Paediatric Assessment: The Basics

Carrie Sprigg
Paediatric Clinical Development Seminar
2014

Paediatric assessment

- First impression (PAT)
- Primary survey (ABCDE)
- Secondary survey
- Developmental stages

Primary Survey

- Assessment at triage
  - Alertness, arousal, activity
  - Breathing
  - Circulation
  - Fluids in / fluids out
- Primary Survey (ABCDE)

Airway

Physiological Differences
- Obligatory nose breathers for first several months
- Under 8 yrs (particularly <2 yrs)
  - Small upper and lower airways
  - Large tongue and pharyngeal tissues
  - Soft airway cartilage (trachea)
  - Larynx higher and more anterior

Potential Threats
- Airway obstruction
  - Foreign body
  - Mucus, secretions (bronchiolitis)
  - Oedema (croup, tonsillitis, pharyngitis, epiglottitis)
  - Flexion/hyperextension of the neck
  - Increased risk of aspiration

Intervention
- Age-appropriate airway manoeuvres and adjuncts
  - Crying
  - Hoarse voice (laryngeal swelling)
  - Stridor (croup, upper a/w FB)
  - Secretions, vomit
  - Oedema (tonsils, oropharynx)
  - Tongue obstruction (in depressed consciousness)
**Breathing**

**Physiological Differences**
- Neonates have fewer alveoli
- Under 8 yrs (particularly <2 yrs)
- Immature intercostal muscles (rely on diaphragm)
- Pliable (cartilaginous) chest wall
- Higher O2 requirements (high metabolic rate)
- Less reserve

**Potential Threats**
- Respiratory distress / failure
- Respiratory conditions (bronchiolitis, asthma, croup) can significantly impact airway diameters
- De-saturate quickly, less tolerance for hypoxia
- Fatigue easily

**Potential Threats**

**Assessment**
- Cyanosis
- Work of breathing
- Nasal flaring
- Grunting (infants)
- Head bobbing (infants)
- Exaggerated abdominal breathing
- Recession / retraction (sternal, supraclavicular, intercostal)
- Resting respiratory rate (1 min)
- SaO2
- Breath sounds – creps, wheeze

**Interventions**
- Oxygen if SaO2 <95% or respiratory distress
- Use age-appropriate delivery method
- Bronchodilators
- CXR

**Circulation**

**Physiological Differences**
- Immature myocardium – difficult to increase SV – increase HR to increase CO
- Able to increase PVR to compensate for reduced CO
- Maintain BP up to 25% blood loss
- HR and BP vary according to age
- Circulating blood volume dependent on size
  - Infant – 90ml/kg
  - Child – 80ml/kg
- Arhythmmias may be normal
- Large surface area (evaporation)

**Potential Threats**
- Tachycardia is an early sign of shock
- Hypotension is a late sign of volume loss / reduced CO
- Small amounts of blood loss can result in shock
- Hypoxia results in bradycardia (significantly reduces CO, terminal sign)
- Greater risk of dehydration

**Potential Threats**

**Assessment**
- Skin colour – pale, mottled
- Cool peripheries, warm centre
- Increased RR without increased WOB
- Pulse (brachial, femoral, carotid)
  - Rate – fast, slow (child = <60, neonate = <100)
  - Quality – weak, strong
- Capillary refill (<2 sec, chest)
- Signs of dehydration

**Interventions**
- Vascular access can be challenging (dorsum of hand, foot, scalp, IO)
- IV fluids (resuscitation vs replacement vs maintenance)
- Strict FBC (weigh nappies)

**Disability**

**Physiological Differences**
- Head is big and heavy in relation to the body (infants, young children)
- Cranial bones do not fuse until 2 months (posterior fontanelle) and 16-18 months (anterior fontanelle)
- Spine is elastic and mobile
- Age-specific cognitive and behavioural development
- High metabolic rate and low glycogen stores

**Potential Threats**
- Increased risk of head injuries when fall
- SCIWORA
- Difficulty in assessing pain / complaint
- Hypoglycaemia (when unwell / injured, poor feeding)

**Potential Threats**

**Assessment**
- Bulging fontanelle – P&CP; sunken fontanelle – dehydration
- Modified GCS
- Paediatric pain scale
- BSL in altered conscious state (heel prick in infants)

**Interventions**
- May be difficult to maintain spinal immobilisation (collar, towel rolls, tape, spinal board, self-immobilise)
- Infants head will flex on spinal board
- Observe for HI
- Analgesia
- Glucose
**Modified GCS (<4 years)**

