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PREVENTION OF HYPERTENSION: PUBLIC HEALTH CHALLENGES (YUICHIRO YANO, SECTION EDITOR)

Impact of the 2017 American College of Cardiology/American Heart Association Blood Pressure Guidelines on the Next Blood Pressure Guidelines in Asia

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Abstract

Purpose of Review To estimate the impact of the 2017 American College of Cardiology/American Heart Association (ACC/AHA) guidelines for high blood pressure (BP) on the next hypertension guidelines in Asia.

Recent Findings The 2017 ACC/AHA guidelines for high BP in adults changed the diagnostic threshold and the management goal of BP from 140/90 to 130/80 mmHg. Another characteristic of the new guideline is its focus on a practical approach for the effective management of hypertension by using home and ambulatory BP monitoring; this point is also recommended in the 2014 Japanese Society of Hypertension Guidelines for the Management of Hypertension.

Summary In Japan, the guidelines for hypertension management are currently under revision and will be released in the spring of 2019. The core concept of the 2019 Japanese Society of Hypertension Guidelines for the Management of Hypertension, i.e., early and tight BP control over 24 h, will contribute to target-organ protection and cardiovascular disease prevention for Asians.

Keywords Ambulatory blood pressure monitoring · Blood pressure · Ethnic differences · Guideline · Hypertension Paradox

Introduction

Hypertension is an important risk factor for cardiovascular events and mortality worldwide regardless of the race/ethnicity [1, 2]. The 2017 American College of Cardiology/American Heart Association (ACC/AHA) guidelines for the prevention, detection, evaluation, and management of high blood pressure (BP) in adults changed the diagnostic threshold and the management goal of BP from 140/90 to 130/80 mmHg [3]. This change raised two important practical considerations for the treatment of hypertension in Asian countries. First, BP-related CVD are more common in Asians than in Westerners, the reduction in the BP goal to 130/80 mmHg might be suitable for the management of hypertension for Asians. However, because of various unique cultural and socioeconomic factors among Asians, insufficient BP control in Asian countries has been reported, even if the treatment target was defined as < 140/90 mmHg. Second, lowering the BP thresholds for hypertension from SBP/DBP ≥ 140/90 mmHg[2] to SBP/DBP ≥ 130/80 will significantly increase the prevalence of hypertension or uncontrolled hypertension by 25–50% in Asian countries [1, 2].

In this review, we discuss the impact of the 2017 ACC/AHA guidelines for high BP on the upcoming hypertension guidelines in Asia.

Impact of Early Diagnosis and Treatment Based on the 130/80 mmHg BP Threshold Goal

The goal of hypertension management is not reducing the BP, but preventing cardiovascular events. From this viewpoint, early diagnosis and treatment of hypertension are important for reducing cardiovascular events later in life. In line with the change in the diagnostic threshold of hypertension, the therapeutic target was changed from 140/90 mmHg in the general

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population and 130/80 mmHg in high-risk patients to 130/80 mmHg overall in the 2017 ACC/AHA BP guideline [3]. This change may affect the intensity of antihypertension treatment and blood pressure control and prevention of both acute cardiovascular events and chronic cardiovascular illnesses. A target of 130/80 mmHg will decrease the control rate compared to the 140/90 mmHg target. An increase in the treatment intensity will theoretically increase the cost for medication and care by health professionals. However, early and intensive treatment may prevent the development of more severe type of hypertension, e.g., resistant hypertension, reduce BP-related morbidity and mortality, and eventually, lower healthcare costs. The benefit of early diagnosis and treatment of hypertension may be greater in the Asians than in Westerners, because the impact of high BP on health outcomes (e.g., stroke) may be greater among Asians than Westerners.

Characteristics of Hypertension in Asians

The association between hypertension and cardiovascular disease might be stronger in Asians than in Westerners [4]. Stroke and heart failure, which have stronger association with higher BP than coronary artery disease, are more common in Asians than in Westerners. In the recent prospective HONEST study (Home Blood Pressure Measurement with Olmesartan Naive Patient, to Establish Standard Target BP), the incidence of stroke was 2.8× higher than that of myocardial infarction (2.92 versus 1.03/1000 person-years) in Japanese with antihypertensive medication [5]. The strength of the association between higher BP levels and cardiovascular events might be stronger in Asians than in Westerners [4]. Therefore, antihypertensive medication targeting a low systolic BP (e.g., < 130 mmHg) might be more beneficial for Asians than Westerners, especially in reducing the risk of stroke and heart failure.

