Examination of PSF correction for improving image quality of PET

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Abstract

Spatial resolution in PET is known to be higher at the center of the field of view (FOV) than in the periphery. Last year we introduced Enhanced Recon Package software equipped with a programme to correct the spatial resolution in the periphery of the FOV. Here we examined how the PET/CT image quality, resolution, and quantification could be improved with this software using Derenzo phantom.

Method: According to the "Japanese guideline for the oncology FDG-PET/CT data acquisition protocol: synopsis of Version 2.0.", 6 MBq/ml FDG was poured into the Derenzo phantom and data acquisition was held dynamic; 1min*5, 5min*1, 10min*2, 30min*1, after transmission scan. We used six image reconstruction methods; FBP, OSEM, DRAMA, 3D-DRAMA, DRAMA with corrected PSF, and 3D-DRAMA with corrected PSF.

Result: Although we assumed that PET ROI counts with PSF correction would be higher than the counts without correction, image data obtained by 3D-DRAMA with PSF correction were less than those obtained without correction. For imaging small cancer in PET, it is considered to be preferable that DRAMA is used with PSF correction.