Comparison between $^{68}$Ga-labelled PSMA and $^{18}$F-FDG PET/CT in the Diagnostic Value of Clear Cell Renal Cell Carcinoma

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**Background & Objectives**

Since the prostate-specific membrane antigen (PSMA) is highly expressed in the cell surface of the solid tumor microvasculature including renal cell carcinoma (RCC), PSMA PET/CT imaging has been a promising method for RCC diagnosis, especially for clear cell RCC (ccRCC) patients. $^{18}$F-FDG PET/CT of whole body imaging is widely used as a valuable method for evaluating metastatic or recurrent lesions in patients with RCC. The aim of this study was to compare the diagnostic value of ccRCC between $^{68}$Ga-labelled PSMA PET/CT and traditional $^{18}$F-FDG PET/CT.

**Methods**

Twelve patients with ccRCC were involved in the study in which 8 patients suffered from metastasis. All patients underwent both $^{68}$Ga-PSMA PET/CT and $^{18}$F-FDG PET/CT. SUV$_{max}$ was calculated for both primary RCCs and PET-positive metastatic lesions. We compared the SUV$_{max}$ of same lesions between $^{68}$Ga-PSMA PET/CT and $^{18}$F-FDG PET/CT images. Metastatic bone, lymph node and lung lesions as well as the primary tumor were evaluated respectively.

**Results**

Primary ccRCC lesions were found in 7 patients. The SUV$_{max}$ value of primary lesions in $^{68}$Ga-PSMA and $^{18}$F-FDG PET/CT were 15.34±3.82 and 8.62±3.11, respectively ($P=0.012$, Fig.1). $^{68}$Ga-PSMA was much more sensitive than $^{18}$F-FDG in bone (SUV$_{max}$: 35.64±5.78 vs. 3.52±1.63) and lymph node (SUV$_{max}$: 43.26±8.53 vs. 16.79±4.68) lesions. However, PSMA based PET/CT was not sensitive for lung metastatic lesions compared to $^{18}$F-FDG PET/CT (Fig.2).

**Figure 1**

Fig.1 Image of ccRCC primary lesions in $^{68}$Ga-PSMA and $^{18}$F-FDG PET/CT, respectively.

**Figure 2**

Fig.2 Image of bone, lymph nodes and lung metastatic lesions in $^{68}$Ga-PSMA and $^{18}$F-FDG PET/CT, respectively.