7-2017

Asymptomatic Hypertension in the Emergency Department

Jed Grant
University of the Pacific, jgrant@pacific.edu

Karimeh Borghei
University of California, Davis

Asymptomatic Hypertension in the Emergency Department

Authors:

Jed Grant, MPAS, PA-C

University of the Pacific PA Program

3200 Fifth Avenue

Sacramento, CA 95817

jgrant@pacific.edu

Office: 916-739-7062

Karimeh Borghei, MSN, FNP-C, PA-C

UC Davis CTSC Clinical Research Center

2221 Stockton Blvd., Suite D

Sacramento, CA 95817

kborghei@ucdavis.edu

Office: 916-703-5593

KEY WORDS

Asymptomatic Hypertension, Hypertensive Urgency, Hypertensive Emergency, Hypertension in the ED, ED work-up hypertension, ED treatment hypertension.

SYNOPSIS

About 5% of emergency department patients will have an elevated blood pressure. Although there are clear guidelines for the treatment of a patient with end organ damage (hypertensive crisis), there is little evidence to guide the evaluation of an asymptomatic patient with an elevated blood pressure in the ED. A reasonable approach is to attempt to ascertain the baseline blood pressure, determine if there is a high probability of occult end organ damage, avoid non-beneficial diagnostic studies, reduce further risk to the patient by initiating conservative treatment in the ED, and allow the primary care provider to bring the patient to the goal blood pressure. Generally acute treatment is not indicated and may possibly be harmful.

KEY POINTS

- Data is limited and there is a paucity of evidence upon which to base treatment of the asymptomatic patient with elevated blood pressure.
- A recheck of the blood pressure at 90 minutes following triage often shows improvement and helps guide the ED evaluation and follow up decisions.
- If history and physical exam are normal, no workup is needed unless blood pressure is >180/110mm Hg. Then, only creatinine or a basic metabolic panel is indicated.

- Consider a basic metabolic panel and discharge with prescription for antihypertensive for African American patients, indigent patients, and those with unreliable or poor follow up.

- Acute treatment is not indicated and possibly harmful. If you must treat, give patient a dose of the antihypertensive medication that is already prescribed by his/her primary care provider, or one you will prescribe at discharge.

INTRODUCTION

Approximately 30% of Americans have hypertension, and about 5% of emergency department (ED) patients will have a blood pressure that is elevated. Of those with elevated blood pressure on initial presentation to the ED, about 40% will have a blood pressure high enough to be associated with end organ damage.[3,7] Although pain and the stress of visiting the ED may contribute to an elevated blood pressure at presentation, one study showed that 75% of those presenting with uncontrolled hypertension were non-compliant with medications.[6] Another showed that on recheck of the BP at 90 minutes most patients returned to their baseline blood pressure, therefore a repeat blood pressure at 90 minutes is an important tool in the evaluation of these patients.[4,5]

The real question is what to do with those patients who have no symptoms, but may have occult underlying end organ damage. Data in establishing guidelines for evaluation and treatment of patients with asymptomatic hypertension in the ED setting is limited due to lack of large outcome studies to help determine the validity of such guidelines. The American College of Emergency Physicians (ACEP) has a policy regarding this issue that was updated in 2013,

however there is a paucity of evidence upon which to base guidance.[4] This chapter will focus on the evaluation and treatment of the asymptomatic hypertensive patient.

DEFINITIONS

The definition of hypertension is based on the Eighth Joint National Committee (JNC 8) guidelines as published in 2014.[11] These guidelines are for adults 18 years and older with hypertension and is focused on the primary care setting. The definition of hypertension is further delineated in the general population and in populations with diabetes or chronic kidney disease. In individuals less than the age of 60 in the general population, hypertension is defined as a systolic blood pressure of 140 mm Hg or greater and/or a diastolic blood pressure of 90 mm Hg or greater.[11] In individuals that are age 60 or older in the general population, hypertension is defined as a systolic blood pressure of 150 mm Hg or greater and/or a diastolic blood pressure of 90 mm Hg or greater. In the population with diabetes and no chronic kidney disease (CKD) hypertension is defined as a systolic blood pressure of 140 mm Hg or greater and/or a diastolic blood pressure of 90 mm Hg or greater in all adults.[11] In the population with chronic kidney disease, regardless of the presence of diabetes, hypertension is defined as systolic blood pressure of 140 mm Hg or greater and/or a diastolic blood pressure of 90 mm Hg or greater in all adults. See table 1.

