

PET-CT

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Editors

PET-CT

A Case-Based Approach

With 472 Illustrations, 107 in Full Color

With a Foreword by Henry N. Wagner, Jr., MD

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To our patients.

__PSC

*To my wife, Yenty, for her unconditional love and untiring efforts
to help me achieve both my personal and professional goals;
To my father, James Cham, Margaret, Grace, Frank, and his wife, Sylvia
for their spiritual support;*

and

*In loving memory of my mother, May Cham, who lost her battle
with cancer.*

__DKC

*To our friends and colleagues whose understanding and support
have been invaluable in the preparation of this book.*

__PSC, DKC

Foreword

Few advances in medicine have had more of an impact on modern health care than the invention of PET-CT studies of FDG in the living human body and experimental animals. Biochemistry has been superimposed on anatomy, which is a giant leap forward. The expertise required for the interpretation of CT must now be combined with the expert interpretation of the biochemical information of the FDG study. The idea that the interpretation of the images simply requires the superimposition of the two image modalities is simple is clearly not true. What is needed is a clear understanding of the sites of metabolic activity revealed by FDG studies in normal persons, and its variability from person to person. For example, FDG accumulates in various structures in the head and neck, and in the ovaries and uterus of normal women during certain phases of the menstrual cycle.

The case method of teaching has stood the test of time for more than a hundred years and is still valid as new modalities are developed and introduced into medical practice. The authors, both of whom have considerable experience in the performance and interpretation of PET-CT studies with FDG, have made an important contribution that will be of great value to nuclear medicine physicians, radiologists, oncologists, and other physicians with the responsibility of caring for patients with cancer.

Capabilities and limitations are discussed in the context of specific problems and patients. Most types of cancer are illustrated, with attention paid to the specific problems of each type. Technical artifacts are identified. F-18 fluoride, which is useful in delineating the normal skeleton, as well as lesions of the skeleton, is included, although the major emphasis is on FDG.

The book meets an immediate need of radiologists, nuclear physicians and oncologists, and will surely lead to great improvement in the care of patients. "Molecular imaging" added to the framework of CT revelations of anatomy is an idea whose time has come.

Henry N. Wagner, Jr., MD
Professor of Environmental Health Sciences
The Johns Hopkins Bloomberg School of Public Health

Preface

PET-CT: A Case-Based Approach provides practical clinical examples of studies performed with FDG on a state-of-the-art dedicated PET-CT device. Detailed histories and correlative imaging findings are given in each case to demonstrate the level of detail required for image interpretation and the capabilities of this instrumentation. Impressions are followed by relevant discussion points and insightful “pearls and pitfalls,” all designed to provide novice as well as experienced readers a brief but concise summary of the advantages and limitations of using this technology in the clinical setting. Images are presented in PET only, CT only and fused format to highlight the advantages of this hybrid technology in displaying the spectrum of normal and pathological findings in the cases selected. Chapter 1 covers the fundamentals of PET-CT imaging with FDG including normal physiology, normal variants and technical artifacts. Chapters 2 to 12 and 15 to 26 cover a spectrum of clinical applications in oncology including common indications in lung and colorectal cancer, as well as less common cancers, such as germ cell tumors and nerve sheath tumors. The use of PET-CT in unknown primary malignancies is also covered in Chapter 15. In addition to brain tumors, Chapter 4 covers general neurological applications such as epilepsy. Cardiac and infectious disease applications are covered in Chapters 13 and 14. Finally Chapter 27 covers PET-CT applications using F-18 fluoride for bone scans. The book has two appendices. The first is a brief review of reimbursement policies; the second focuses on instrumentation.

This book is ideal for nuclear medicine practitioners, radiologists, and residents, as well as referring clinicians interested in learning more about how this new medical imaging technology can be applied in their patient populations.

Peter S. Conti, MD, PhD, FACNP, FACR
Daniel K. Cham, MD, MS

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