

EM CASE OF THE WEEK

BROWARD HEALTH MEDICAL CENTER DEPARTMENT OF EMERGENCY MEDICINE

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Hypertension is one of the most common diseases found in healthcare, affecting 50 million Americans. While chronic hypertension is a major contributor to morbidity and mortality, it is even more important to identify acute hypertensive emergencies as they pose an immediate, life-threatening situation that must be carefully managed

EM CASE OF THE WEEK

EM Case of the Week is a weekly “pop quiz” for ED staff. The goal is to educate all ED personnel by sharing common pearls and pitfalls involving the care of ED patients. We intend on providing better patient care through better education for our nurses and staff.



Hypertensive Emergency

A 58 year old African American male with PMHx of HTN and hyperlipidemia is referred to the ED after a visit to his PCP due to a blood pressure of 225/130 mmHg during his office visit despite compliance with his lisinopril 10mg PO daily. Vital Signs are T 98.6 HR 95, RR 18, O2 96% RA. Physical exam reveals papilledema and urinalysis shows microscopic hematuria and proteinuria. EKG and CXR are normal. Creatinine is 2.9 with known baseline of 1.1. What is the most appropriate treatment strategy for this patient’s blood pressure?

- A blood pressure goal of <140/90 should be rapidly obtained with IV anti-hypertensive medications.
- Increase the patient’s dose of lisinopril to 20mg PO daily and discharge with outpatient follow up.
- Give the patient 1 dose of IV labetalol, increase patient’s dose of lisinopril to 20mg PO daily and discharge with outpatient follow up.
- Lower blood pressure using short acting, titratable IV antihypertensives by 10-25% within the first hour, with an additional 5-15% reduction over the next 23 hours and admit.
- Lower blood pressure using short acting, titratable IV antihypertensives by 10-20% within the first hour. If the patient’s blood pressure improves, the patient can be discharged with outpatient follow up.



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Hypertensive Emergency

The correct answer is D. Hypertensive emergency is defined as an acute elevation in blood pressure with evidence of end organ damage. In the patient above, the patient's blood pressure is clearly elevated to extreme levels, and evidence of papilledema on physical exam and acute kidney injury with hematuria and proteinuria suggest end organ damage involving the neurological and renal systems. Strict management of the patient's blood pressure is important. If the patient's blood pressure is lowered too quickly, there is a risk of decreased perfusion to vital organs like the brain, kidney and heart. This occurs because most patients presenting with hypertensive emergency are chronically hypertensive and therefore have physiologically adjusted to the increase in pressure. If the pressure is dropped too fast, the body will not have time to adjust, leading to decreased blood flow. Therefore, in the patient above, your goal is to drop the diastolic blood pressure 10-15% in the first hour to prevent further end organ damage, followed by a slow decrease in pressure to allow physiologic adaptation to lower pressures. These patients require hospitalization in an intensive care unit to ensure end organ damage is minimized with strict control of blood pressure utilizing IV anti-hypertensive agents.

Take Home Points

- Hypertensive emergency is generally defined as severe hypertension with SBP >180 or DBP >120 with evidence of end organ damage
- End organ damage commonly affects the neurological, cardiovascular, or renal systems
- Common causes of hypertensive emergency include medication non-compliance, sympathomimetic abuse, collagen vascular diseases or renal parenchymal disease.
- The primary treatment goal is to decrease the MAP by 10-15% within the first hour, and an additional 5-15% in the following 23 hours

Discussion:

Hypertension is one the most common diseases encountered by health care professionals. 50 million people in the USA and approximately 1 billion people worldwide suffer from hypertension. Of those, it is estimated that 1% of all patients with hypertension will develop hypertensive emergency in their lifetimes. Hypertensive emergency is generally defined as severe hypertension with SBP > 180 and DBP > 110 with evidence of end organ damage. If a patient meets the blood pressure criteria without evidence of end organ damage, it is classified as hypertensive urgency. Left untreated, hypertensive emergency carries close to an 80% mortality rate due to its high association with stroke, heart attack and renal failure. Before the widespread use of anti-hypertensives, this condition was referred to as "malignant hypertension" due to the similar mortality rote to that of many true malignancies.

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and click on the "Conference" link. All are welcome to attend !

Etiology and Pathophysiology. Common causes of hypertensive emergency include medication non-compliance, sympathomimetic abuse, collagen vascular diseases or renal parenchymal disease. It is believed that hypertensive emergency is caused by a triggering factor superimposed on pre-existing hypertension, and the risk of developing hypertensive emergency is directly proportional to the severity and controllability of the patient's existing hypertension. A sudden increase in blood pressure results in endothelial damage, activation of the clotting cascade, and fibrinoid necrosis of small blood vessels that results in the release of vasoconstricting factors. This creates a constant loop of potentiating damage as continually increasing damage results in increasing release of vasoconstricting factors. This vasoconstriction in the renal system activates the RAAS system, which further potentiating vascular damage.

Patient Presentation. Patient presentation varies depending on where end organ damage is occurring. The susceptibility of various organ systems to end organ damage is variable in each person. If the neurologic system is involved, patient's can present with headache, altered mental status, papilledema or focal neurological deficits. If the cardiopulmonary system is involved, then chest pain, MI, shortness of breath, pulmonary edema and acute LV dysfunction may occur. If the renal system is involved, then hematuria, oliguria, and AKI are common. It is important to remember that many patients can present completely asymptotically.

A focused and detailed history is important to elicit from the patient because treatment strategies can vary greatly depending on if an etiology for the hypertensive emergency can be discovered. Of special importance is any recreational drug use, as cocaine is a common cause of hypertensive emergency but requires a very different treatment strategy. Basic workup of a patient should include CBC, CMP, EKG, UA, and drug screen. CT of the brain or chest can be performed if stroke or aortic dissection is suspected.

Treatment. Treatment of hypertensive emergency is centered on careful reduction of blood pressure. A balance should be struck between reducing the blood pressure to prevent further end organ damage while keeping blood pressure high enough to maintain perfusion in a patient who is physiologically adapted to chronically elevated pressures. The initial treatment strategy is to use IV anti-hypertensive agents to decrease the blood pressure 10-15% in the first hour. The exception to this rule is if the patient has a confirmed dissecting aneurysm, where the goal should be 10-15% reduction in 5 minutes. After this initial reduction is achieved, the patient can be weaned off of IV medications and can be transitioned to oral anti-hypertensive agents with the goal to reduce the blood pressure another 5-15% in the next 24 hours. Careful monitoring is required in an intensive care unit in order to ensure blood pressure does not drop to undesirable levels to prevent perfusion injuries.

The medications used to treat hypertensive emergency vary based on the location of end organ damage. The goal is to use an easily titratable, short acting agent whose pharmacodynamics are very predictable. The most commonly used drugs for this purpose tend to be beta blockers such as esmolol and labetalol. Fenoldopam, nitroprusside, and nicardipine can also be used. In the setting of hypertensive emergency caused by cocaine use, beta blockers are absolute contraindications, because beta blockade would provide physiologically unopposed alpha-1 adrenergic vasoconstriction, leading to potentiating of the hypertensive emergency. Following the initial blood pressure reduction via IV medications, patients can be started on any oral anti-hypertensive medication taking into account patient co-morbidities to continue the gradual reduction in blood pressure.

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ABOUT THE AUTHOR:
This month's case was written by Ajith Susai. Ajith is a 4th year medical student from NSU-COM. He did his emergency medicine rotation at BHMC in January 2016. Ajith plans on pursuing a career in Internal Medicine after graduation.