Hypertension

National Pediatric Nighttime Curriculum
Written by: H. Barrett Fromme, MD, MHPE
The University of Chicago
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 90\textsuperscript{th} and 95\textsuperscript{th}%

- **Stage 1 Hypertension:**
  - SBP and/or DBP $\geq$ 95\textsuperscript{th}% but $\leq$ 99\textsuperscript{th}% $+ 5\text{mm}$

- **Stage 2 Hypertension:**
  - SBP and/or DBP $> 99\textsuperscript{th}% + 5\text{mm}$

*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

Severe acute hypertension

- Life-threatening symptoms (seizures, HF, etc)
  - Hypertensive emergency
    - Bolus dose of IV hydralazine or labetalol followed by nicardipine or labetalol infusion

- Minor symptoms (nausea, headache, vomiting)
  - Hypertensive urgency
    - Unable to tolerate PO medication: IV hydralazine or labetalol
    - Able to tolerate PO medication: Isradipine or clonidine

Flynn, JT, Tullus, K.
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
