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A comparison of Tc-99m HMPAO brain SPECT images of young and aged normal individuals

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The purpose of this study was to examine the normal distribution patterns of ^{99m}Tc-HMPAO (HMPAO) in young and aged normal individuals and to clarify differences between the distribution patterns of the two groups by means of an anatomical standardization technique.

The tracer distribution was measured with HMPAO and SPECT in 18 normal subjects; age range 20–81 yrs. SPECT images were globally normalized by averaging whole brain radioactivity counts to 100 counts/voxel. The SPECT images for each subject were transformed into the standard brain anatomy by means of a computerized brain atlas, together with each subject's CT images. Mean and SD images for young (28.8 ± 6.4 yrs) and aged groups (62.3 ± 10.2 yrs) were then calculated on a voxel-by-voxel basis.

Statistically significant differences between young and aged groups were observed in the relative tracer distribution patterns. In the aged group, relative decreases were found in the cortical areas of the frontal and temporal lobes, limbic areas and basal ganglia regions.

The results, as visualized changes in tracer distribution patterns with aging, may contribute to more accurate clinical diagnosis.

Key words: SPECT, aging, anatomical standardization