Clinical Insights

Management of Elevated Blood Pressure in the Hospital—Rethinking Current Practice

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Managing elevated blood pressure (BP) in the hospital is a common challenge. An estimated 50% to 70% of adults experience BP elevations (≥140/90 mm Hg) during hospitalization,[1] which may be due to underlying essential hypertension, inaccurate measurement, iatrogenic causes, or physiologic stressors of hospitalization and acute illness. Severe asymptomatic hypertension (formerly referred to as *hypertensive urgency* [a misnomer]) is defined as severely elevated BP (>180/120 mm Hg) in the absence of acute hypertension-mediated organ damage.[2] While there are evidence-based guidelines for the outpatient management of chronic hypertension, a recent systematic review by Wilson et al[3] found no clinical practice guidelines for asymptomatic elevated BP in the inpatient setting. The goal of this article is to propose a framework for approaching asymptomatic BP elevations in the hospital.

Recent Evidence

Management of inpatient BP is heterogenous, with some clinicians treating asymptomatic BP elevations aggressively during hospitalization and on discharge, even among patients with limited life expectancy and well-controlled outpatient BPs.[4-6] Meanwhile, a growing body of observational data has suggested intensive treatment of elevated BP in the hospital without acute end-organ damage is not associated with a lower risk of hypertensive emergencies and may be associated with harm, including acute kidney injury,[5-7] myocardial injury,[5,6] and stroke.[6,7] These findings were consistent across degrees of BP elevation, with the risk of harm highest among patients treated with intravenous antihypertensives. Observational data have also shown that, among patients admitted for noncardiac reasons, intensification of antihypertensive regimens at discharge is associated with increased risk of short-term adverse events but not improvements in long-term BP control or cardiovascular outcomes.[5,8] While each of these observational studies is at risk of selection bias and unmeasured confounding, their findings suggest a need for caution in treating elevated inpatient BPs.

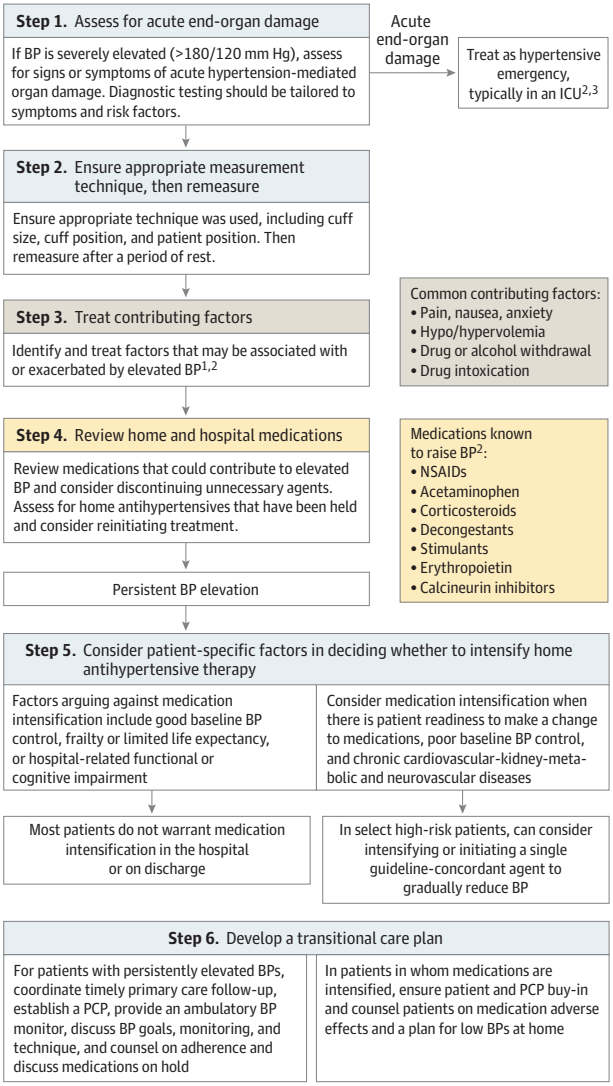
Stepwise Approach

When approaching elevated BP management in the hospital, there are 2 primary goals: to avoid preventable harm and adverse drug events in the short term while improving long-term outcomes and BP control. We propose the following approach for patients hospitalized for noncardiac, nonneurovascular reasons with asymptomatic elevated BP, which is based on best available evidence (**Figure**).

