

## Clinical significance of reduced cerebral metabolism in multiple sclerosis: A combined PET and MRI study

Xiayan SUN,\* Makoto TANAKA,\* Susumu KONDO,\*  
Koichi OKAMOTO\* and Shunsaku HIRAI\*\*

*\*Department of Neurology, Gunma University School of Medicine*

*\*\*Tokyo Metropolitan Neurological Hospital*

Magnetic resonance imaging (MRI) in patients with multiple sclerosis (MS) has provided major insights into the disease's natural history, and many studies have focussed on possible correlations between MRI findings and the clinical manifestations of MS. In contrast, there are few reports on possible relationships between functional imaging data and cognitive function. The present study assessed the relationship between clinical presentation and combined anatomical and functional imaging data in MS. Twenty patients with definite MS underwent MRI and positron emission tomography (PET) to evaluate cerebral blood flow (rCBF) and oxygen metabolism (rCMRO<sub>2</sub>). The relationships between these neuroimaging findings and clinical data, including the Expanded Disability Status Scale (EDSS), Mini-mental status scale, Hasegawa Dementia Scale and relapse time, were evaluated with Spearman's rank correlation coefficients. A general reduction in rCBF and rCMRO<sub>2</sub> in the gray and white matter were found in the MS patients. EDSS was correlated with the number and size of the lesions on MRI and was negatively correlated with rCMRO<sub>2</sub>. A correlation between the decrease in rCMRO<sub>2</sub> and the level of cognitive impairment was also found. The severity of cerebral hypometabolism was also related to the number of relapses. Morphological and functional findings obtained by MRI and PET are closely related to the clinical status in MS. Our results suggest that measurement of cerebral metabolism in MS has the potential to be an objective marker for monitoring disease activity and to provide prognostic information.

**Key words:** multiple sclerosis, cerebral oxygen metabolism, magnetic resonance imaging, hypometabolism, prognosis