The Role of FDG PET/CT for the Diagnosis of Urothelial Cancer

Introduction and Objective: Fluorodeoxyglucose (FDG) positron emission tomography/computed tomography (PET/CT) is widely used for screening and staging of many malignant diseases. However, it is not thought to be useful for detecting urothelial cancer (UC) because of physiologic excretion of FDG to the urinary tract. This study investigated the value of FDG PET/CT for the management of urothelial cancer.
Materials and Methods: Between December 2009 and September 2011, 127 PET/CT studies were carried out for staging or detecting the recurrence of UC at single institute. Furosemide (20mg) was injected intravenously to wash out FDG from urinary tract, and delayed images were obtained after the administration. The findings of PET/CT were compared to those of histology, CT scan or MRI.
Results: Primary lesions: Sensitivity of PET/CT, CT and MRI for the detection of primary UC were 81.8% (18/22), 66.7% (14/21) and 87.5 % (7/8), respectively. Oral intake of water and intravenous injection of furosemide washed out FDG immediately from urinary tract effectively enough for detection of primary UC. CIS could not be detected by PET/CT because for the small tumor volume. Metastatic lesions: Sensitivity and specificity for the detection of metastatic lesions by PET/CT was 95% (21/22) and 98% (125/127), and those by CT was 89% (16/18) and 95% (130/137), respectively. PET/CT after radical cystectomy revealed local recurrence in two cases which CT could not detect. Therapeutic effects: SUVmax of the metastatic lesions remarkably decreased after successful chemotherapy or radiotherapy. On the other hand, SUVmax increased in the growing tumors or in the newly appeared lesions.
Conclusions: Ability of detecting UC can be improved by using FDG PET/CT with delayed images after administration of furosemide. PET/CT may be useful to detect primary and metastatic lesions of UC and to evaluate therapeutic effects in those sites.