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Easy detection of tumor in oncologic whole-body PET by projection reconstruction images with maximum intensity projection algorithm

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Whole-body PET scanning for an oncology study produces a large number of transaxial images by data acquisition over multiple bed positions. The sagittal and coronal reformatted images are often used for better understanding of radioisotope distribution. We reduced the number of PET images by calculating projection images and evaluated the merit of additional data processing for the visualization and detection of tumors. After reconstructing whole-body ^{18}F-FDG PET images (6–8 bed positions) of eight cancer patients, antero-posterior and lateral projection images were calculated by the maximum intensity projection (MIP) algorithm, the standard deviation projection (SD) algorithm and the summed voxel projection (SUM) algorithm. The projection images were compared with 2D whole-body images for visualizing foci. The focal uptakes of various positions in original whole-body PET data (294–392 transaxial images) were visualized on only two MIP reformatted images when superimposition of hot spots did not occur. Even if one hot spot was superimposed over the other hot spot, we could recognize the existence of at least one focus and determine the true positions of the hot spots from corresponding transaxial images. The SD image was found inferior for showing a contrast of small foci to the corresponding MIP images in the neck, mediastinum and abdomen. The SUM image failed to visualize many metastatic lesions. MIP is a promising technique for the easy preliminary assessment of tumor distribution in oncologic whole-body PET study.

Key words: whole-body PET, 3D display, maximum intensity projection, cancer study, FDG