Targeting High Blood Pressure in Emergency Department

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Confusing Terminologies for Severe High BP

- Urgent
- Emergent
- Accelerated
- Malignant
- Hypertensive crisis
- Uncontrolled

Vignette

- A 66-y-old woman with a history of chronic hypertension presented to ED because of reading a high number for her BP in a self check after noting a mild headache.

Which BP level should be targeted for acute ED management?

- 160/100
- 180/110
- 220/120
- ?

Which BP level should be targeted for acute ED management?

- 160/100 (stage II hypertension according to JNC-7)
- 180/110 (defined as hypertensive crisis by JNC-7)
- 220/120 (usually perceived as extreme hypertension)
- ?

Vignette (cont'd)

On ED admission the BP is 220/120 mmHg.

Physical exam otherwise is normal.

- What is the best ED antihypertensive strategy?
  - IV drugs (Labetalol, …)
  - Sublingual (Captopril, …)
  - Oral (Diuretic, …)
- What other ED studies are required?

Case 1

- A 55-yr-old woman, presented to the ED at 4 am, complaining of sudden-onset severe vertigo and frequent vomiting, woken her up at night.
- PMH: long-term HTN, taking Lisinopril 5mg/d
- P/E:
  - BP= 200/110 PR= 88
  - Anxious but alert
  - Normal cardiopulmonary exam
  - Grade 1 hypertensive retinopathy on fundoscopy
  - Rotational nystagmus with no neurological deficit

Case 2

- 64-yr-old man with chronic HTN, presented with acute-onset, intolerable sharp, tearing interscapular pain.
- P/E:
  - BP: 185/110
  - Agitated but conscious
  - Normal cardio-pulmonary exam
  - Normal Fundoscopy
- ECG: LVH

Case 3

- A 70-yr-old diabetic female, presented with acute R hemiparesis & incoherent speech
- P/E:
  - BP= 210/110 PR=75
  - S4 in heart; clear lungs
  - Fundoscopy not possible because of cataract
  - R facial & R arm weakness; dysphasic

Case 4

- A 55-yr-old man, presented with nausea, vomiting and confusion.
- P/E:
  - BP= 210/115 PR=80
  - Uncooperative and altered level of consciousness
  - No obvious focal neurologic deficit
  - Fundoscopy shows bilateral papilledema

Questions to be addressed

- What is the cut-off point for severely high BP?
- Is high BP indicative of true HTN in ED?
- What is the danger of severely elevated BP?
- Which patients would benefit from prompt therapy?
- What should be the basic ED work-up?
- What is the best ED treatment?
- Who needs to be admitted?

Is high BP indicative of true HTN in ED?

- Between 25% and 70% of hypertensive patients in ED will prove hypertensive in follow-up
- Higher BP reading (≥160/100 mm Hg) during the ED stay are more correlated with HTN at follow-up
- Recommend hypertensive patients to have their BP checked after discharge

What is the cut-off point for severely high BP?

- No strict criteria
- Usually defined as SBP≥ 180 or DBP≥ 120 mm Hg
- Definition adopted from JNC-7* guideline

** 7th report of Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High BP*

What's the danger of severely elevated BP?

- Put the patient at risk for acute target organ damage (TOD)
  - Encephalopathy
  - Cerebral ischemia or hemorrhage
  - Coronary ischemia
  - Myocardial dysfunction with pulmonary edema
  - Aortic dissection
  - Acute renal insufficiency
  - Acute funduscopic changes

What should be the basic ED work-up?

- No evidence-based guideline
- JNC-6 recommending:
  - Urinalysis
  - Basic metabolic tests
  - ECG
  - Chest radiograph
  - CBC
- JNC-6 was not intended to provide guidance for acute care setting!

How to evaluate severe HTN in ED?

- Only in 6% of severely hypertensive patients in ED (24 out of 423 patients) were subjected to full tests as suggested by the guideline

  [Karras et al [Ann Emerg Med. 2006]

- Only in 6% of those who were fully tested, the result significantly changed the clinical decision (7 out of 109 patients)

  [Karras et al [Ann Emerg Med. 2008]

Is routine evaluation for TOD indicated?