CLASSIFICATIONS OF HYPERTENSION

Hypertension is most commonly primary (essential), but may be due to secondary causes on occasion. In 90-95% of individuals with hypertension, no root cause can be identified.[9] There are current implications that genetics may play a role in the development of

high blood pressure, such as hypertension being more prevalent in some families and in African Americans. Primary or essential hypertension can also be caused by increased sodium consumption, excessive alcohol use, obesity, sedentary lifestyle, use of tobacco and nicotine products, polycythemia, aggressiveness, and poor stress coping skills.[9]

In approximately 5% of all individuals a root cause for hypertension is found. Secondary hypertension should be considered in individuals with sudden onset of hypertension, in individuals less than the age of 30 without a family history of hypertension, and with suddenly uncontrolled blood pressure that had previously been well controlled.

Medication related etiologies of secondary hypertension include use of oral contraceptives, hormone therapies as used in infertility and transgender treatments, sympathomimetics, decongestants, non-steroidal anti-inflammatory drugs, appetite suppressants, antidepressants, corticosteroids, anabolic steroids, cyclosporine, and erythropoietin. Hypertension is also caused by excessive consumption of caffeine, excessive ingestion of black licorice, and use of illicit drugs such as cocaine and methamphetamines.[9]

Systemic etiologies of secondary hypertension include acute and chronic kidney disease, renal artery stenosis, hyperthyroidism, hypothyroidism, primary hyperaldosteronism, Cushing syndrome, coarctation of the aorta, pheochromocytoma, and obstructive sleep apnea.[9]

Hypertension in the ED is most commonly situationally transient, acutely elevated, chronic hypertension.[5] In this setting hypertension can further be classified as hypertensive crisis/emergency or hypertensive urgency.

Chronic Hypertension

In the emergency department setting hypertension may be caused by pain due to a traumatic injury, a procedure or illness, and by anxiety secondary to the setting. In all of these situations the elevated blood pressure is situational and transient, usually returning to the patient's baseline within 90 minutes. Only about 6% of patients with blood pressure that remains elevated 90 minutes after arrival will have a normal blood pressure outside the ED, and likely have underlying chronic hypertension.[1, 4, 5] While these patients are most appropriately managed in the primary care setting, this may be a valuable opportunity for the emergency department provider to start therapy for those patients who have poor follow-up or are at increased risk of end organ damage.[7]

Hypertensive Crisis and Hypertensive Emergency

Hypertensive crisis or hypertensive emergency is classified as systolic blood pressure $\geq$ 180 mm Hg or a diastolic blood pressure $\geq$ 110 mm Hg associated with acute end-organ damage. There is poor correlation between the blood pressure numbers and presence of end organ damage, so how high is too high for an asymptomatic patient? There is some discordance in the literature, but generally an asymptomatic patient may be discharged safely with a prescription for antihypertensive medication and a blood pressure as high as 180/110mm Hg.[4, 8, 10]

Signs and Symptoms

Hypertension in itself does not cause any symptoms, but over time may have a profound effect on the brain, eyes, heart, and kidneys. An appropriate history and physical exam focused on the end organs most affected by hypertension should be performed. Interestingly, one study found that emergency providers are not particularly adept at recognizing hypertension until it reaches the range associated with hypertensive urgency, and then only 36% of patients with blood pressure above 180/100mm Hg had fundoscopy performed in the ED.[5] Acute changes in vision may be reported due to retinal hemorrhages, though the more concerning finding on funduscopic examination would be papilledema indicating elevated intracranial pressure.

Concerning signs and symptoms of hypertension related to brain injury include altered mental status, confusion, irritability, headache, and focal neurologic findings all of which may be suggestive of intracranial hemorrhage.[8,9] Any change in the baseline level of neurologic function combined with a markedly elevated blood pressure suggests ongoing insult to the brain.

