Common Pediatric Emergencies

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Goals and Objectives

By the end of this session, each student should be able to:

- Have systematic approach to sick child in ED
- Know the basics of cardiopulmonary resuscitation in Pediatrics
- Know the ED management of
  - Fever
  - Status epilepticus
  - Asthma
Let's start with the basics!!
Lets start with the basics!!

- Children are not young adults
- Adults are big children but with chest pain
- Different age group
- Age specific norms
- Remember important differences between adult and kids
Normal Pediatric Vitals...

- **RR**
  - > 60/min = abnormal

- **BP**
  - 60 mm Hg in term neonates (0 to 28 days)
  - 70 mm Hg in infants (1 month to 12 months)
  - 70 mm Hg + (2 x age in years) in children 1 to 10 years
  - 90 mm Hg in children 10 years of age

- **HR**
  - Newborn to 3 mths: 85-205
  - 3 months to 2 yrs: 100-190
  - 2 yrs to 10 yrs: 60-140
  - > 10 yrs: 60-100

- **Wt Estimation**
  - < 8 years: 2x[Age]+8
  - > 8 years: 3x[Age]
PALS
Pediatric Cardiorespiratory Arrests

- Respiratory: 80%
- Shock: 10%
- Cardiac: 10%
Rapid Cardiopulmonary Assessment

Airway
Breathing
Circulation

Should take less than 30 seconds to complete
Airway Assessment

- Patent
- Maintainable
<table>
<thead>
<tr>
<th>Differences between the pediatric and the adult airway</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tongue</strong></td>
</tr>
<tr>
<td><strong>Epiglottis</strong></td>
</tr>
<tr>
<td><strong>Larynx</strong></td>
</tr>
<tr>
<td><strong>Cricoid</strong></td>
</tr>
<tr>
<td><strong>Trachea</strong></td>
</tr>
<tr>
<td><strong>Head</strong></td>
</tr>
</tbody>
</table>
Breathing

- RR
- Respiratory Mechanics
  - Retractions, Accessory Muscles use and Nasal Flaring
  - Head Bobbing
  - Grunting
  - Stridor
  - Wheezing

- Air Entry
  - Chest Expansion
  - Breath Sounds

- Color
Circulation

- Heart rate
- BP
  - Vol/strength of central pulses
- Peripheral pulses
  - Present/absent
  - Volume/strength
- Skin perfusion
- Cap.refill time

- Color
  - Mottling
- Temperature
- CNS perfusion
  - Responsiveness
  - Recognizes parents
  - Muscle tone
  - Pupil size
  - Posturing

Capillary refill time alone is not a good indicator of circulatory volume
The most common cause of shock is hypovolemia
Shock

- Compensated
- Decompensated
  - BP
  - Volume expander
  - 20 ml/kg
Intraosseous Cannulation

- Media to tibial tuberosity
- Above medial malleolus
- Distal femur

[Diagram with labels: Tibial tuberosity, Saphencous vein, External femoral condyle, Medial malleolus]
Case # 1

4 days old baby boy brought by his parents with H/O fever since last night clinically looks well temp 38.5 C rectal

How would you approach this child?
Case # 2

3 weeks old baby girl brought by her grandmother complaining of fever for 2 days. Clinically looked well temp 37.5 C rectal

How would you approach this child?
Case # 3

4 month old boy brought to ED with H/O fever for 3 days associated with skin rash clinically looked sick lethargic temp 40 C rectal

How would you approach this child?
Case # 4

2 months old baby girl presented with fever for 3 days. Clinically looked well temp 38.9 C rectal

How would you approach this child?
Fever

- Definition: temperature > 38 °C (100 °F) rectal
- Fever due to an infectious origin in children are rarely above 42 °C
- Serious bacterial infection
  - Bacteremia
  - Meningitis
  - Osteomyelitis
  - Septic arthritis
  - UTI
  - Bacterial enteritis
  - Periorbital cellulitis
  - Abscess
  - Cellulitis
Approach to febrile child ....

