

## Crossed cerebellar tracer uptake on acute-stage $^{123}\text{I}$ -iomazenil SPECT imaging predicts 3-month functional outcome in patients with non-fatal hypertensive putaminal or thalamic hemorrhage

Daigo Kojima<sup>1</sup>, Nobukazu Komoribayashi<sup>1</sup>, Shinichi Omama<sup>1</sup>,  
Kohki Oikawa<sup>1</sup>, Shunrou Fujiwara<sup>1</sup>, Masakazu Kobayashi<sup>1</sup>,  
Yoshitaka Kubo<sup>1</sup>, Kazunori Terasaki<sup>2</sup> and Kuniaki Ogasawara<sup>1</sup>

<sup>1</sup>Department of Neurosurgery, Iwate Medical University  
19-1 Uchimaru, Morioka, 020-8505 Japan

<sup>2</sup>Cyclotron Research Center, Iwate Medical University  
348-58 Tomegamori, Takizawa, Iwate 020-0603, Japan

### Abstract

**Purpose:** Whereas single-photon emission computed tomography (SPECT) images obtained 180 min after administration of  $^{123}\text{I}$ -iomazenil (late images) are proportional to the distribution of central benzodiazepine receptor binding potential, SPECT images obtained within 30 min after  $^{123}\text{I}$ -iomazenil administration (early images) correlate with regional brain perfusion. The aim of the present study was to determine whether crossed cerebellar tracer uptake on acute-stage  $^{123}\text{I}$ -iomazenil SPECT imaging predicts 3-month functional outcome in patients with non-fatal hypertensive putaminal or thalamic hemorrhage. **Methods:** Forty-six patients underwent early and late SPECT imaging with  $^{123}\text{I}$ -iomazenil within 7 days after the onset of hemorrhage. A region of interest (ROI) was automatically placed in the bilateral cerebellar hemispheres using a three-dimensional stereotaxic ROI template, and the ratio of the value in the cerebellar hemisphere contralateral to the affected side to that in the ipsilateral cerebellar hemisphere (ARcbl) were calculated in each patient. Each patient's physical function was measured using the modified Rankin scale score (mRS) 3 months after onset. **Results:** ARcbl on early ( $\rho = -0.511$ ;  $P = 0.0003$ ) and late ( $\rho = -0.714$ ;  $P < 0.0001$ ) images correlated with the mRS 3 months after the onset of hemorrhage. Multivariate analysis showed that only a low ARcbl in late images was significantly associated with a poor functional outcome (mRS  $\geq 3$  at 3 months after onset) (95% confidence intervals, 0.001 to 0.003;  $P = 0.0212$ ). **Conclusion:** Crossed cerebellar tracer uptake on acute-stage  $^{123}\text{I}$ -iomazenil SPECT imaging predicts 3-month functional outcome in patients with non-fatal hypertensive putaminal or thalamic hemorrhage.