Step 1 is to assess for acute end-organ damage. Determine whether any signs or symptoms of acute hypertension-mediated organ damage are present, particularly when BP is severely elevated (>180/120 mm Hg). Guidelines vary regarding routine testing to assess for acute organ damage[3]; generally, testing should be tailored to patient symptoms and risk factors. If a hypertensive emergency is suspected, BP should be reduced rapidly, most often in an intensive care unit, according to guidelines.[2,3]

Step 2 is to ensure the appropriate mesurement technique is used and then remeasure. Inpatient BP measurements lack standardization, are prone to inaccuracies, and often fail to adhere to established outpatient principles, such as patient positioning and cuff

Figure. Management of Persistently Elevated Blood Pressure (BP) in Asymptomatic Adults Hospitalized for Noncardiac, Nonneurovascular Reasons



ICU indicates intensive care unit; NSAID, nonsteroidal anti-inflammatory drug; PCP, primary care physician.

size.[9] Ensure that elevated BPs were taken appropriately, then remeasure after a period of rest. Interpret elevated BPs taken from the ankle or leg cautiously. Step 3 is to treat contributing factors. Elevated BP in the hospital is common, even among patients who do not have hypertension at home.[4,6] Often this indicates another condition that may itself warrant treatment, such as pain, nausea, or anxiety; sleep disruption; changes in volume status; withdrawal from recreational (eg, alcohol) or prescription (eg, clonidine) drugs; drug intoxication (eg, cocaine); delirium; or other physiologic stressors.[1,2] In such cases, rather than treating the BP, the underlying condition should be addressed; this is analogous to treating patients with sinus tachycardia.

Step 4 is to review home and hospital medications. Review the health record for any medications that may contribute to elevated BP, such as nonsteroidal anti-inflammatory drugs, acetaminophen, corticosteroids, and sympathomimetics, among others.[2] Consider discontinuing any unnecessary agents to improve BP control. Unintended medication discrepancies may occur on admission to the hospital, or antihypertensives may be intentionally held during the early stages of an acute illness. A thorough medication reconciliation should be performed, and home antihypertensives should be reinitiated, if appropriate. The assistance of a clinical pharmacist may help to reduce errors.

Step 5 is to consider patient-specific factors. When BP elevations persist despite the previously described interventions, the decision to intensify the existing antihypertensive regimen, through either a dose change or addition of a new oral agent, should be tailored to patient-specific factors. First, outpatient BP trends should be reviewed, when available. Adequate BP control in the outpatient setting argues against treating elevated BPs in the hospital. Next, consider patient age, comorbidities, and prognosis. Patients with limited life expectancies are less likely to benefit from medication intensification. Older patients and those with frailty or hospital-related functional or cognitive impairment may be more susceptible to adverse events from changes to the antihypertensive regimen. Ultimately, most hospitalized patients with asymptomatic elevated BP do not warrant modifications to their antihypertensive regimen in the hospital or on discharge.

In select patients with chronic cardiovascular-kidney-metabolic or neurovascular diseases, poorly controlled hypertension at baseline, and a willingness to make medication changes, hospitalization may represent an opportunity to optimize BP control. In such cases, the addition or intensification of a long-acting, guideline-concordant[2] oral antihypertensive can be considered, with the goal of gradual BP reduction over weeks. In general, such changes should not be made in the hospital unless the intent is to continue them on discharge. Step 6 is to develop a transitional care plan. For all inpatients with persistently elevated BPs, timely outpatient follow-up is vital. Consider providing an ambulatory BP monitor with instructions to measure BP at home using an appropriate technique. Counsel on ambulatory BP targets, lifestyle modification, and adherence to home antihypertensives.

If the decision is made to intensify or initiate a new long-term antihypertensive in the hospital, the inpatient clinician should ensure buy-in from the patient and their primary care clinician; otherwise, changes to the medication regimen are unlikely to persist in the long term.[10] In addition to counseling patients on home monitoring, adherence, and ambulatory BP goals, potential adverse effects and a plan for managing low BPs should also be discussed.

Conclusions

Elevated BP in the hospital is common and most often asymptomatic. Recent observational studies have demonstrated that intensive pharmacologic treatment of elevated BP without end-organ damage may be harmful. Modifications to antihypertensive regimens should be avoided for most asymptomatic hospitalized patients; however, they can be considered for a minority of patients with persistent BP elevations, underlying comorbidities, poor baseline control, and a readiness to enact medication changes. A careful, stepwise approach is recommended.

ARTICLE INFORMATION

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