Hypertension

National Pediatric Nighttime Curriculum

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Case 1

- You are the intern and are paged at 8pm:

  "FYI: The patient in Room 678 has a BP of 125/82.– Nurse Mike"

- Signout:

  11yo male here for asthma exacerbation.

  Meds: Albuterol q3h, Prednisone 60mg

- *What Else Do You Want To Know?*

Case 2

- “The 8mo in room 502 is having blood pressures as high as 113/62. Can I get your opinion? – J. Intern”

- Signout:
  - 8mo female ex 26wk premie admitted for labial abscess
  - Wt: 6.4kg, Length 64cm

- *As you walk to the patient’s room, what is your differential? What questions do you have for the nurse? When would you be concerned enough to intervene?*

Objectives

- Describe the initial steps in evaluation of inpatient hypertension
- Identify scenarios when medical therapy is warranted for inpatient hypertension
- Select pharmacologic therapy for hypertensive urgency and emergency

On Call Hypertension Primer

Hypertension Definitions*

- Prehypertension:
  - SBP and/or DBP between 90th and 95th%
- Stage 1 Hypertension:
  - SBP and/or DBP ≥ 95th%, but ≤ 99th% + 5mm
- Stage 2 Hypertension:
  - SBP and/or DBP > 99th% + 5mm

All based on gender, height and age (see references)

More Definitions

- Hypertensive Urgency:
  - Severe elevation (Stage 2) without end-organ damage

- Hypertensive Emergency
  - Severe elevation (Stage 2) with any signs of end-organ damage

End Organ Damage signs, symptoms includes:

- CNS (headache, seizure, lethargy, irritability)
- Eyes (papilledema, visual changes)
- Cardiac (cough, SOB, signs of heart failure, gallop, abdominal bruit)
- Renal (hematuria, proteinuria)

Initial Approach

- Start by seeing the patient
- Confirm blood pressure
  - Manual reading with auscultation
  - Appropriate size cuff
- Assess blood pressure trends
  - Current and prior data points
- Assess for other secondary causes
  - Pain
  - Drugs
  - Increased ICP
  - Coarctation of the aorta
- Look for symptoms of end-organ damage
  - Classify as emergency, urgency or just hypertension

Differential Diagnosis

- Renal
  - Parenchymal ds
  - Congenital anomaly
- Cardiovascular
  - Coarctation
  - Renal artery stenosis
  - AV fistula
- Psychological
  - Stress, Anxiety
- Endocrine
  - DM
  - Hyperaldosteronism
  - Cushing Syndrome
- Neurologic
  - Increased ICP
  - Pain
- Pharmacologic
  - Steroids
- Other
  - White Coat common in hospital

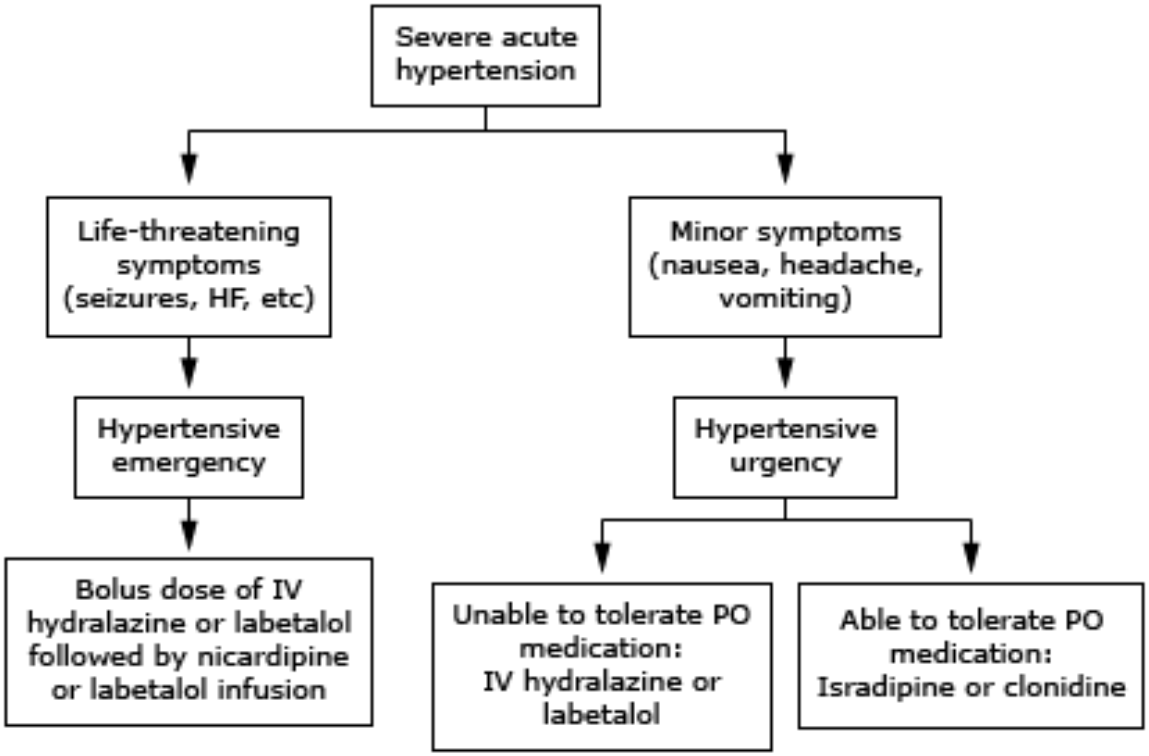
Management

- Hypertensive Urgency
  - Preferentially obtain IV access
    - Oral could be used if tolerating po (Clonidine, Isradipine)
  - If acute, treat medically:
    - Hydralazine 0.2mg/kg/dose IV (max 20mg/dose)
    - Labetolol 0.2mg/kg/dose IV (max 20mg/dose)
  - If chronic (long-standing renal ds, etc)
    - Consult with Nephrology
    - Oral medications potentially
      - Clonidine

Management

- Hypertensive Emergency
  - Obtain IV access
  - Give either:
    - Hydralazine 0.2mg/kg IV (max 20mg/dose)
    - Labetolol 0.2mg/kg IV (max 20mg/dose)
  - Transfer to ICU for IV medications

On-Call Hypertension Algorithm



Flynn, JT, Tullus, K.
Severe hypertension in children and adolescents: pathophysiology and treatment.
Pediatr Nephrol 2008

Big Picture

- The on call job is to identify urgencies/emergencies and treat as needed
- Always interpret blood pressure by age and height-based norms
- Work-up can be done less acutely if patient stable

Take Home Points

- Always recheck BP manually with appropriate cuff
- Treat underlying causes if exist
- Urgency and Emergency require treatment
- End-organ symptoms = Hypertensive Emergency = ICU

References

- National High Blood Pressure Education Program Working Group on High Blood Pressure in Children and Adolescents. The fourth report on the diagnosis, evaluation, and treatment of high blood pressure in children and adolescents. *Pediatrics*. 2004; 114: 555-576.

- Constantine E, Linakis J. The assessment and management of hypertensive emergencies and urgencies in children. *Pediatr Emerg Care*. 2005; 21: 391-396.