Lifestyle Modification in Asia

An increased prevalence of hypertension does not necessarily mean that a strict medication regimen should be recommended [3]. Instead, lifestyle modifications starting early in life, including diet, exercise, good sleep, good environment, and especially, a reduced salt intake and body weight, are recommended as the first-line treatment in Asia.

The impact of obesity on high BP may differ between Asians and Caucasians [6]. Asians are likely to develop high BP even with mild overweight. The impact of body mass index of 25 kg/m^2 on elevated BP/stage I hypertension (previous prehypertension), as defined by the 2017 ACC/AHA, in Japanese is almost equivalent to that of 30 kg/m^2 in the US population [7]. Obesity and metabolic syndrome are known to increase salt sensitivity, and Asians are likely to have a genetic predisposition to salt sensitivity [8]. Asians tend to have a higher salt intake than Westerners. Thus, increased BP among Asians with overweight or obesity might be attributable to higher salt sensitivity with or without excess salt intake [8].

Salt intake is gradually decreasing in Japan but remains high at > 10 g/day. In a recent survey of hypertensive patients recruited from general practitioner-based clinics, the average salt intake (estimated by concentrations of sodium and creatinine in spot urine) was 10.2 g/day, and the prevalence of salt intake of < 6 g/day was only 6.7% [8]. In a recent study, a moderate reduction in the salt restriction of 1.8 g/day (targeted 6.0 g/day, baseline 8.6 g/day, achieved 6.8 g/day), guided by a nutritionist, significantly reduced clinic, home, and ambulatory BP (7.3 mmHg for 24-h systolic BP [SBP]) in medicated patients with hypertension [9]. Thus, salt intake of < 6.0 g/day and lowering body mass index toward less than 25 kg/m^2 might be effective approaches for lowering BP inside and outside of the clinic for Asians.

BP Measurements Outside of the Clinic

Ambulatory BP monitoring (ABPM) devices measure awake and asleep BP, typically every 15 to 30 min, over a 24-h period, outside of the clinic setting. ABPM as the reference standard for obtaining BP measurements outside of the clinic. However, there are barriers to its use including limited availability, the cost of testing, healthcare provider concerns about the accuracy and benefit of testing, and low tolerability in examinees because of sleep disturbances, discomfort, and restrictions to daily activities. Therefore, the 2014 Japanese Society of Hypertension Guidelines for the Management of Hypertension (JSH 2014) recommend home BP monitoring as the most-effective and practical approach for BP management [10]. The 2017 ACC/AHA guidelines also recommended home BP monitoring for the diagnosis and treatment of hypertension in conjunction with telehealth counseling (recommendation: Class I; level of evidence A) if ABPM is not available in clinical practice [3].

Masked hypertension refers to BP levels not in the hypertensive range when measured in the clinic but in the hypertensive range when measured outside of the clinic. Early detection and control of masked hypertension are key to successful individual management of 24-h BP control [1, 11]. An information communication technology-based anticipation approach using individual time-series big data on BP is expected to dramatically suppress the incidence of cardiovascular events and improve the health and longevity of patients worldwide [12, 13].

The diagnosis of hypertension is based on the average of BP measurements, but cardiovascular events may be triggered

by BP variability. There are various phenotypes of BP variability with different time phases, including beat-by-beat, acute trigger-specific (triggers such as physical and mental stress, strain, cold temperature, and poor sleep), positional, diurnal, day-by-day, seasonal, and annual BP variability [14]. BP variability may be greater in the Asian population than in the Western population [4]. For example, an exaggerated morning surge in BP may be more prevalent among Asians compared to African Americans and white individuals. Even when the clinic BPs are normal, Asians are more likely to have morning and nocturnal hypertension. Therefore, it is important to assess out-of-clinic BP in Asian patients, especially in the morning, and ideally, during the sleep period as well. A recent analysis of data from the international ambulatory BP monitoring registry—the ARTEMIS study (International Ambulatory Blood Pressure Registry: Telemonitoring of Hypertension and Cardiovascular Risk Project)—demonstrated that the prevalence of masked hypertension is higher in Asians than in Westerners [15]. Although the clinic BP was comparable between Japanese and Western patients with hypertension in the same database, Japanese patients with hypertension showed an exaggerated morning surge in BP as compared to their Western counterparts [16].

