

Preface

Peter E. Valk passed away on December 16, 2003 in Berkeley, California. David Townsend wrote in the “*In Memoriam*” that was published in the February 2004 issue of the *Journal of Nuclear Medicine*: “He will be deeply missed by his many friends and colleagues throughout the Nuclear Medicine and PET community world-wide for his insight, knowledge, integrity and humour.”

Peter was a dear friend and we certainly miss him. In 2003, Peter coedited *Positron Emission Tomography: Basic Science and Clinical Practice*, a comprehensive contemporary reference textbook on positron emission tomography (PET). A few months before he died, Peter informed me that Springer intended to divide this nearly 900 pages textbook into two separate volumes for clinical and basic sciences. Peter was acutely aware of his prognosis and asked me if I would be willing to take over and edit the clinical volume. I willingly accepted. This book *Positron Emission Tomography: Clinical Practice* is a selected and updated version of the clinical chapters from the original book.

Positron Emission Tomography is an exceptional functional imaging tool. There has been a tremendous increase in interest in PET in the past decade, not only as a research tool but particularly in the clinical arena. The editors of the original book (Peter Valk, Dale Bailey, David Townsend and Michael Maisey) noted how they had collectively been involved in many aspects of PET development, including instrumentation, algorithms and protocol developments and applications, as well as the training of basic scientists and medical specialists, and efforts to convince health bureaucrats of the value of functional imaging in patient management. Through their extensive involvement in all aspects of PET, they progressively became aware of the lack of a comprehensive and contemporary reference work covering the science and clinical applications of PET. The original edition of their book arose from a desire to redress this situation.

The field of PET is progressing rapidly with the developments of multimodality imaging using integrated PET/CT systems. For this separate edition of clinical applications, the intent remains true to the aims of the first edition, namely, to provide a contemporary reference work covering the science and clinical applications of PET with extensive updating to include PET/CT technology. The book is designed to be used by residents and fellows training in medical imaging specialties as well as imaging experts in private or academic medicine who need to become familiar with this technology, and by those whose specialties carry over to PET and PET/CT such as oncologists, cardiologists, neurologists and surgeons.

Chapters 1 to 4 address the basic aspects of PET and PET/CT including physics and instrumentation, an overview of the clinical advantages of the PET/CT technology over PET or CT alone; the viewpoint of the technologist, radiation dosimetry and protection. Chapters 5 to 25 address oncologic applications and have been significantly updated with new data related to the PET/CT technology; many PET/CT illustrations are included. As in the first edition, a chapter is devoted to infectious diseases and another to PET imaging in pediatric disorders. Chapter 26 is an overview of the cardiac applications of PET, and Chapter 27 discusses cardiac PET/CT that some experts envision as the future one-stop-shop cardiac examination. Chapter 28 is an overview of PET imaging in clinical neurology and is probably the least influenced by recent development of PET/CT technology.

To conclude, I restate part of the preface from the first edition:

We are indebted to the many friends and colleagues who have contributed to this book, and who have willingly shared their knowledge and experience.

The functional nature of PET is based on its ability to target specific biochemical pathways through sophisticated radioactive probes and to record the time course of tracer uptake with highly sensitive instrumentation. PET is indeed a rich area in which to work, in part because of the multidisciplinary nature of the field. Developments in instrumentation, for example, are as much driven by radiochemistry and medical challenges as they are by progress in basic physics and instrumentation. Manufacturers of PET instrumentation have also played a major role in the development of the field by sharing many of their designs for critical appraisal at an early stage, and by being willing to listen to, support, and often fund novel prototype concepts. The development of the combined PET/CT scanner is a prime example of this collaboration.

PET is currently moving forward rapidly on a number of fronts: instrumentation is developing at a fast pace; synthetic radiochemistry is becoming more sophisticated and reliable; new reconstruction algorithms and processing methods are becoming more generally usable because of rapid advances in computer hardware and software; clinical applications are burgeoning as PET becomes affordable for more practitioners; and developments in molecular biology and functional genomics provide opportunities for monitoring gene expression and targets for gene therapy.

In this context, it is a challenge to produce a reference work which remains current even during the period from production of the original text to eventual publication, let alone for a significant number of years afterwards. We leave it up to the reader, and to future readers, to assess how successful we have been in this endeavour.

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