Preface

Lung Cancer

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Editors

PET with fludeoxyglucose/computed tomography (FDG PET/CT) is widely used in pretreatment and posttreatment evaluations of various types of cancer, including non-small cell lung cancer. This issue of *PET Clinics* addresses the serious ongoing health problem of non-small cell lung cancer. The staging article summarizes the changes to TNM classification of lung cancer that have recently been announced. The lung neoplasms with low FDG avidity article expand on the problem posed by small nodules and those comprising predominantly ground glass opacities. It also introduces the concept that carcinoid tumors often have low FDG uptake. It is essential to recognize that the role of FDG imaging in these tumors is not tumor detection but assessment of the aggressiveness of the tumor, as the degree of FDG uptake in neuroendocrine tumors predicts growth rate. The prognosis article explores innovative assessment of the FDG signal in predicting outcomes of patients. It has long been known that the intensity of FDG uptake correlates with aggressiveness of a malignancy; the recent work examining the ACRIN data published this year is a dataset hard to ignore and shows that the metabolic tumor volume is prognostically important as would be expected. Intuitively, the greater the number of metabolically active cells, the greater the probability there will be cells harboring resistance to therapies. The Solomon article describes the impact of genomic analysis of lung

cancers and illustrates why a targetable mutation is often better treated with a specific agent than a relatively nonspecific cell cycle agent, such as “conventional” chemotherapy. This is not to say that cell cycle approaches are not without validity, as is illustrated in the MacManus article on radiotherapy.

Non-small cell lung cancer has significant heterogeneity, which may exist within the same histological subtype, in different tumor masses of the same person or even within the same tumor mass. In addition to FDG, numerous new PET tracers are under development to evaluate other aspects of characteristic cancer biology in addition to glucose metabolism. ⁶⁸Ga-somatostatin analogue PET imaging has significantly improved diagnosis of pulmonary carcinoid tumors versus other non-FDG-avid tumors and benign lesions. Most other new PET tracers targeting tumor proliferation, hypoxia, angiogenesis, or a specific signal pathway are under early development, with the potential to provide noninvasive and more specific information in tumor heterogeneity for better patient selection, treatment stratification, and therapeutic monitoring.

In terms of global health in decades ahead, the most challenging issue that faces us all is the rise of multidrug-resistant mycobacterium tuberculosis (TB). Increasing urbanization leads to greater frequency of person-to-person contact, especially as growing numbers of people utilize public transport. In addition, in today's global environment,

international travel and relocation of refugees is becoming more common. The symptoms and signs of TB closely overlap with those of cancer; imaging findings on CT can mimic each other, and as pointed out in the article in this issue, FDG findings are also overlapping. Given the number of cases of people previously exposed to TB and the potential for reactivation, due to either the tumor or its treatment, increasing numbers of difficult cases will present. It seems both a challenge and an opportunity, a call to arms if you will, for governmental bodies to fund research into imaging TB itself. It would be a huge advance if lesions due to TB could be reliably distinguished from malignancy.

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