Nocturnal BP dipping may be smaller in Asians than in Westerners [4]. Asians are likely to have isolated nocturnal hypertension [17]. Isolated nocturnal hypertension is significantly associated with arterial stiffness in the Chinese population. Nocturnal hypertension is associated with a high sodium intake and salt sensitivity, which more common in Asians than in Westerners [17]. The international epidemiological data have demonstrated that increased nocturnal BP is a powerful predictor of cardiovascular outcomes, especially in patients taking antihypertensive medication [18]. Thus, controlling hypertension for a 24-h period including while asleep might be essential for Asians [4].

Owing to their lifestyle, Asians are unlikely to measure their evening home BP before dinner, and thus, it is recommended that the evening home BP be measured just before bedtime [19]. However, the measurement of evening home BP just before bedtime is strongly affected by the individual's dinner contents, alcohol consumption, and behavior (e.g., bathing in the evening is common in Asia) [20]. In clinical practice, morning home BP measurement is important [19] because it has better reproducibility and stronger association with CVD events compared to evening home BP measurement or clinic BP measurement [21]. Thus, morning home BP control is important from a practical standpoint, especially in Asian patients with hypertension.

After control of morning home BP, the next important aspect is the management of uncontrolled nocturnal hypertension [14]. The 2017 ACC/AHA BP guidelines defined a threshold of nocturnal high BP as ≧ 110/65 mmHg, and daytime high BP as ≧ 130/80 mmHg [3]. In the sub-analysis of the J-HOP (Japan Morning Surge-Home Blood Pressure) study, a morning home SBP of 135 mmHg corresponds to a night-time home SBP of 120 mmHg [22], which is the threshold defined by the seventh report of the Joint National Committee on Prevention [23], whereas the 110-mmHg threshold of the 2017 ACC/AHA guidelines corresponds to a morning home SBP of 130 mmHg. Among patients with well-controlled morning home SBP, a significant proportion have uncontrolled nocturnal hypertension (30% by the criteria of 135 mmHg for morning home SBP and 120 mmHg for night-time SBP; 56% by the criteria of 130 mmHg for morning home SBP and 110 mmHg for night-time SBP) [22]. Thus, even after controlling morning BP, there is a risk of uncontrolled nocturnal hypertension. Therefore, to detect the residual risk of uncontrolled nocturnal hypertension, ambulatory BP monitoring or nocturnal home BP monitoring may be recommended, even for patients with well-controlled normotension clinic BP and morning home BP and especially for high-risk Asian patients with hypertension, including those with diabetes mellitus, chronic kidney disease, sleep apnea, or organ damage such as left ventricular hypertrophy or albuminuria [12, 14].

Challenge of the Hypertension Paradox in Asia

Many effective antihypertensive drugs without severe adverse effects have been developed; however, the adherence and BP-control rates are still low, which results in a significant number of cardiovascular events in the "real world"; this is known as the Hypertension Paradox [24]. The failure to adopt healthy lifestyles has been a critical factor in this paradox and must be addressed urgently in not only Asia but also worldwide. To reduce noncommunicable diseases in Japan, a nationwide screening program called "specific health check-ups and specific health guidance" was introduced by the Japanese government in 2008 for people aged 40–74 years [25]. This program expands on general health check-up programs to include a wider range of conditions and, based on the results, specific health guidelines are offered to participants with risk factors for lifestyle-related diseases including hypertension. Thus, this program may be helpful in spreading awareness on hypertension and uncontrolled hypertension. Therefore, as the next step, we should establish interprofessional collaborations among physicians, public health nurses, dieticians, pharmacists, and social workers in health and social care to overcome the Hypertension Paradox.

Conclusions and Perspectives

In Japan, the guidelines for the management of hypertension are currently under revision and will be released in the spring

of 2019. The target blood pressure for drug therapy treatments may be reduced from that of the JSH 2014 in the elderly patients and patients with past history of cardiovascular disease such as myocardial infarction and stroke. For the general population, especially patients with high–normal blood pressure (prehypertension) and low cardiovascular disease risk, we emphasize on the importance of lifestyle modification more than that in the JSH 2014. Regardless of whether we use the definition of hypertension as BP > 130/80 mmHg, the core concept of the 2017 ACC/AHA guidelines, i.e., early and tight BP control over 24 h, will contribute to sustained target-organ protection and cardiovascular disease prevention in Asia.

To determine the feasibility and benefit of a diagnostic BP threshold and management goal of 130/80 mmHg, further clinical research in Asian countries is required.

Compliance with Ethical Standards

Conflict of Interest The authors declare no conflicts of interest relevant to this manuscript.

Human and Animal Rights and Informed Consent This article does not contain any studies with human or animal subjects performed by any of the authors.

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