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EDITORIAL

Special Issue: Current evidence and perspectives for hypertension management in Asia

# Hypertension management to prevent dementia

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It is reported that the number of people with dementia will increase to 135 million by 2050 and that more than half of these people are expected to be living in Asia-Pacific countries; thus, Asian people should take action to reduce the future prevalence of dementia [1]. Epidemiological studies have demonstrated that lifestyle-related diseases such as hypertension, diabetes mellitus, and obesity are a strong risk for the incidence of dementia caused by not only vascular cognitive impairment but also Alzheimer's disease (AD) [2]. In 2016, the American Heart Association released a scientific statement on the impact of hypertension on cognitive function [3]. In this statement, "midlife" hypertension is confirmed to be a strong risk with a deleterious influence on late-life cognitive function. Because chronic elevation of blood pressure (BP) worsens pathological features of AD, it is possible that midlife hypertension also contributes to dementia, even that caused by AD. In Asian people, the Honolulu-Asia study, which is a historical community-based cohort study of Japanese American men born between 1900 and 1919, also demonstrated that midlife systolic BP is the strongest BP component predicting incident dementia. Thus, in Asia, hypertension management in "midlife" hypertensives is also believed to be an important risk reduction measure against dementia. (Fig. 1).

On the other hand, the Hisayama study demonstrated that midlife hypertension and late-life hypertension are significant risk factors for late-life onset of vascular dementia (VD) but not for that of AD in the general Japanese population, using only definite cases determined by autopsy [4]. The authors discussed the discrepancies of these results, which may derive from the difficulty in distinguishing between dementia subtypes. In older people, mixed dementia, which is a condition with more than one type of dementia such as VD or AD, is often observed. Therefore, detailed analysis to determine dementia subtypes in previous studies might show a different result of the association between midlife hypertension and all-cause dementia (Fig. 1). The HOPE Asia Network also suggested the effect of midlife hypertension on cognitive impairment mainly due to VD [5].

A sub-study of the Systolic Blood Pressure Intervention Trial (SPRINT) (SPRINT-Memory and Cognition in Decreased Hypertension (MIND)) demonstrated that hypertensive patients with intensive treatment (who achieved SBP lower than 120 mmHg) showed a significantly lower incidence of mild cognitive decline and dementia than those with standard treatment (who achieved SBP lower than 140 mmHg) [6]. From this impressive result, it is recommended that SBP less than 130 mmHg is achieved to prevent cognitive decline and the incidence of dementia in the European Hypertension Guidelines in 2018 [7]. The Japanese Society of Hypertension Guidelines for the Management of Hypertension (JSH 2019) also discuss the SPRINT-MIND study; however, intensive treatment to prevent dementia is not recommended to date, while the office BP goal is usually under 130/80 mmHg for hypertensive adults with comorbid conditions. The study by Zhang et al. showed that intensive treatment with a systolic BP target of 110 to less than 130 mmHg resulted in a lower incidence of cardiovascular events than standard treatment with a target of 130 to less than 150 mmHg in older patients with hypertension, like SPRINT [8]. However, it is not well known whether intensive treatment showed benefit to prevent cognitive impairment and dementia in this valuable study (Fig. 1).

Recently, the association between hypertension management and the risk of dementia using 4.5 million people from the Korean National Health Insurance Service-Health Screening Database from 2009 to 2012 has been published in Hypertension [9]. This was an exceptional nationwide study focusing on the association between BP and dementia in Asian people. In this article, U-shaped associations according to baseline systolic BP and diastolic BP; SBP 130