- Age dependant
- Documentation of fever
- Detailed History
- Duration of fever
- Associated symptoms

- Look for the focus
  - History
  - Physical exam
  - Investigations

- Management options
  - Age
  - General condition
  - Focus of the fever
Approach to sick young febrile child …

- Acute care area
- ABC
- Quick IV access is important
- Consider all of the following
  - Infection
  - Metabolic
  - Cardiac
  - Abuse
- Abx should be given even before definitive C/S
Fever in Children 0-36 months
## Risks in infants <12 weeks

<table>
<thead>
<tr>
<th>Problem</th>
<th>Toxic</th>
<th>Non-toxic</th>
<th>Low risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bacteremia</td>
<td>11%</td>
<td>2%</td>
<td>1.1% (0.2-2.6)</td>
</tr>
<tr>
<td>Meningitis</td>
<td>4%</td>
<td>1%</td>
<td>0.5% (0.0-1.0)</td>
</tr>
<tr>
<td>SBI</td>
<td>17%</td>
<td>8.6%</td>
<td>1.4% (0.4-2.7)</td>
</tr>
</tbody>
</table>
Clinical judgment and febrile infant protocols do not work in neonates (age 0-1 month)
Mandatory work up

- CBC with diff
- UA and cath culture
- Blood C/S
- CSF + -
- Stool C/S if diarrhea bloody or watery
Treat if .......

- Neonates ≤ 1 month of age who are febrile
- Toxic infants ≤ 3 months of age
Treatment options

Ampicillin 200 mg/kg/ day q 6h
Gentamycin 7.5 mg/kg/day q 8h
(if CSF negative)

OR

Amoxicillin 200 mg/kg/ day q 6h
Cefotaxime 200 mg/kg/day q 6h
Low risk infants 29- 90 days

- Non-toxic, normal exam
- No focus of infection
- Negative past history
- WBC 5- 15,000/mm
- Band <1500/mm
- Normal UA
Treatment options in low risk group

**Option one**
- No Abx and return in 24 – 48 hour

**Option two**
- Ceftriaxone: 50 mg/kg and repeat examination at 24 h and 48 h
3 - 36 months of age

- Overall rate of bacteremia if fever > 39°C is 4-7%
- Increases percent as temperature increases
- Most common organism of sepsis is S. pneumoniae
- Treatment of the focus e.g. OM, UTI
Antibiotics options

<table>
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<tr>
<th>Age Group</th>
<th>ETIOLOGIC AGENTS</th>
<th>IV ANTIBIOTICS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neonate &lt; 2 months</td>
<td>E. coli. Group B streptococci Listeria</td>
<td>Ampicillin 50 mg/kg/dose q 4-6 hrs + Cefotaxime 50 mg/kg/dose q 12 hrs or Gentamicin 2.5 mg/kg/dose q 8 hrs</td>
</tr>
<tr>
<td>2 months – 9 years</td>
<td>N. Meningitidis S. Pneumoniae Group A Strep H. Influenzae (rare)</td>
<td>Cefotaxime 50 mg/kg/dose q 6 hrs Ampicillin 50 mg/kg/dose q 4-6 hrs</td>
</tr>
<tr>
<td>&gt; 9 years</td>
<td>N. Meningitidis S. pneumoniae</td>
<td>Penicillin G250,00 u/kg/24 hrs q 4 hrs or Cefotaxime 50 mg/kg/dose q 6 hrs</td>
</tr>
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Note: any third generation cephalosporin can substitute for cefotaxime
Back to the cases .....
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How would you approach this child?
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- How would you approach this child?
Case # 3

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How would you approach this child?
2 months old baby girl presented with fever for 3 days. Clinically looked well temp 38.9 C rectal

How would you approach this child?
Case # 5

- 2 years old child brought by his parents in generalized convulsion
- How would you approach him?
Figure 1: Treatment of paediatric generalized convulsive status epilepticus

