



How should we manage hypertension and dyslipidemia to maintain cognitive function in older adults?

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It is widely known that patients suffering from coronary artery disease and heart failure develop dementia. Risk factors for cardiovascular disease are mostly lifestyle-related diseases such as hypertension, dyslipidemia, diabetes, smoking, etc. Therefore, it can be inferred that these are risk factors for dementia. Especially from adolescence to middle age, we can assume that to prevent the onset of dementia by managing the risk factors for cardiovascular disease. However, the goals for the management of hypertension and dyslipidemia in older ages are not clear.

The present study by Nakamura et al. [1] is valuable for understanding the associations among cognitive decline, hypertension, and dyslipidemia in older adults. The Septuagenarians, Octogenarians, Nonagenarians, Investigation with Centenarians (SONIC) study provides important insights into these complex relationships. The use of the Montreal Cognitive Assessment-Japanese version (MoCA-J) test adds to the reliability and validity of the findings. The results suggest that high levels of high-density lipoprotein (HDL) and diastolic blood pressure (DBP) in individuals with hypertension and dyslipidemia and high systolic blood pressure (SBP) levels in individuals with hypertension are associated with better cognitive function in community-dwelling older adults.

Vascular dementia and Alzheimer's disease are the most common causative diseases of dementia. Hypertension is a well-known risk factor for vascular dementia [2]. On the other hand, it has been shown that the risk of developing Alzheimer's disease also increases with the risk of vascular diseases such as hypertension, obesity, dyslipidemia, etc [3].

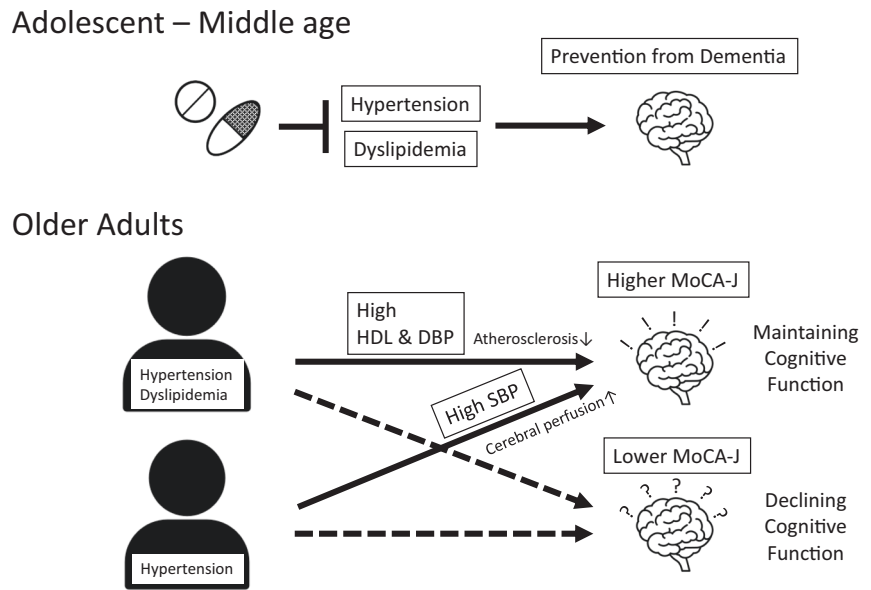
The impact of hypertension on dementia varies with age. Hypertension in middle age was associated with a 5.3-fold incidence of dementia compared to blood pressure below 140/90 mmHg, regardless of blood pressure levels in old age. Hypertension was only associated with a 3.3-fold incidence if hypertension was present only in old age. Therefore, blood pressure control from middle age is useful in preventing dementia in old age [4]. Prevention of cognitive decline by antihypertension treatment in the elderly is not clear, and the preDIVA study of 70-79-year-olds found no difference in the incidence of dementia even with strict antihypertensive management [5]. An observational study of mild cognitive impairment (MCI) and Alzheimer's disease showed an accelerated decline in cognitive function when daytime blood pressure was below 128 mmHg in the antihypertensive treatment group [6]. Thus, there is concern that in patients with declining dementia, excessive hypotension due to antihypertensive drug therapy may affect cognitive decline. In a meta-analysis, hypertension was associated with worse cognitive function in the early elderly, but in the late elderly, higher blood pressure was associated with better cognitive function [7]. Low blood pressure has also been reported to increase the risk of Alzheimer's disease and dementia [8]. Thus, for older adults, there is concern that excess low blood pressure may also exacerbate dementia.

Lipid levels such as total cholesterol are not recognized as a risk factor for cerebrovascular disease mortality in the Japanese population [9]. A meta-analysis of cohort studies in Japan and China reported that hypertension was the greatest risk, but total cholesterol was less involved in dementia [10]. In atherothrombotic stroke, it has been reported that low-density lipoprotein is a risk factor for the development of dementia [11]. Lower HDL has been shown to increase the incidence of stroke [12]. Higher HDL was associated with lower cognitive decline in cognitive function [13]. This has been shown to be particularly relevant to vascular dementia [14]. In the MEGA Study, statin treatment in patients with

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Fig. 1 Prevention of dementia throughout life. HDL high-density lipoprotein, SBP systolic blood pressure, DBP diastolic blood pressure, MoCA-J Montreal Cognitive Assessment-Japanese version



high cholesterol who had no history of coronary artery disease or stroke showed a trend toward a reduction in stroke with a hazard ratio of 0.66 (men) and 0.63 (women) [15]. Although there is no drug that directly raises HDL cholesterol, statins are expected to raise HDL cholesterol and may protect against cerebrovascular injuries.

These findings have important implications for preventing and managing cognitive decline in this population. Overall, this study represents an important contribution to the field and provides valuable insights for future research and clinical practice.

There may be a complex interplay between hypertension, dyslipidemia, and cognitive function (Fig. 1). Higher levels of HDL and DBP may have a protective effect on the brain and cognitive function in patients with hypertension and dyslipidemia, while high SBP levels may be a compensatory mechanism to maintain cerebral blood flow and oxygenation in individuals with hypertension in community-dwelling older adults. However, the results from patients with combined hypertension and dyslipidemia or hypertension alone do not apply to all elderly patients. Hypertension and dyslipidemia in the elderly should be managed with consideration of each patient's unique background. Further research is needed to determine to what extent lipid and blood pressure control can extend life expectancy while preserving cognitive function in older adults.

Compliance with ethical standards

Conflict of interest The authors declare no competing interests.

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