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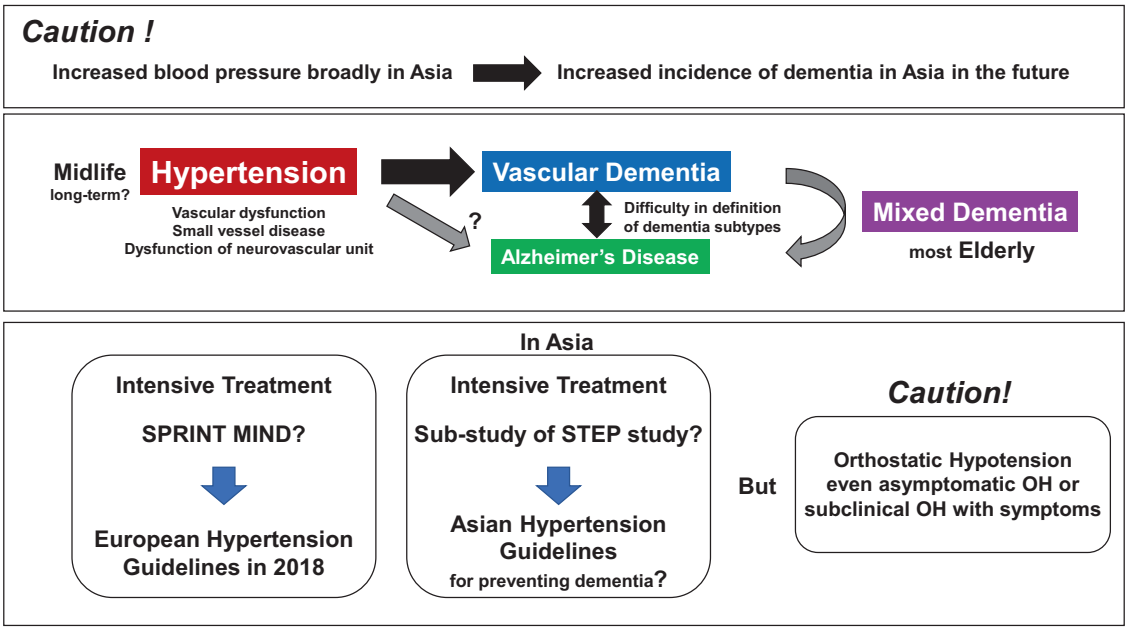


**Fig. 1** Graphic representation of this commentary. A tendency of blood pressure elevation may increase the risk of dementia (upper panel). Possible mechanisms of hypertension-induced dementia (middle panel). Effect of intensive blood pressure treatment on dementia prevention (lower panel). OH; orthostatic hypotension.

to <140 mmHg and diastolic BP 80 to <90 mmHg as reference groups were observed in both probable AD and probable VD. Among lower BP groups, the probable AD group showed a higher risk than the probable VD group, indicating that there is a optimal BP level in patients with AD. Moreover, an article very recently published in Hypertension Research demonstrated that heterogeneity existed in the longitudinal trajectories of cognitive performance among middle-aged and older individuals with hypertension [10]. Thus, the authors propose consideration of the heterogeneity of cognitive change patterns and targeted interventions to ameliorate the burden of cognitive decline in individuals with hypertension.

Orthostatic hypotension (OH) should also be noted as a risk factor for dementia. Peters previously reported that OH, especially subclinical OH with symptoms, indicates an increased risk of dementia and cognitive decline [11]. A recent study also showed that OH, even asymptomatic OH, is associated with an increased risk of dementia and the progression from cognitive impairment to dementia in older adults [12] (Fig. 1). Cui et al. recently demonstrated that home-measured OH was associated with cerebral small vessel disease in the older population in the Shandong area, China [13]. Tabara et al. reported that orthostatic BP decline was significantly associated with morning BP variability [14], indicating that perfect 24 h-management of hypertension is important to prevent dementia according to the individual hypertension situation [15].

The worldwide trends in BP demonstrate that mean systolic BP and diastolic BP show the largest decline in the high-income Asia-Pacific region; on the other hand, mean systolic and diastolic BP have risen in East, South, and Southeast Asia [16]. This uneven distribution of hypertensive management in Asia may become a problem associated with an uneven incidence of dementia in the future. Continuous BP management is necessary as a global action against dementia (Fig. 1).