- ACEP* does not recommend routine evaluation for TOD (level C)
- In selected patient populations (eg, poor follow-up), screening for an elevated serum creatinine may be indicated

* ACEP policy: "the Evaluation and Management of Adult Patients in the Emergency Department With Asymptomatic Elevated Blood Pressure" (*Ann Emerg Med. 2013;62:59-68*)

Who needs rapid BP control?

- Most patients with acute TOD need immediate control
  - Hypertensive encephalopathy
  - Preeclampsia
  - Aortic dissection
  - Progressive renal failure
  - Cardiogenic pulmonary edema
  - CVA is a major exception
- Those without TOD may need risk stratification for treatment planning

Who needs rapid BP control?

Recommended (Active TOD)	May be indicated (High risk for TOD)	Not suggested (Low risk for TOD)
Hypertensive encephalopathy	Previous CVA	All those not fitted in other risk groups
Pulmonary edema	Stable CAD	Acute stroke
Preeclampsia	Chronic kidney disease	
Aortic dissection	Diabetes mellitus	
Progressive renal failure	Minor symptoms (headache, epistaxis)	

Strategy to control severe HTN

	Active TOD	High risk for TOD	Low risk for TOD
Status	Emergent	Urgent	Non-urgent
BP reduction goal in ED	≤25% reduction in 1 hr To 160/100 mmHg in 6 hr	None if is followed out-patiently	None if is followed out-patiently
Treatment onset	ED	ED or outpatient	Outpatient
Mode of therapy	IV	Oral	Oral
Disposition	Admission	Discharge	Discharge

What is the best ED treatment?

	Drug choices	Drugs to be avoided
Hypertensive encephalopathy	Labetalol, nicardipine, esmolol	Nitroprusside, hydralazine
Aortic dissection	Labetalol, nicardipine, nitroprusside Plus esmolol	beta-blockers if there is aortic regurgitation or cardiac tamponade
CHF	Nitroglycerin, enalaprilat, diuretics	Labetolol
Preeclampsia	Hydralazine, labetalol, nifedipine	ACE inhibitors, Nitroprusside, esmolol

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Case 1 management

- Clinical Assessment: Peripheral vertigo causing anxiety and severely elevated BP
  - Provide the patient a quiet room to rest
  - Symptomatically manage the vertigo
  - If symptoms are controlled & SBP≤ 200 mmHg, she can be discharged and referred for follow-up

Case 2

- 64-yr-old man with chronic HTN, presented with acute-onset, intolerable sharp, tearing interscapular pain.
- P/E:
  - BP: 185/110
  - Agitated but conscious
  - Normal cardio-pulmonary exam
  - Normal Fundoscopy
- ECG: LVH

Case 2 management

- Clinical assessment: Aortic dissection and hypertensive emergency
  - Aggressively reduce SBP to as low as 100 mmHg if tolerated
  - Treatment choice is labetalol or nitroprusside plus beta blocker
  - Request for a definite imaging study for aortic dissection
  - Consult with a vascular surgeon

Case 3

- A 70-yr-diabetic female, presented with acute R hemiparesis & incoherent speech
- P/E:
  - BP= 210/110 PR=75
  - S4 in heart; clear lungs
  - Fundoscopy not possible because of cataract
  - R facial & R arm weakness; dysphasic

Case 3 management

- Clinical assessment: Acute stroke associated with severely elevated BP
  - Request for brain CT
  - Don't reduce BP if hemorrhagic stroke was ruled out
  - Admit the patient for close follow-up

Case 4

- A 55-yr-old man, presented with nausea, vomiting and confusion.
- P/E:
  - BP= 210/115 PR=80
  - Uncooperative and altered level of consciousness
  - No obvious focal neurologic deficit
  - Fundoscopy shows bilateral papilledema

Case management

- Clinical assessment: hypertensive encephalopathy
  - Reduce MAP by 20% to 25% over 6 h
  - Labetalol is the drug of choice
  - Be cautious to administer nitroprusside or hydralazine
  - Plan further lowering BP to 160/100 within few days or weeks

Vignette

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Vignette (management)

- Provide rest and reassurance
- Urge home drugs (if already missed)
- Make sure the BP is not accelerating by planning a short time ED observation
- Schedule for an outpatient follow-up
- Discharge the patient with no additional ED studies

Conclusion

- Active TOD mandates ED intervention; CVA is a major exception
- Most cases of asymptomatic severe high blood pressure do not need ED treatment
- Hypertension is a major example of ED overtreatment

Thank you for your attention