

Diastolic blood pressure influences cerebrovascular reactivity measured by means of ^{123}I -iodoamphetamine brain single photon emission computed tomography in medically treated patients with occlusive carotid or middle cerebral artery disease

Yasuyuki KIMURA,* Naohiko OKU,* Katsufumi KAJIMOTO,* Hiroki KATO,* Makiko Rai TANAKA,* Masashi TAKASAWA,* Masao IMAIZUMI,* Kazuo KITAGAWA,** Masatsugu HORI** and Jun HATAZAWA*

*Department of Nuclear Medicine and Tracer Kinetics, Osaka University Graduate School of Medicine

**Department of Cardiovascular Medicine, Osaka University Graduate School of Medicine

Objective: Impaired cerebrovascular reactivity (CVR) to vasodilating agents is a predictor of the onset and prognosis of ischemic stroke. It is realized that the CVR improves or worsens when measured periodically during the clinical course in medically treated patients with occlusive cerebrovascular disease. In these patients, we investigated the possible relationship between the interval change in CVR and that in systemic blood pressure (BP). **Methods:** Forty-two patients (14 females and 28 males, mean age \pm SD: 65.3 ± 8.8 years) with severe stenosis or occlusion of the common carotid, internal carotid, or middle cerebral arteries repeatedly underwent single photon emission computed tomography (SPECT) studies using ^{123}I -iodoamphetamine to measure cerebral blood flow (CBF) distribution and CVR at a more-than-6-month interval (mean \pm SD: 18.5 ± 8.8 months). The CVR was separately estimated in cerebral hemispheres ipsilateral and contralateral to the most severe vascular lesion as the % increase in CBF after acetazolamide loading to CBF at rest. Systemic BP was measured four times at enrollment and the follow-up SPECT studies during resting and acetazolamide loading. Average BP at each SPECT study was an average of BP measurements during resting and acetazolamide loading. Interval changes in CVR were correlated with those in average systolic BP, average diastolic BP, and average mean arterial BP. **Results:** The interval changes in CVR were significantly correlated with those in average diastolic BP in the ipsilateral hemisphere ($y = 0.71x + 1.43$, $r^2 = 0.11$, $p < 0.05$) and in the contralateral hemisphere ($y = 0.88x - 0.46$, $r^2 = 0.16$, $p < 0.05$) but not with those in average systolic BP or average mean arterial BP. **Conclusions:** In medically treated patients with steno-occlusive carotid artery or middle cerebral artery lesions, the interval change in CVR to acetazolamide by means of ^{123}I -IMP SPECT was influenced by the diastolic BP at the SPECT studies. Monitoring diastolic BP is important to evaluate interval change in CVR.

Key words: blood pressure; cerebral blood flow; autoregulation; carotid artery disease; tomography, emission computed, single-photon