

FDG PET/CT in Clinical Oncology: Case Based Approach with Teaching Points

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This book, intended for those seeking additional perspectives on the growing field of ^{18}F -FDG PET/CT, uses a case-based design with teaching points. The authors are to be commended for their great effort in organizing the book, editing the cases, and developing the teaching points. The 29 chapters are grouped into 5 main parts dealing with diagnosis, disease extent, follow-up, response to treatment, and neurology.

Part 1 covers diagnosis of solitary pulmonary nodules, tumors of unknown primary, and unexpected malignancies. The 8 cases of chapter 1 are typical lung cancers and inflammatory nodules. Although well representative, the cases should have included a greater number of lung cancers. In oncology, lung cancer is one of the major cancers imaged using ^{18}F -FDG PET/CT. Additional examples, such as cases of germ cell tumor, thymic carcinoma, and hamartoma, would have better informed the audience. Chapter 2, on tumors of unknown primary, included only 2 example cases. Although both are good, a greater number ought to be included in the next edition, as ^{18}F -FDG PET/CT has been most useful in evaluating such tumors. Chapter 3, on unexpected malignancies, includes 2 especially noteworthy cases: case 3, which presents relative axial, coronal, and sagittal images with bone setting, and case 5, which is particularly instructive to readers of PET/CT.

Part 2 comprises 9 chapters covering disease extent and including various typical cases that illustrate representative and relative images. In chapter 6, on breast carcinoma, the discussion of case 6 mentions semilunar uptake along the right lateral thoracic wall. Although the extent of disease is shown well on maximum-intensity projections, it would have been better to include coronal images for evaluation of the lung. Chapter 7 deals with only 2 esophageal carcinomas. Upper, middle, and lower esophageal cancer are common in the clinical setting, and esophageal squamous cell carcinoma is common in Asian patients. A greater number of typical cases would have improved this chapter. However, the limited number of cases may have been related to the heterogeneous ethnicities of the book's expected audience. Chapter 8, on colorectal carcinoma, includes 5 cases. The authors mention a particularly good teaching point: the significance of rotating maximum-intensity projections when ^{18}F -FDG PET/CT images are read in a clinical setting. In chapter 9, on lymphoma, case 1 shows both PET/CT and MR images to explain epidural masses. Multiple images of other modalities help the audience to understand more easily. Case 4 is a carefully chosen, interesting one of prostate lymphoma. In chapter 10, on multiple myeloma, case 2 is quite useful. The authors explain that hypercalcemia-induced calculi in multiple myeloma may be mistaken for a systemic disease or incidental finding. In chapter 11, on gynecologic adenocarcinoma, the term *adenocarcinomata* should have been changed to *adenocarcinoma*. Otherwise, the cases are good.

Part 3 covers various cancers typically requiring follow-up. In case 1 of chapter 16, on pancreatic carcinoma, the authors suggest in a teaching

point that ^{18}F -FDG PET/CT is the current paradigm in medical practice—a point with which I agree, as ^{18}F -FDG PET/CT created a paradigm shift as a means to detect cancer early and to evaluate systemic disease status. In chapter 19, on multiple myeloma, case 2 shows that multiple lesions may have different responses. Heterogeneous components and heterogeneous responses in cancer are currently a major topic in the field of oncology, and this excellent case illustrates that the intensity of increased ^{18}F -FDG uptake may be representative of disease status. In chapter 20, on cancer of the thyroid gland, case 3 includes some good images. Recently, ^{131}I -SPECT/CT, ^{123}I -SPECT/CT, and even ^{124}I -PET/CT have become available. The case illustrates that correlative imaging using such techniques may provide more information on heterogeneous metabolism in thyroid cancer. In chapter 21, on tumors of the urinary bladder, the 2 included cases are adequate, but beginners may have difficulty understanding a postsurgical new ileal conduit or neobladder. Therefore, a future edition would do well to include an explanation of such postsurgical structures.

Part 4 covers assessment of response to treatment. ^{18}F -FDG PET/CT has been widely used for follow-up after chemotherapy and radiotherapy, and this part of the book clearly explains the importance of ^{18}F -FDG PET/CT in this role. Particularly commendable are chapter 23, on lymphoma (9 cases); chapter 24, on multiple myeloma (3 cases); chapter 25, on lung cancer (2 cases); chapter 26, on gastrointestinal tumors (2 cases); chapter 27, on breast cancer (2 cases); and chapter 28, on neuroendocrine tumor (1 case)—all of which represent good follow-up cases with helpful teaching points. Case 1 of chapter 27 contains an explanation about arm position that is important to the understanding of image quality.

Part 5 covers neurology. The use of ^{18}F -FDG PET/CT for oncologic brain imaging is promising but is also limited by the high glucose metabolism of the brain parenchyma, which can create false-negative findings and photon defects that can be confused for either malignant or benign lesions. Therefore, evaluation of the brain using ^{18}F -FDG PET/CT frequently requires the addition of MR imaging or ^{11}C -methionine PET/CT. Chapter 29 includes 16 cases of brain tumors—all excellent. However, it is unfortunate that there are no ^{11}C -methionine PET/CT images for case 5, of low-grade glioma. Even though this book deals primarily with ^{18}F -FDG PET/CT, the characteristics of malignancy under various other radiopharmaceuticals should also be covered. In pursuing targeting of images and therapy, we have to look to new modalities such as PET/MR imaging and SPECT/CT, as well as to new radiopharmaceuticals. Case 9 of chapter 29 is a superb example of a pseudo response.

Overall, this book will be a good guide for the nuclear medicine physician, and the authors are to be thanked for producing it. Early detection of metabolic changes is important and provides patients with a better chance of receiving personalized therapy.

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