Hypertension is the second most common cause of end stage renal disease. African American patients and those with coexisting diabetes are at increased risk for progression to renal failure associated with hypertension. Symptoms of azotemia may be absent, and when present may be vague depending on whether the cause of renal insult is pre-renal, intrarenal, or post-renal. Symptoms may include hematuria, edema, pericardial friction rub caused by uremic pericarditis, abdominal bruit, palpable kidney or asterixis (flapping tremor) in the setting

of hypertensive nephropathy.[8,9] Asterixis and pericarditis are indications for emergency dialysis.

Aortic dissection occurs when the intima and media dissect in the aorta. It may occur in the setting of profound hypertension and classically presents dramatically with a sudden onset of a tearing pain radiating to the intra-scapular area. Blood pressure differential may exist in the upper extremities, or between the upper and lower extremities depending on the location and severity of the tear. Any chest pain radiating to the back in the setting of markedly elevated blood pressure should prompt concern for dissection.

Acute coronary syndrome and pulmonary edema may occur in the setting of markedly elevated blood pressure. Chest pain, shortness of breath, dizziness or syncope, and rales on auscultation of the lungs are commonly associated with these diagnoses and should spur prompt intervention from the clinician.

Pre-eclampsia/eclampsia is associated with hypertension in the pregnant patient. In the normal patient blood pressure should fall during early gestation and gradually return to normal by full term. Hypertension with proteinuria and edema occur in pre-eccampsia, while the onset of seizure heralds eclampsia.

Asymptomatic hypertension only occurs in the stable patient without signs or symptoms of end organ damage. Presence of end organ damage as evidenced by history, physical exam or diagnostic studies is an indication for further evaluation and treatment in the ED, however the focus here is on the asymptomatic patient with hypertension.

Diagnostic Evaluation

While a proper history and physical exam are required, multiple studies have shown that routine ordering of diagnostic studies to screen for end organ damage in the asymptomatic patient is not beneficial.[2,3] Complete blood count (CBC), Chest x-ray, Computerized Tomography (CT) of the brain or chest, electrocardiogram (ECG), and urinalysis (UA) were all found to be of no benefit in the evaluation of the asymptomatic hypertensive patient and should not be routinely ordered.[2,3,4]

A basic metabolic panel (BMP) or serum creatinine may be ordered for African American patients because they are at risk for accelerated end organ damage particularly in the setting of co-morbid diabetes mellitus.[6,7] Likewise, indigent patients or those with poor access to care may have either a creatinine alone or BMP performed because those patients with long standing untreated hypertension are most likely to have occult hypertensive nephropathy.[6,7,8]

Patients with pressures higher than 180/110mm Hg may also have a serum creatinine or BMP in the ED. A benefit of obtaining the BMP rather than just the serum creatinine is that the additional information provided is helpful in determining which medications are safe to prescribe on discharge and may reveal co-morbidities with significant prognostic value. Obtain a pregnancy test on a hypertensive female before prescribing an angiotensin converting enzyme inhibitor (ACEI) or angiotensin receptor blocker (ARB).

Indications for initiation of anti-hypertensive medications in the ED

It may ultimately take several months and multiple treatment modalities to get blood pressure to goal. The goal of initiating anti-hypertensive medications for patients with asymptomatic hypertension in an ED setting is not to treat the numbers and bring the BP to goal, but to begin the process of treatment to reduce end organ damage in those patients at most risk.[1,4,7,8] There is no difference in outcomes for those patients with hypertensive urgency admitted or treated as an outpatient.[10] Likewise there are no studies associating hypertensive urgency with acute risk of end organ injury, and the majority of patients with hypertensive urgency have uncontrolled hypertension six months later.[10] Caution should be taken when considering lowering blood pressure acutely, such as when requested by law enforcement to lower blood pressure for medical clearance for incarceration. Chronically elevated asymptomatic blood pressure should not be lowered to a normal goal during a brief emergency department visit because there is paradoxically increased risk of damage to end organs, particularly to the brain.[1,4,8]

One dose of the patient's usual prescribed antihypertensive for those patients with chronic hypertension may be given in the ED if the blood pressure is $\geq$ 180/110mm Hg. Though caution is advised, for antihypertensive naïve patients with a markedly elevated blood pressure medications listed in Table 2 may be used, with treatment choice depending on patient race, comorbidities and socioeconomic factors. After initiating medications, ideal follow-up by a primary care provider should be within one week.[8] It is appropriate to prescribe 30 days of medication however, refills and medications for more than 30 days are not recommended due to need for close follow-up.