## Compliance with ethical standards

**Conflict of interest** The author declares no competing interests.

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## References

1. Prince M, Guerchet M, Prina M. The Global Impact of Dementia 2013–2050. 1st December, 2013. Alzheimer's Disease International. London.
2. Livingston G, Sommerlad A, Orgeta V, Costafreda SG, Huntley J, Ames D, et al. Dementia prevention, intervention, and care. Lancet. 2017;390:2673–734.
3. Iadecola C, Yaffe K, Biller J, Bratzke LC, Faraci FM, Gorelick PB, et al. Impact of hypertension on cognitive function: a scientific statement from the American Heart Association. Hypertension. 2016;68:e67–e94.
4. Ninomiya T, Ohara T, Hirakawa Y, Yoshida D, Doi Y, Hata J, et al. Midlife and late-life blood pressure and dementia in Japanese elderly: the Hisayama study. Hypertension. 2011;58:22–8.
5. Turana Y, Tengkawan J, Chia YC, Hoshide S, Shin J, Chen CH, et al. Hypertension and dementia: a comprehensive review from the HOPE Asia Network. J Clin Hypertens. 2019;21:1091–8.

6. Kjeldsen SE, Narkiewicz K, Burnier M, Oparil S. Intensive blood pressure lowering prevents mild cognitive impairment and possible dementia and slows development of white matter lesions in brain: the SPRINT Memory and Cognition IN Decreased Hypertension (SPRINT MIND) study. Blood Press. 2018;27:247–8.
7. Williams B, Mancia G, Spiering W, Agabiti Rosei E, Azizi M, Burnier M, et al. 2018 ESC/ESH Guidelines for the management of arterial hypertension: the Task Force for the management of arterial hypertension of the European Society of Cardiology and the European Society of Hypertension. J Hypertens. 2018;36:1953–2041.
8. Zhang W, Zhang S, Deng Y, Wu S, Ren J, Sun G, et al. Trial of intensive blood-pressure control in older patients with hypertension. N Engl J Med. 2021;385:1268–79.
9. Lee CJ, Lee JY, Han K, Kim DH, Cho H, Kim KJ, et al. Blood pressure levels and risks of dementia: a nationwide study of 4.5 million people. Hypertension. 2022;79:218–29.
10. Zhang B, Jiang S. Heterogeneity in longitudinal trajectories of cognitive performance among middle-aged and older individuals with hypertension: Growth mixture modeling across an 8-year cohort study. Hypertens Res. 2021. https://doi.org/10.1038/s41440-021-00829-5.
11. Peters R, Anstey KJ, Booth A, Beckett N, Warwick J, Antikainen R, et al. Orthostatic hypotension and symptomatic subclinical orthostatic hypotension increase risk of cognitive impairment: an integrated evidence review and analysis of a large older adult hypertensive cohort. Eur Heart J. 2018;39:3135–43.
12. Xia X, Wang R, Vetrano DL, Grande G, Laukka EJ, Ding M, et al. From normal cognition to cognitive impairment and dementia: impact of orthostatic hypotension. Hypertension. 2021;78:769–78.
13. Cui Y, Zhang H, Zhao Y, Sun S, Chai Q, Gong G, et al. Home-measured orthostatic hypotension associated with cerebral small vessel disease in a community-based older population. Hypertens Res. 2020;43:798–807.
14. Tabara Y, Matsumoto T, Murase K, Setoh K, Kawaguchi T, Nagashima S, et al. Day-to-day home blood pressure variability and orthostatic hypotension: the Nagahama Study. Am J Hypertens. 2018;31:1278–85.
15. Kario K. Perfect 24-h management of hypertension: clinical relevance and perspectives. J Hum Hypertens. 2017;31:231–43.
16. Zhou B, Perel P, Mensah GA, Ezzati M. Global epidemiology, health burden and effective interventions for elevated blood pressure and hypertension. Nat Rev Cardiol. 2021;18:785–802.