Efficacy of ^{18}F-FDG and ^{11}C-Acetate PET in Characterizing Renal Cell Carcinoma: A Preliminary Experience

Introduction and Objective: We assessed the usefulness of positron emission tomography (PET) with ^{11}C-acetate (AC) and ^{18}F-fluorodeoxyglucose (FDG) in the evaluation of solid renal tumor.
Materials and Methods: A total of 23 patients (mean age 64.6 ± 11.6) with renal tumors were enrolled in this study. All patients underwent both AC PET scan and FDG PET scan, followed by nephrectomy or partial nephrectomy. Regional values of tracer uptake were evaluated by using standardized uptake value (SUV), a normalized value corrected by using injection dose and body weight.
Results: In total 24 renal tumors were evaluated. Twenty-two of 24 renal tumors were diagnosed as renal cell carcinoma (RCC) (clear cell carcinoma; 17, chromopobe cell carcinoma; 2, papillary cell carcinoma; 1, cystic renal cell carcinoma; 1 granular cell carcinoma; 1). Two tumors were diagnosed as benign tumor (metanephric adenoma; 1, oncocytoma; 1). AC PET findings were positive in 19 of these 22 RCCs (86%), while FDG PET was positive in only 5 (23%). Patients with renal cell carcinoma showed significantly greater mean SUV for AC (3.6 ± 1.5) than for FDG (2.3 ± 0.3) ($P < 0.001$). There was a positive correlation observed between FDG uptake and RCC tumor size. Both AC and FDG PET findings were negative for a case of metanephric adenoma. One case of oncocytoma showed positive AC PET and negative FDG PET findings.
Conclusions: AC PET demonstrated a pronounced increase in tracer uptake in RCC and higher sensitivity than FDG PET. These preliminary data show that ^{11}C-acetate is a possible PET tracer for the characterization of renal tumor.