

## Decreased cerebral blood flow and prognosis of Alzheimer's disease: A multicenter HMPAO-SPECT study

Tsunehiko NISHIMURA,\*<sup>1</sup> Kazuo HASHIKAWA,\*<sup>2</sup> Hidenao FUKUYAMA,\*<sup>2</sup> Takao KUBOTA,\*<sup>1</sup> Shin KITAMURA,\*<sup>3</sup>  
Hiroshi MATSUDA,\*<sup>4</sup> Haruo HANYU,\*<sup>5</sup> Hidehiko NABATAME,\*<sup>6</sup> Naohiko OKU,\*<sup>7</sup> Hirotaka TANABE,\*<sup>8</sup>  
Yasuo KUWABARA,\*<sup>9</sup> Seishi JINNOUCHI\*<sup>10</sup> and Atsushi KUBO\*<sup>11</sup>

\*<sup>1</sup>Department of Radiology, Graduate School of Medical Science, Kyoto Prefectural University of Medicine

\*<sup>2</sup>Department of Functional Brain Imaging, Human Brain Research Center, Graduate School of Medicine, Kyoto University

\*<sup>3</sup>Department of Internal Medicine, Nippon Medical School Second Hospital

\*<sup>4</sup>Department of Radiology, National Center Hospital for Mental, Nervous, and Muscular Disorders,  
National Center of Neurology and Psychiatry

\*<sup>5</sup>Department of Geriatric Medicine, Tokyo Medical University

\*<sup>6</sup>Department of Neurology, Shiga Medical Center for Adults

\*<sup>7</sup>Department of Nuclear Medicine and Tracer Kinetics, Graduate School of Medicine, Osaka University

\*<sup>8</sup>Department of Neuropsychiatry, Ehime University School of Medicine

\*<sup>9</sup>Department of Clinical Radiology, Graduate School of Medical Sciences, Kyushu University

\*<sup>10</sup>Department of Radiology, Miyazaki Medical College

\*<sup>11</sup>Department of Radiology, Keio University School of Medicine

**Purpose:** To determine the usefulness of brain perfusion SPECT for evaluating the severity and progression of Alzheimer's disease (AD). **Methods:** Eighty-four AD patients were included. At entry, <sup>99m</sup>Tc-HMPAO-SPECT, the Mini Mental State Examination (MMSE), Mental Function Impairment Scale (MENFIS), and the Raven Colored Progression Matrix (RCPM) were performed for all 84 patients. During the follow-up periods, two individual MMSE evaluations in 34 patients, two MENFIS evaluations in 30 patients, and two RCPM evaluations in 20 patients were performed. Based on the regions of decreased cerebral blood flow demonstrated on 3D-SSP images of SPECT, the cases were classified as type A (no decrease), type B (decreased blood flow in the parietal or temporal lobe), type C (decreased blood flow in the frontal lobe and parietal or temporal lobe), type Pc (decreased blood flow in posterior cingulate gyrus only), and "other types". The types of decreased blood flow, scores on neuropsychological evaluations, and symptom progression were analyzed. **Results:** The MENFIS, MMSE, and RCPM scores were poorest in type C patients at entry. The degree of decrease of these scores during the follow-up periods was also greatest in type C. The greatest difference between patients with and without rapid progression in SPECT data of the mild AD patients (MMSE score  $\geq 24$ ) was in the frontal lobe. **Conclusion:** Decreased blood flow in the frontal lobe of AD patients is correlated not only with reduced cognitive function at the time of the evaluation but with rapid progression in the subsequent clinical course.

**Key words:** 3D-SSP, Alzheimer's disease, <sup>99m</sup>Tc-HMPAO SPECT