Blood Pressure Control in Hypertensive Patients With a History of Stroke

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The targets for lowering blood pressure (BP) in hypertensive stroke patients remain unclear. We assessed the current status of BP control in hypertensive patients with a history of stroke, investigating 413 hypertensive patients (age range, 19 to 93; mean age, 62 ± 12 years) who visited the hypertension and stroke clinic at Kyushu University Hospital. We compared the clinical characteristics of these hypertensive patients with a history of stroke, including brain infarction, transient ischemic attack, and brain hemorrhage (age range, 29-86; mean age, 66 ± 12 years; n = 95) with those of patients without such a history (age range, 19-93; mean age, 61 ± 12 years; n = 318). Clinic BP was measured by physicians with a mercury sphygmomanometer, and the averaged BP determined at 2 occasions in 2002 was used for analysis. Systolic BP was similar among the patients with and without a history of stroke (134 ± 15 vs 137 ± 14 mm Hg; P = not significant), but diastolic BP was significantly lower in patients with stroke than in those without stroke (76 ± 10 vs 82 ± 10 mm Hg; $P < .05$). When strict BP control was defined as <130/85 mm Hg, the rate of strict BP control was higher in the stroke patients than in those without stroke (35.8% vs 19.8%; $P < .01$). The average number of antihypertensive drug classes used was similar in the 2 groups (1.7 ± 0.9 and 1.8 ± 1.0, respectively). Calcium antagonists were the most frequently used drugs in both groups. Diuretics and β-blockers were prescribed less frequently to the patient with ischemic stroke than to those without stroke. BP levels were lower in the patients with brain hemorrhage than in those with lacunar and atherothrombotic infarction. In our outpatient clinic, BP levels were lower in the stroke patients than in the patients without stroke, which may reflect physicians' awareness of the importance of strict BP control in stroke patients, as has been suggested by several recent clinical intervention trials. **Key Words:** Blood pressure control—hypertensive patients—stroke—clinical intervention trials.

Hypertension is one of the most important risk factors for stroke,[1,2] and antihypertensive therapy is known to reduce stroke morbidity and mortality.[2] Among those who survive a stroke or a transient ischemic attack (TIA), the risk of recurrent stroke is very high.[3,4] The contribution of high blood pressure (BP) to recurrent stroke has been supported in some,[5,6] but not all,[7,8] community studies. Because a J-shaped relation between BP and recurrent stroke rate has been observed among patients with a recent history of ischemic stroke,[9] an extreme

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reduction in BP might also contribute to recurrent stroke by reducing cerebral blood flow. Recent clinical intervention trials have demonstrated the importance of strict BP control in the prevention of recurrent stroke;[10] however, the target for lowering BP to prevent recurrent stroke remains a matter of debate. In the present study, we assessed the current status of BP control in hypertensive patients with a history of stroke.

Patients and Methods

We investigated 413 hypertensive patients who had been followed at a hypertension and stroke outpatient clinic in Kyushu University Hospital in 2002. Hypertension was defined as systolic blood pressure (SBP) ≥140 mm Hg and/or diastolic blood pressure (DBP) ≥90 mm Hg. In addition, all patients on antihypertensive medication were considered to have hypertension. Stroke, including brain infarction, TIA, and brain hemorrhage, was diagnosed according to patient history, neurologic examination, and radiologic examination, including brain computed tomography or magnetic resonance imaging. Patients who had a stroke within the preceding 3 months were excluded. The levels of BP as well as other clinical characteristics were compared in the hypertensive patients with a history of stroke and those with no history of stroke. The presence of diabetes mellitus (DM), habitual alcohol intake, and smoking, as well as the use of antihypertensive, antiplatelet, or anticoagulant drugs were compared. DM was defined as fasting plasma glucose level ≥126 mg/dL or plasma glucose level ≥200 mg/dL at any time, or HbA1c ≥6.5%, or the current use of hypoglycemic agents. Serum creatinine and total cholesterol levels were also determined. BP was measured with patients in the sitting position by physicians using a mercury sphygmomanometer. The averaged BP determined at 2 occasions between March and May 2002 was used for analysis. "Good control" was defined as SBP of <140 mm Hg and diastolic blood pressure DBP of <90 mm Hg. "Strict control" was defined as SBP of <130 mm Hg and DBP of <85 mm Hg, based on the BP control guidelines for young and middle-aged patients issued by the Japanese Society of Hypertension in 2000. Stroke patients were divided into 6 groups: TIA, lacunar infarction, atherothrombotic infarction, cardioembolic infarction, brain hemorrhage, and others. Patients who had stroke of unknown etiology or had several subtypes of stroke were placed in the others group. BP control was also assessed in the lacunar infarction, atherothrombotic infarction, and brain hemorrhage groups.

Statistical Analysis

Values are presented as mean ± standard deviation. The differences in the variables between 2 groups and among 3 or more groups were statistically compared using the Student *t*-test and 1-way ANOVA, respectively. A χ^2 test was also used when appropriate. *P* values <.05 were considered significant.

Table 1. *Characteristics of hypertensive patients with and without stroke*

	Without stroke	With stroke
Number of patients	318	95
Age (years)	61 ± 12	66 ± 12*
Male (%)	48	61
Systolic blood pressure (mm Hg)	137 ± 14	134 ± 15
Diastolic blood pressure (mm Hg)	82 ± 10	76 ± 10*
Diabetes mellitus (%)	11.9	17.9
Habitual alcohol drinking (%)	38.0	45.5
Smoking habit (%)	15.8	24.4
Serum creatinine (mg/dL)	0.9 ± 0.6	1.0 ± 0.8
Serum total cholesterol (mg/dL)	205 ± 32	198 ± 35*
Average number of antihypertensive drug classes used	1.8 ± 1.0	1.7 ± 0.9
Antiplatelets and anticoagulants (%)	14.2	64.2**

Values are means ± standard deviations.
*$P < .05$; **$P < .01$ versus without.

Results

The 413 hypertensive patients visiting the hypertension and stroke clinic in Kyushu University Hospital were divided into 2 groups: patients with a history of stroke (n = 95) and those without a history of stroke (n = 318). Patient characteristics are given in Table 1. The patients with a history of stroke were significantly older than the patients without a history of stroke. Although the average SBP was similar between the patients with and without a history of stroke, the average DBP was significantly lower in the patients with a history of stroke. The number of antihypertensive drug classes used in treating these patients was similar in the 2 groups, although antiplatelet or anticoagulant drugs were prescribed more frequently in the patients with a history of stroke. These differences in characteristics were similar when the patients with a history of brain hemorrhage were excluded and the comparison was made between the patients with and without ischemic stroke. Figure 1 shows the status of BP control in the patients with and without stroke. The rate of strict BP control (<130/85 mm Hg) was greater in the stroke patients than in those without a history of stroke (35.8% vs 19.8 %; $P < .01$). The antihypertensive drugs used in the patients with and without ischemic stroke are shown