

عنوان مقاله:

Evaluation of the Effect of Tumor Position on Standardized Uptake Value Using Time-of-Flight Reconstruction and Point Spread Function

محل انتشار:

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خلاصه مقاله:

Objective(s): The present study was conducted to examine whether the standardized uptake value (SUV) may be affected by the spatial position of a lesion in the radial direction on positron emission tomography (PET) images, obtained via two methods based on time-of-flight (TOF) reconstruction and point spread function (PSF). Methods: A cylinder phantom with the sphere (30mm diameter), located in the center was used in this study. Fluorine-18 fluorodeoxyglucose (18F-FDG) concentrations of 5.3 kBq/ml and 21.2 kBq/ml were used for the background in the cylinder phantom and the central sphere respectively. By the use of TOF and PSF, SUVmax and SUVmean were determined while moving the phantom in a horizontal direction (X direction) from the center of field of view (FOV: 0 mm) at 50, 100, 150 and 200 mm positions, respectively. Furthermore, we examined 41 patients (23 male, 18 female, mean age: 68±11.2 years) with lymph node tumors, who had undergone 18F-FDG PET examinations. The distance of each lymph node from FOV center was measured, based on the clinical images. Results: As the distance of a lesion from the FOV center exceeded 100 mm, the value of SUVmax, which was obtained with the cylinder phantom, was overestimated, while SUVmean by TOF and/or PSF was underestimated. Based on the clinical examinations, the average volume of interest was 8.5 cm³. Concomitant use of PSF increased SUVmax and SUVmean by 27.9% and 2.8%, respectively. However, size of VOI and distance from the FOV center did not affect SUVmax or SUVmean in clinical examinations. Conclusion: The reliability of SUV quantification by TOF and/or PSF decreased, when the tumor was located at a 100 mm distance (or farther) from the center of FOV. In clinical examinations, if the lymph node was located within 100 mm distance from the center of FOV, SUV remained stable within a constantly increasing range by .use of both TOF and PSF. We conclude that, use of both TOF and PSF may be helpful

کلمات کلیدی:

standardized uptake value, time-of-flight, point-spread-function, 18F-FDG, tumor size

