

Standing Systolic Blood Pressure: Insights from Heartful Living

Anand Chockalingam, MD, FACC, FAHA, FASE¹

Author affiliations are listed at the end of this article.

Corresponding Author:
Anand Chockalingam, MD
Charleston Area Medical Center
anand.chockalingam@vandaliahealth.org

Blood pressure (BP) changes rapidly based on posture, physical activity, and mental stress levels.¹ Routine measurement of BP began over 100 years ago and continues to evolve with scientific advances and improving technology. To ensure reproducibility and avoid confusion, we have adopted the current standard of measuring BP in the seated position after several minutes of rest and relaxation. This guides clinicians in making the diagnosis of hypertension and initiation of therapy. The public, however, is not familiar with medical terminology, normal variability, and the nuances between systolic and diastolic hypertension. Polypharmacy, comorbidities, and frailty compound risk for iatrogenic complications. With an evolving understanding of BP, changing social priorities, and cardiometabolic risk profiles, it may be time to simplify and adopt practical BP clinical targets. This opinion piece aims to optimize hypertension management.

We can empower patients across a broad spectrum of literacy, age, functionality, and comorbidities using the insights we gained from virtual hypertension care. We developed advanced cardiac energetics

(ACE), a novel, technology-enabled mindfulness program offering tailored lifestyle interventions to reduce cardiometabolic risk. This is based on Heartful Living self-inquiry, our secular holistic empowerment curriculum developed for stress reduction and exploring Higher Consciousness.² The ACE lifestyle, inspired by ancient Siddha yoga meditation, has been adapted to help students, families, and patients with cardiometabolic disorders. The ACE program routinely and sustainably lowers BP. Our understanding of hypertension has evolved with completely reversing hypertension among patients who previously required multiple medications. Gastric bypass has been shown to reverse refractory hypertension.³ The latest weight loss medications also effectively lower BP.⁴ Irrespective of the method, actual weight loss achieved determines BP reduction. Notably, BP lowering occurs within days to weeks, while weight loss takes months. Thus, BP lowering with ACE, medications, and bariatric surgery is mediated by calorie restriction even before the weight reduction. Hypotension and syncope are increasing concerns as older comorbid patients start targeted weight reduction.



STANDING IS A RECENT EVOLUTION. Our early hominin ancestors stood up to explore, walking on 2 legs, about 6-7 million years ago.⁵ Only in the last 3-4 million years have we started routinely walking on 2 legs. This defining characteristic of human evolution freed the hands to build tools, allowed us to cover long distances, and improved social cooperation. Standing thus allowed us to develop the complex consciousness and language that makes us human.

Standing is a fundamental human right and a freedom worthy of defending. The ability to stand and move should be preserved for as long as possible. This is central to quality of life, agency, and independence. Clinicians should have careful shared decision-making to clarify individual goals before committing to BP control that can be disabling beyond an age due to concomitant orthostatic hypotension. With the average life expectancy doubling over the last century, we increasingly care for elderly hypertensive people with numerous neurological and musculoskeletal challenges compounded by polypharmacy. There are ways to engage patients in self-care routines to improve BP management.

STANDING CAUSES HYPOTENSION. The autonomic balance is quickly restored when we are younger, allowing us to move forward. The stiffening of arteries and declining neuro-cardio-vascular-renal muscular resilience make standing increasingly difficult with age.⁶ Diuretics and BP medications significantly reduce biological adaptations to standing. An estimated 15- 50% of adults over 60 have orthostatic hypotension (OH) based on systolic BP decrease of at least 20 mm Hg with standing.⁷ For simplicity, we recommend only 2 positions for BP, heart rate, and symptoms to detect OH. The first measurement is obtained at 3-5 minutes of resting supine. The second measurement is obtained after 3 minutes of standing.

