AbstractID: 11111 Title: Computer-aided Diagnostic System for FDG-PET Scans by Use of a Statistical Model from Normal Cases

Purpose: Our purpose in this study was to develop a new method for quantitative analysis of SUV of FDG-PET scans to examine for normality by use of a score which is based on the range of SUV in normal cases. **Methods and Materials:** Our scheme consisted of two approaches, which included the construction of a normal model and the determination of the SUV score as an index for the abnormality of an FDG-PET scan. To construct the normal model, all of the normal scans were registered into one model which indicated the normal range of SUV at all voxels. First, a large region from the shoulder to the bladder was deformed to fit the model. Second, the liver region was registered into the one after the upper and lower planes were obtained by use of an automated recognition technique based on a three-dimensional segmentation approach. Finally, the body surface was deformed into the model by use of a thin-plate-spline technique. In order to determine the abnormality of SUV, we obtained a score based on the 3D visualization of the deviations derived from a simple statistical approach. **Results:** We employed 243 (male: 143, female: 100) normal cases to determine the normal model and also 63 abnormal cases with 73 cancer lesions. The scores for the normal cases in all voxels were in the range from zero to plus/minus 2 SD. Most of the scores for the abnormal regions associated with cancer and metastasis were larger than the upper limit of the model. With the body registration method, the temporal subtraction images for SUV were also obtained by use of the previous and current images. **Conclusions:** Our computerized scheme would be useful for visualization and detection of subtle lesions on FDG-PET scans even when the SUV may not show an abnormality clearly.