Molecular imaging with positron emission tomography (PET) using tumour-seeking radiopharmaceuticals has gained wide acceptance in oncology with many clinical applications. The hybrid imaging modality PET/CT allows assessing molecular as well as morphologic information at the same time. Therefore, PET/CT represents an efficient tool for whole body staging and re-staging within one imaging modality. In oncology the glucose analogue (18)F-fluorodeoxyglucose (FDG) is the most widely used PET and PET/CT radiopharmaceutical in clinical routine. FDG PET and PET/CT have been used for staging and re-staging tumour patients in numerous studies. This chapter will discuss the use and the main indications of FDG PET and PET/CT in oncology with special emphasis on lung cancer, oesophageal cancer, colorectal cancer, head and neck cancer, lymphoma and breast cancer (among other tumour entities). A review of the current literature will be given with respect to primary diagnosis, staging and diagnosis of recurrent disease (local, lymph node and distant metastases). Besides its integral role in diagnosis, staging and re-staging of disease in oncology, there is increasing evidence that FDG PET and PET/CT can significantly contribute to therapy response assessment possibly influencing therapeutic management and treatment planning, to therapy tumour control and prediction of prognosis in oncologic patients, which will also be discussed in this chapter.
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