STANDING ALSO CAUSES HYPERTENSION. We use a 10 mmHg increase in systolic BP at 3 minutes of standing to diagnose orthostatic hypertension (OHT). This occurs in 2-8% of the broader population. In our ACE cardiometabolic patient population

with severe obesity, OHT is present in 25% and is often without symptoms.⁸ This may have several mechanisms like deconditioning, younger age with a higher sympathetic tone, splanchnic redistribution, pain, and apprehension. We hypothesize that standing can elicit the well-recognized systolic hypertensive response to exercise (SHRE) in some younger, sedentary people with obesity. Irrespective of the mechanism, this often corresponds to labile BP fluctuations that can overwhelm cerebral autoregulation. OHT may be a readily available “stress test” for some patients. OHT may thus predict higher cardiovascular risk than traditional risk factors.⁹

Standing systolic blood pressure (SSBP) may be the one variable that offers the most value. We emphasize routinely tracking SSBP, even in the absence of any symptoms. Masked hypertension is challenging to detect as office BP is normal, but ambulatory BP is elevated. Prevalence ranges from 16% to 30%, with no clear consensus on appropriate therapy. OHT is a significant determinant of masked hypertension and may be linked to obesity, a sedentary lifestyle, and sympathetic overactivity.¹⁰

Once OH and OHT are excluded in the ACE clinic, we encourage an SSBP diary after 3 minutes of standing. This simplifies recommendations to care teams, families, and patients to ensure compliance. If patients have postural symptoms, we recommend measuring BP in different postures and during symptoms. Most patients are asked to hold anti-hypertensive medications when SSBP is below 120 mmHg. (Figure 1).The systolic BP is already only 70mmHg at the level of the brain when SSBP is 120mmHg.⁶ Age, atherosclerosis, and hydration concerns can further lower BP, cause postural symptoms, and increase the risk of falls. Patients with significant systolic dysfunction typically run lower baseline BP. They can continue guideline therapies with Angiotensin receptor neprilysin inhibitors, beta-blockers, and aldosterone antagonists unless SSBP < 110mmHg or limiting postural symptoms. Rigorous studies that examine cardiac outcomes based on emerging ambulatory data are needed to validate this as a universal recommendation.



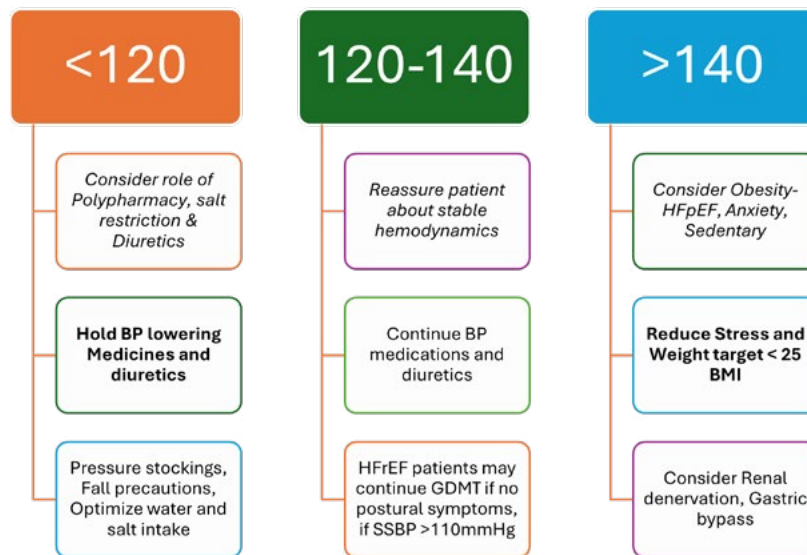


FIGURE 1: Advanced Cardiac Energetics (ACE) protocol for hypertension and heart failure patients based on standing systolic BP home monitoring, irrespective of postural symptoms. This assumes hypertension is reasonably controlled and “stable” in ambulatory settings. HFrEF is Heart Failure with reduced Ejection Fraction.

In conclusion, we encourage routine, random home-standing BP tracking to optimize cardiac risk and minimize postural symptoms. Orthostatic hypertension may be just as challenging as orthostatic hypotension in the care of our increasingly older comorbid cardiac patients. Systolic BP tracking may offer simplified instructions to technology-enabled multidisciplinary care teams increasingly engaged in BP control.

AUTHOR AFFILIATIONS

1. Charleston Area Medical Center Institute for Academic Medicine, Director of CardioMetabolic

Center, Director of Diastolic Heart Failure Clinic, Professor of Cardiology, Charleston, West Virginia

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