

## Development of quantitative analysis method for stereotactic brain image: Assessment of reduced accumulation in extent and severity using anatomical segmentation

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Through visual assessment by three-dimensional (3D) brain image analysis methods using stereotactic brain coordinates system, such as three-dimensional stereotactic surface projections and statistical parametric mapping, it is difficult to quantitatively assess anatomical information and the range of extent of an abnormal region. In this study, we devised a method to quantitatively assess local abnormal findings by segmenting a brain map according to anatomical structure. Through quantitative local abnormality assessment using this method, we studied the characteristics of distribution of reduced blood flow in cases with dementia of the Alzheimer type (DAT). Using twenty-five cases with DAT (mean age, 68.9 years old), all of whom were diagnosed as probable Alzheimer's disease based on NINCDS-ADRDA, we collected I-123 iodoamphetamine SPECT data. A 3D brain map using the 3D-SSP program was compared with the data of 20 cases in the control group, who age-matched the subject cases. To study local abnormalities on the 3D images, we divided the whole brain into 24 segments based on anatomical classification. We assessed the extent of an abnormal region in each segment (rate of the coordinates with a Z-value that exceeds the threshold value, in all coordinates within a segment), and severity (average Z-value of the coordinates with a Z-value that exceeds the threshold value). This method clarified orientation and expansion of reduced accumulation, through classifying stereotactic brain coordinates according to the anatomical structure. This method was considered useful for quantitatively grasping distribution abnormalities in the brain and changes in abnormality distribution.

**Key words:** three-dimensional stereotactic surface projections, I-123 iodoamphetamine, Talairach atlas, dementia with Alzheimer type