

Editorial



Lifestyle Modification, the Effective but Neglected Strategy in Lowering Blood Pressure

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Conflict of Interest

The author has no financial conflicts of interest.

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► See the article “The Effects of Diet Alone or in Combination with Exercise in Patients with Prehypertension and Hypertension: a Randomized Controlled Trial” in volume 48 page on 637.

The cardiovascular risk increases from blood pressure (BP) 115/75 mmHg and 63% of cardiovascular events were occurred in the group of baseline BP <140/90 mmHg during 7.7 years follow up in the 3 cohorts regardless of taking medications or not¹⁾ and the people at this range of BP tend to develop hypertension during follow up. The term of ‘prehypertension’ was first introduced at 7th Report of the Joint National Committee to correct the normal value from <130/85 to <120/80 mmHg according to observational studies and improve the hypertension control rate because the previous term, high normal, was regarded as ‘not hypertensive.’ But the target organ damages such as left ventricular diastolic function, end-stage renal disease and cardiovascular mortality increase from this range of BP which need to manage with effective strategies. But no guidelines recommend the drug management in prehypertension due to lack of proven data. The 2017 American College of Cardiology/American Heart Association Guideline for the Prevention, Detection, Evaluation, and Treatment of High Blood Pressure in Adults reclassified BP of previous prehypertension as hypertension and recommends lifestyle modification instead of drugs.²⁾ The meta-analysis by Cornelissen and Smart revealed that the regular exercises (≥4 weeks) lower BP with endurance, dynamic resistance and isometric resistance exercise from the baseline BP of prehypertension.³⁾ And management with both dietary approaches to stop hypertension (DASH) or Korean DASH are proved the BP lowering effects.⁴⁾⁵⁾ From the scientific evidences of many studies, all guidelines recommend exercise and DASH diet in lowering the BP from the prehypertension with the strongest recommendation class and the highest level of evidence. But the compliance of exercise is only 19.9% and 26.6% of patients with hypertension are still continued to enjoy the salty food.⁶⁾ There are many gaps between clinical studies which are well designed and analyze only the data from the patients with high compliance of the lifestyle modification. In real-world practice, physician's advice is not detailed, monitored and the BP lowering effects is not known well.

The study by Lee et al.⁷⁾ published in *Korean Circulation Journal* revealed the real-world effects of lifestyle modification in lowering blood pressure. They included the participants with prehypertension or stage I hypertension who are the majority in the distribution of BP and need not mandatory drug management for initial strategy. From the analysis of 72 participants (87.8% of initial participants) who finished eight weeks intervention with advice-only group, DASH diet education group and DASH and home-based exercise group, the

office blood pressure, the primary outcome, is not different in exercise and DASH group than others statistically. But the daytime systolic ambulatory BP of exercise and DASH diet group was lower than advice-only groups.

We can get some clinical implications from the results of lifestyle modification in real-world practice for the patients with prehypertension or hypertension.

First, even though the Korean Lifestyle Modification study has failed to prove the office BP lowering effects with DASH diet or exercise with DASH management, it is not because of little effects of lifestyle modification itself but because of small number of participants with small BP lowering results as mentioned in study limitations. The previous randomized trials and meta-analysis reports showed consistent BP lowering effects in office or out-of-office BP from prehypertension to hypertension. The effects for lowering BP are synergistic when more than two lifestyle modifications are combined with or without antihypertensive drugs. Second, most guidelines recommend to monitor the compliance of lifestyle modification and drug to control the BP below the target goal. From the big data analysis covering more than half million patients with hypertension, treatment adherence is tightly correlated with the cardiovascular complications.⁸⁾ Maintenance the patients' motive and monitoring the compliance of both strategies at every clinic visits is key to control the high blood pressure. Recently, we can monitor the compliance of both strategies by smartphone applications using automatic measurement and wireless data transfer. In the near future, the personalized strategies according to the blood pressure, prescribed drugs, patient's physical status and monitoring of lifestyle modification are available from the supports of fast growing technology. The risk of prehypertension and stage I hypertension in future cardiovascular events cannot be exaggerated and the 2017 American guideline redefined the previous 'prehypertension' as 'hypertension.' But there are little data to decrease the risk by active drug treatment and all current available guideline including the new guideline recommend to start the lifestyle modifications.

The benefits of lifestyle modifications are very important in lowering blood pressure. In stage I hypertension, the guidelines recommend to start medication or lifestyle modification according to the co-morbidities. All kinds of lifestyle modification have minimal adverse effects and many beyond BP lowering effects in cardiovascular and non-cardiovascular

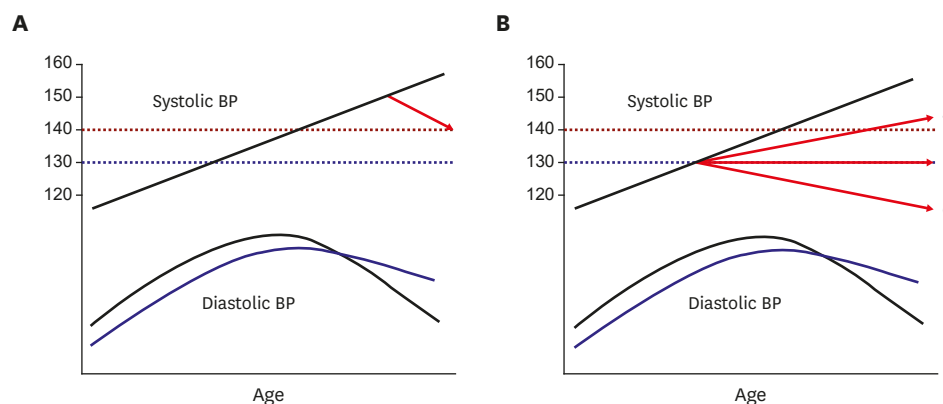


Figure 1. The benefits of BP lowering effects with lifestyle modification. (A) In hypertension, lifestyle modification can lower the cardiovascular risk by control the BP below the target goal. (B) In prehypertension, lifestyle modification can delay (a) or prevent (b, c), the initiation of medication and even lower the cardiovascular risk (c). BP = blood pressure.

health. If the patients get the target BP goal with only lifestyle modification, we can postpone the initiation of medication, prevent the medication and even lower the cardiovascular risk by lowering the BP (**Figure 1**). The degree of BP lowering effects with lifestyle modification is inverse relationship of baseline BP level. In prehypertension, there are various results of lifestyle modification for lowering blood pressure. Combination of DASH diet and exercise with good compliance is essential to get the beneficial effects of BP in relatively small BP lowering patients. Third, the two most prevalent comorbid diseases in hypertension are obesity (60.1%) and dyslipidemia (57.6%) from Korea National Health and Nutrition Examination Survey from 2007 to 2013.⁹⁾ In this era of the most powerful cardiovascular risk factor is hypertension and its most prevalent co-morbid disease is obesity, the role of highly compliant and well-monitored DASH and exercise is very important to prevent the progression to hypertension in prehypertensive state, to get the BP target and finally prevent the cardiovascular complications.

We need large scale study which will prove the significant BP lowering effects with highly compliant and well monitored lifestyle modification.

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