

*Editorial Comment*

## Control of Morning Blood Pressure: The Best Preventive Strategy against Stroke

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Stroke is a major public-health problem, especially in Japan. Although many factors contribute to an increased risk of stroke, hypertension has the strongest predictive value. Risk of stroke is intimately related to blood pressure (BP) without a threshold for adults from middle age to elderly (1). In the Perindopril Protection against Recurrent Stroke Study (PROGRESS) (2), BP reduction effectively prevented recurrence of stroke even in subjects with normal BP. In clinical practice, however, strict BP control could not always prevent stroke in hypertensive patients. This finding is not surprising, since there are numerous other mechanisms that also cause stroke. However, there is more to it than that. Control of clinic BP has recently been shown to be an incomplete antihypertensive therapy, since the development of accurate automatic devices proves that control of clinic BP was insufficient.

Ambulatory blood pressure monitoring (ABPM) devices can provide BP information throughout the day, including daytime, nighttime, and early morning readings. BP is usually high during waking and low during sleeping. It has been shown that the 24-h average of ambulatory BP is more closely correlated with hypertensive target organ damage such as stroke than the clinic BP (3). Moreover, ambulatory BP more accurately predicts the occurrence of cardiovascular diseases than clinic BP, especially in populations of elderly hypertensives, who often show abnormal circadian BP changes (4).

Recently, a relation was noted morning hypertension and cardiovascular events that occurred in the morning, although it remains unclear which BP-monitoring times (*e.g.*, morning vs. evening) are the most powerful predictors of stroke events. However, in a recent report in *Hypertension Research*, Kario

*et al.* clearly demonstrated that morning hypertension was the strongest independent risk factor for stroke in elderly hypertensive patients (5). Thus, morning BP should be a focus in the treatment of hypertension in elderly patients. Although there is no strict definition of morning hypertension, the condition may be provisionally defined as hypertension specifically observed shortly after awakening.

The 2004 edition of the Japanese Society of Hypertension Guidelines for the Management of Hypertension (JSH 2004) (6) has reported that “In terms of the absolute values observed by the home BP measurement, a condition in which the home BP in the morning is 135/85 mmHg or higher may be regarded as morning hypertension, but the BP measured in the morning must be higher than that measured in the evening to fulfill the criterion, *i.e.*, the BP is high specifically in the morning.” Despite this definition by the JSH 2004, morning BP was usually evaluated by automatic ABPM devices, which sometimes interfere with the continuity of the examinee’s sleep, disturb the examinee’s work, and create extra stress. Although the self-measured BP at home may be less accurate compared with ambulatory BP, its usefulness has been reported by some investigators (7–10). Therefore, practicing internists must be eager to know whether self-measured morning BP is also useful as a predictor of stroke risk and should be controlled strictly to prevent cardiovascular disease, especially stroke. In order to resolve whether strict control of self-measured morning BP can reduce hypertensive organ damage, The Japan Morning Surge-1 (JMS-1) Study has been started (11). There is also need of a precise evaluation of the advantages and/or disadvantages between morning

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BP measured by an automatic ABPM device and morning BP measured by the patients themselves. Such an evaluation would allow a practicing internist to use either method as the situation demands.

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