Is Vascular Morning Blood Pressure Surge in the Elderly Resistant to Antihypertensives and More Risky?

To the Editor:

I have read the recent article on morning surge in blood pressure (BP; MSBP) in the Progetto Ipertensione Umbria Monitoraggio Ambulatoriale (PIUMA) Study.1 Surprisingly, the suppressed MSBP was a risk factor for poor long-term prognosis of cardiovascular disease (CVD) in hypertensives. In previous studies, including our Jichi Medical University Ambulatory Blood Pressure Monitoring (JMUABPM) Study and the International Database of Ambulatory Blood Pressure in Relation to Cardiovascular Outcome, exaggerated MSBP was found to be an independent risk factor of CVD.2,3 Why were these results so different? I would like to address this question from 3 standpoints.

Elderly MSBP

MSBP may be more risky in elderly than in younger individuals (Table). The mean age of the PIUMA Study subjects was much younger than that of the JMUABPM subjects (50.8 versus 72.2 years). The impact of BP variability on CVD would be quite different among the different age groups, as well as among the different severities of concomitant vascular disease. Advancing age increases stiffness of the large artery and remodeling of the small artery and impairs autoregulation of the blood flow of the target organ. This cardiovascular remodeling augments the amplitude of BP variability and the impact of BP variability on target organ damage to trigger cardiovascular events. In fact, advancing age is the most powerful determinant of exaggerated MSBP.2,3

Distribution and Threshold of MSBP

The adequate MSBP as a part of normal circadian rhythm of BP is the physiological, but an exaggerated MSBP that was more than the top 10th percentile would be pathological. Thus, the association between MSBP and CVD would not be linear, but rather would be curvilinear around the median MSBP in the JMUABPM Study. Although the decile analysis of the PIUMA Study found no significant association with MSBP and CVD, their threshold of the top 10th percentile of MSBP was 44 mm Hg, which was still lower than the value of 55 mm Hg for the JMUABPM Study. In addition, the width of the distribution range of MSBP is increased in elderly hypertensives.

Effect of Antihypertensive Medication

Elderly vascular stiffness-related MBPS might be more difficult to control than younger hemodynamic MBPS (Table). The longer follow-up with antihypertensive medication (mean, 8.4 years) in hypertensive patients may have weakened the impact of exaggerated MSBP defined by ambulatory BP monitoring conducted under an unmedicated condition at the baseline in the PIUMA Study. Although there is no precise information about the antihypertensive medications used during the longer follow-up in the PIUMA Study, a higher percentage of hypertensive patients, >70.0%, were under medication in that study than in the JMUABPM Study. In the JMUABPM Study, the prevalence of medicated hypertensives at the final follow-up (mean, 3.4 years) was lower (52.5%). In the population-based International Database of Ambulatory Blood Pressure in Relation to Cardiovascular Outcome, as the prevalence of medicated hypertensives during follow-up would be quite low (21.1%), the effect of medication would be much smaller.

MSBP may be more clinically relevant in elderly hypertensives. In a future study, it will be necessary to conduct serial morning BP measurements by self-measured home BP or by ambulatory BP monitoring during the antihypertensive medication.

Table. Age-Related Characteristics of Morning Surge in Blood Pressure

<table>
<thead>
<tr>
<th>Type</th>
<th>Cardiac Reactive Type</th>
<th>Vascular Stiffness Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>Younger adult</td>
<td>Elderly</td>
</tr>
<tr>
<td>Clinical implication</td>
<td>Prehypertension</td>
<td>Advanced vascular disease</td>
</tr>
<tr>
<td>BP characteristics</td>
<td>Increased heart rate</td>
<td>Systolic hypertension</td>
</tr>
<tr>
<td>Response to treat</td>
<td>Easy to treat</td>
<td>Difficult to treat</td>
</tr>
<tr>
<td>Day-by-day variability</td>
<td>Stable</td>
<td>Variable</td>
</tr>
<tr>
<td>Morning BP surge reactivity</td>
<td>Lower</td>
<td>Higher</td>
</tr>
</tbody>
</table>

BP indicates blood pressure.

Disclosures

None.

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