ALZHEIMER DISEASE AND FRONTAL LOBE DEMENTIA: DIFFERENTIAL rCBF DISTRIBUTION AND MAPPING BY 99Tc^m-HMPAO SPECT.

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Objectives: The aim of the study was to investigate the pathological regional cerebral blood flow (rCBF) distribution in Alzheimer Disease (AD) and Frontal Lobe Dementia (FLD) as assessed by 99Tc^m-HMPAO Single Photon Emission Computed Tomography (SPECT). The additional diagnostic information that is achieved by visual and statistical evaluation comparing the pathological standardized data sets to the one of normal individuals is also discussed.

Methods: 17 probable AD, fulfilling the NINCDS-ADRDA criteria, 7 FLD (fulfilling the Swedish Consensus Criteria for FLD) and 19 normal subjects (NOR) were examined by 99Tc^m-HMPAO SPECT. The relative uptake in all cerebral lobes, hippocampus, thalamus and basal ganglia was evaluated by a Computerized Brain Atlas. Subtraction images were created by subtracting the pathological data sets from the NOR one. Statistical analysis was carried out by ANCOVA, covariating for age.

Results: rCBF in AD patients differed significantly from the normal group in all lobes ($p = 0.001$) except in the frontal and occipital ones. The same pattern was observed in FLD patients with the exclusion of parietal lobe. Subtracting the AD and FLD rCBF images from those of the normal control group demonstrated a clear rCBF reduction in the temporo-parietal lobes and frontal lobes, respectively. A corresponding reduction of rCBF was also observed in nc caudatus in AD and FLD ($p = 0.025$ and $p = 0.001$ respectively) and anterior cingulate cortex in FLD ($p = 0.001$).

Conclusions: Standardising SPECT images in a common space, and subtracting patients flow data from those of a control group, facilitates the visual interpretation. In this study, we confirm the typical rCBF decrease in temporo-parietal cortex in AD and in fronto-temporal cortex in FLD. Furthermore, we have identified nc caudatus and anterior cingulate cortex as possible target for rCBF decrease in both AD and FLD.

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