and nuclear oncological imaging, and a further chapter focusses on the applications of quantitative imaging-based dosimetry and treatment planning in radionuclide therapy.

In many cases, available software packages that are useful in implementing and testing the described procedures are also suggested, providing the reader with the possibility of "hands-on" experience of the techniques described in the book.

Despite the complexity of the subject matter, overall this book is easy to read, clear and stimulating. It can be recommended to all imaging professionals (NM physicians, residents and fellows, as well as physicists and engineers) who seek an authoritative guide that will enable them to keep up to date with the "hard" quantitative aspects of NM, which are clearly going to play a greater role in the future of molecular imaging.

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