Editorial Comment

Hypertension and Risk Stratification

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Japan has become a super-aged society (the percentage of the elderly $\geq 20\%$ of the population), and medicine is shifting to "preventive medicine" for the prevention of severe cardiovascular diseases to use limited medical resources effectively. In particular, the specific health checkup for Japanese aged 40–74 years, which was initiated in April 2008, is considered to be a large-scale intervention study aiming at preventing cardiovascular diseases and has attracted global attention. The specific health checkup focuses on the early detection of metabolic syndrome. The diagnostic criteria of this syndrome (*1*) were proposed not only by introducing visceral obesity as a new concept, but also by paying attention to the clustering of cardiovascular risks before the development of disease. The blood pressure criterion for metabolic syndrome is equal to or more than 130/85 mmHg, which corresponds to a high-normal value according to the Japanese Society of Hypertension Guidelines for the Management of Hypertension (JSH 2004) (*2*). The cluster of blood pressure higher than this criterion, visceral obesity, and lipid metabolism abnormality synergistically increases the risk of cardiovascular disease. As shown in Fig. 1, the Seventh Report of the Joint National Committee on Prevention (JNC-7) (*3*) in the U.S. abolished risk stratification and simplified the criteria so that treatment principles could be determined based on blood pressure alone. In contrast, the European Society of Hypertension (ESH)/the European Society of Cardiology (ESC) Guidelines for the Management of Arterial Hypertension (*4*) classified the non-hypertensive group into two (normal, high-normal) groups, and proposed treatment based on detailed risk stratification. In the guidelines in Japan or China (*5*), the risk stratification in the hypertensive group is similar to that in the ESH/ESC guidelines, but risk assessment in the non-hyper-

tensive group is described only in the text. The proposal of a risk stratification system for the development of strokes or transient ischemic attack (TIA) by Asayama *et al.* in this issue of *Hypertension Research* (*6*) showed a classification of blood pressure into 6 grades from optimal to Stage 3, that of risk factors into 3 strata, and that of severity assessment into 4 grades (no–high). The unique point in their proposal was the classification of non-hypertensive group into 3 grades. The risk stratification in their paper was similar to that of the ESH/ESC guidelines, but differed in that a very high risk group was not established because clinical intervention methods are similar between high and very high risk groups, and an optimal blood pressure group was established. In Fig. 1, for the comparison of evaluation based on casual blood pressures as in other guidelines, we presented the table in Fig. 2C of Asayama *et al.* (*6*), showing relatively well-separated casual blood pressures after minor adjustments based on absolute risks. The unique point of Asayama *et al.*'s proposal that differs from other guidelines is that the Stage 2 group with 1–2 risk factors (* in the figure) was classified as high severity. If classification based on home blood pressures effective for predicting prognosis as a characteristic of this paper is adopted, the risk stratification shown in Fig. 2B of Asayama *et al.* (*6*) is excellent. In this stratification, this group (* in the figure) is classified as moderate severity, as is observed in other guidelines.

The other important findings in Asayama *et al.* (*6*) were an increased stroke risk even in the high-normal and normal blood pressure groups compared with the optimal blood pressure group and a definite increase in the relative risk of the presence of multiple risk factors even in the same blood pressure group. The only difference between Fig. 2A and B of

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Ohasama Study	Optimal	Normal	High normal	Stage 1 HT	Stage 2 HT	Stage 3 HT
No other risk factors	No	No	No	Low	Moderate	High
1–2 risk factors	No	Low	Moderate	Moderate	High*	High
3 or more risk factors, DM or PHCVD	Moderate	Moderate**	High	High	High	High

JSH 2004				Mild HT	Moderate HT	Severe HT
No other risk factors				Low	Moderate	High
1–2 risk factors				Moderate	Moderate	High
3 or more risk factors, TOD, DM or CVD				High	High	High

ESH/ESC 2007		Normal	High normal	Grade 1 HT	Grade 2 HT	Grade 3 HT
No other risk factors		Average	Average	Low	Moderate	High
1–2 risk factors		Low	Low	Moderate	Moderate	Very high
3 or more risk factors, MS, OD or DM		Moderate	High	High	High	Very high
Establishd CV or renal disease		Very high	Very high	Very high	Very high	Very high

JNC-7	Normal	Prehypertension		Stage 1 HT	Stage 2 HT	

Chinese Guideline 2005				Grade 1 HT	Grade 2 HT	Grade 3 HT
No other risk factors				Low	Moderate	High
1–2 risk factors				Moderate	Moderate	Very high
3 or more risk factors, DM or PHCVD				High	High	Very high
ACC				Very high	Very high	Very high

Fig. 1. *Comparison between risk stratification in the guidelines in each country and that in Asayama et al. (Fig. 2C) (6). *Classified as Moderate in Fig. 2B and **classified as High in Fig. 2A in Asayama et al. (6). HT, hypertension; DM, diabetes mellitus; PHCVD, past history of cardiovascular disease; TOD, target organ damage; MS, metabolic syndrome; OD, subclinical organ damage; CV, cardiovascular; ACC, associated clinical conditions.*

Asayama *et al*. (*6*) is whether the normal blood pressure group with ≥3 risk factors and a history of diabetes mellitus or cardiovascular disease (** in the figure) is classified as moderate or high severity. The ability of the severity assessment to predict survival based on home blood pressure is greater when this group is classified as moderate severity. These delicate considerations regarding classification by stratification not only suggest the importance of risk stratification in non-hypertensive groups, which has rarely been evaluated before, but are also valuable in terms of preventive medicine.

There are some cautionary items concerning Asayama *et al*. (*6*) is understood. One is that the diseases for the evaluation of relative risk were "stroke or TIA," which slightly differs from various hypertension guidelines aiming at preventing "cerebro- and cardiovascular diseases" as the final goal. The second cautionary item is that the number of subjects with Stage 2 or 3 hypertension is small due to risk assessment in the general population in Ohasama Town, and, therefore, the statistical power is slightly poorer. The stratification method in this study was similar to that in the ESH/ESC and JSH 2004 guidelines but markedly differed from the severity assessment into 6 grades after stratification of the 10-year relative risks of death due to cardiovascular diseases according to race, age, sex, the presence or absence of diabetes mellitus, the cholesterol level, or blood pressure, which is observed in the risk assessment chart shown by the NIPPON DATA80 (*7*) and the risk assessment chart for the prevention of cardiovascular disease proposed by the WHO (*8*).

Further discussion may be necessary on the reference values of home blood pressure. However, we are certain that more attention will be paid to classification by risk stratification using home blood pressure as an index and the importance of risk assessment in non-hypertensive people.

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