1. Position, airway, suction available secretions, 100% oxygen.
2. Verify adequacy of breathing and circulation.
4. Administer 1 g/kg of 25% dextrose if hypoglycaemia (4 mL/kg).
5. Diazepam 0.3 mg/kg or lorazepam 0.1 mg/kg intravenously with an infusion rate of < 2 mg/min.
6. Diazepam 0.5 mg/kg or paraldehyde 0.3 mL/kg may be given rectally if no IV access.
7. Repeat diazepam 0.3 mg/kg or lorazepam 0.1 mg/kg intravenously up to 3 times.
8. Phenytoin 20 mg/kg IV. Infusion rate of 1 mg/kg/min.
9. Phenobarbital 20 mg/kg IV. Infusion rate of 1 mg/kg/min.
10. The elapsed seizure time is now approximately 45 minutes. Depending on the resources available, further intervention will be needed in consultation with a paediatric intensivist, anaesthetist, neurologist.
11. Transfer to intensive care unit for further treatment.
Status Epilepticus

- Rule out treatable causes
  - Hypoglycemia
  - Intracranial pathology
  - Toxic ingestion

- Management
  - ABC's
  - Short acting benzodiazepines
  - Long acting anti epileptics
SE treatment

1st line anticonvulsants

- IV
  - Lorazepam 0.1 mg/kg
  - Diazepam 0.2 mg/kg
  - Midazolam 0.2 mg/kg
- Rectal diazepam
  - 0.5 mg/kg
- IM, intranasal, buccal midazolam
SE treatment

- **2\textsuperscript{nd} line agents**
  - Phenytoin 20 mg/kg
  - Fosphenytoin 15-20 mg/kg

- **3\textsuperscript{rd} line agents**
  - Phenobarbital 20mg/kg
  - Repeat prn 5-10mg/kg
  - Maximum 40 mg/kg or 1 gram
Refractory SE treatment

- Consider midazolam
  - 0.2 mg/kg bolus
  - Then 1-10 mcg/kg/min infusion

- Induce barbiturate coma
  - Pentobarbital 5-15 mg/kg @ 25 mg/min
  - Then 1-5 mg/kg/hour

- Others
  - Valproic acid
  - Paraldehyde, chloral hydrate
  - Propofol, inhalational anesthesia, paralysis
  - Lidocaine
Case # 6

6 years old buoy known asthmatic on ventolin & flexotide came to ED with H/O cough. Clinically looked well SPO2 100% in RA by auscultation prolonged exp phase

How would you manage this child?
Case # 7

- 11 year old girl presented to ED with progressive SOB for 2 days. She is on ventolin almost regularly for the last 10 days, had previous ICU admission for BA, clinically looked distressed, SPO2 88% RA has wheezing ++ using accessory muscles
- How would you manage this girl?
Case # 8

5 year old child known BA brought to ED with SOB, cough & fever. Clinically has temp 39C diffuse wheeze SPO2 96% with decrease air entry on both bases

How would you manage this child?
Asthma exacerbation
Asses severity…….

Don’t forget your ABC

Asses severity based on:
  - Work of breathing
  - Accessory muscle use
  - RR
  - SPO2
  - Air entry
  - Wheezing
  - LOC

Mild
Moderate
Severe
Mild Asthma exacerbation

- Minimum distress
- Normal SPO2
- Salbutamol
  - Inhaler
  - Neubelization
  - Intermittent dosed
Moderate Asthma exacerbation

- Use of accessory muscles
- Normal saturation
- Decreased air entry
- Salbutamol
  - Inhaler
  - Neubelization
  - Intermittent dosed
  - Steroids
    - PO, IV, Inhaler, or Neubelization?
Severe Asthma exacerbation

<table>
<thead>
<tr>
<th>Significant distress</th>
<th>MgSO4</th>
</tr>
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<tbody>
<tr>
<td>Desaturation</td>
<td>IV salbutamol</td>
</tr>
<tr>
<td>Accessory muscle use</td>
<td>Thiophyline</td>
</tr>
<tr>
<td>Silent chest</td>
<td>Intubation</td>
</tr>
<tr>
<td>Salbutamol &amp; Atrovent</td>
<td>Paralysis</td>
</tr>
<tr>
<td>– 3 doses back to back</td>
<td></td>
</tr>
<tr>
<td>Steroids</td>
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How would you manage this child?
Thank you.....