SUMMARY

Asymptomatic hypertension is chronically uncontrolled hypertension that has very low risk of causing acute end organ damage.[10] As with other chronic problems, it is best treated over the long term by the primary care provider. No serious hypertensive–related adverse events occurred when delaying medical intervention until follow-up out to six months, though placing the patient on anti-hypertensive therapy at discharge may protect from further end organ damage. [2,4,7,8,10]

Though there is limited evidence upon which to base guidelines for treatment in the ED, current recommendation is that routine screening for acute target organ injury is NOT required in this population unless the patient is African American or has poor follow-up or limited access to care.[3,6,7] For those patients, and for patients with a blood pressure $\geq$180/110mm Hg that does not normalize after 90 minutes of observation, serum creatinine or BMP may be appropriate to order to evaluate for occult kidney dysfunction and to determine patient disposition.[4,7] (Table 3) Routine screening of UA, chest radiograph, and an ECG were shown to be of no benefit in all populations studied and should not be routinely performed.[3] The majority of these patients are safe to discharge with follow up with their primary care provider within one week. (See figure 1)

See Tables and Figure separately.

References:

1. Lawson L, Robelli S. Best Evidence on Management of Asymptomatic Hypertension in Emergency Department Patients. J of Emergency Nursing. March 2011. 37:147-178

2. Karras DJ, Kruus LK, Cienki JJ, et al. Evaluation and Treatment of Patients with Severely Elevated Blood Pressure in Academic Emergency Departments: A Multi-Center Study. Annals of EM, March 2006. 43:230-236.

3. Karras DJ, Kruus LK, Cienki JJ, et al. Utility of Routine Testing for Patients with Asymptomatic Severe Blood Pressure Elevation in the Emergency Department. Annals of EM, March 2008. 51:231-239.

4. Wolf SJ, Lo B, Shih RD, et al. Clinical Policy: Critical Issues in the Evaluation and Management of Adult Patients in the Emergency Department with Asymptomatic Elevated Blood Pressure. Annals of EM, July 2013. 62:59-68

5. Tilman K, DeLashaw M, Lowe S, et al. Recognizing Asymptomatic Elevated Blood Pressure in Emergency Department Patients: How Good (Bad) Are We? American J of EM, 2007. 25:313-317

6. Nishijima DK, Paladino L, Sinert R. Routine Testing in Patients with Asymptomatic Elevated Blood Pressure in the Emergency Department. American J of EM, 2010. 28:235-242.

7. Brody A, Rahman T, Reed B, et al. Safety and Efficacy of Antihypertensive Prescription at Emergency Department Discharge. Academic EM, SAEM 2015. 22:632-635

8. Baumann BM. Systemic Hypertension. In: Tintinalli JE, editor in chief. Emergency Medicine: A Comprehensive Study Guide, 8th ed. McGraw Hill, 2016. 57:399-408.

9. Sutters M, Systemic Hypertension. In: Papadakis MA, McPhee SJ, Rabow MW editors, Current Medical Diagnosis and Treatment 2016, 55th edition, McGraw Hill; 2016. 11:435-467

10. Patel KK, Young L, Howell EH, et al. Characteristics and Outcomes of Patients Presenting with Hypertensive Urgency in the Office Setting. JAMA Int. Med. 2016. 176(7):981-988

11. James PA, Oparil S, Carter BL, et al. 2014 evidence-based guideline for the management of high blood pressure in adults: report from the panel members appointed to the eighth Joint National Committee (JNC 8). JAMA. doi:10.1001/jama.2013.284427.