<table>
<thead>
<tr>
<th>Response (eyes open)</th>
<th>Best verbal response</th>
<th>Best motor response</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Spontaneous or obeys verbal commands</td>
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<tr>
<td>5</td>
<td>Appropriate words or social smile, follows</td>
<td>Localises to stimuli</td>
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<tr>
<td>4</td>
<td>Spontaneously cries but consistent, less than usual words</td>
<td>Withdraws to stimuli</td>
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<tr>
<td>3</td>
<td>To verbal stimuli Persistently irritable</td>
<td>Abnormal flexion to pain (decorticate)</td>
</tr>
<tr>
<td>2</td>
<td>To painful stimuli Moans to pain</td>
<td>Abnormal extension to pain (decerebrate)</td>
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<tr>
<td>1</td>
<td>No response to pain</td>
<td>No response to pain</td>
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**Paediatric Pain Scales**

- **Numeric Rating Scale (0-10)**
  - Older children who are able to self-report pain
- ** Wong-Baker Faces**
  - Children aged 4-12 years who are able to self-report pain
- **FLACC Scale**
  - Children aged 0-4 years who are unable to self-report pain
  - Children and infants postoperative pain scale (CHIPPS)
  - Children aged 0-4 years who are unable to self-report pain

**FLACC**

<table>
<thead>
<tr>
<th>FLACC</th>
<th>0</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Face</td>
<td>No particular expression or smile</td>
<td>Occasional grimace/tear, withdrawn, disinterested</td>
<td>Frequent to constant brow, eyelid, mouth drooping, mucus</td>
</tr>
<tr>
<td>Legs</td>
<td>Normal position or relaxed</td>
<td>Unsteady, times asleep, times awake</td>
<td>Kicking, or legs drawn up</td>
</tr>
<tr>
<td>Activity</td>
<td>Sitting, lying, normal position, moves easily</td>
<td>Inconsistent, shifting, limp, arched, or jerking</td>
<td>Inconsistent, rigid, or jerking</td>
</tr>
<tr>
<td>Cry</td>
<td>No cry (at ease) or silent</td>
<td>Moans or whimpers, occasional complaints</td>
<td>Crying steadily, frequent complaints</td>
</tr>
<tr>
<td>Consolability</td>
<td>Content, relaxed</td>
<td>Resists attempts to be touched, hugging or hitting, or Distracted</td>
<td>Difficult to console or comfort</td>
</tr>
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</table>

**Exposure / Environment**

- **Assessment**
  - Keep infants/young children warm (after exposure)
  - Monitor temperature
  - Obtain weight (bear weight if <12 months)
  - Obtain earlier if child is unwell
  - Consider paediatric tape if critically unwell
  - Observe for rashes, lesions, injuries, deformities, signs of abuse

- **Interventions**
  - Use warm blankets, heat lamps, warmed IV fluids as necessary (especially in <3 months)

**Physiological Differences**

- Large body surface area and little subcutaneous fat (infants, young children)
- Infants <3 months cannot produce heat by shivering (burn fat stores)

**Potential Threats**

- Hypothermia
- Metabolic acidosis
- Hypoglycaemia
- Coagulopathy

**Secondary Survey**

- F – family (brought in by mum, dad, grandparent, DCP)
  - Presenting complaint (parental concern, child-generated)
  - Signs and symptoms (age-related)
  - Allergies
  - Medications – names, doses, time
  - Past medical history – previous illnesses/injuries, hospitalisations, birth details/complications, immunisations, last weight
  - Last food/liquid
  - Events leading up to the illness/injury – including fluid intake, eating patterns (milk, solids, amount), urine output and bowel movements (nappies – wet, dirty, amount)
Normal Physiological Values

<table>
<thead>
<tr>
<th>Age</th>
<th>HR</th>
<th>RR</th>
<th>SBP</th>
<th>Approx. weight*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neonate</td>
<td>110-170</td>
<td>25-60</td>
<td>60-105</td>
<td>3.5 kg</td>
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<tr>
<td>3-6 months</td>
<td>105-165</td>
<td>25-55</td>
<td>65-115</td>
<td>6-8 kg</td>
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<tr>
<td>1-4 years</td>
<td>85-150</td>
<td>20-40</td>
<td>70-120</td>
<td>10-15 kg</td>
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<tr>
<td>6-10 years</td>
<td>70-135</td>
<td>16-34</td>
<td>80-130</td>
<td>20-30 kg</td>
</tr>
<tr>
<td>12+ years</td>
<td>60-120</td>
<td>14-26</td>
<td>95-140</td>
<td>40+ kg</td>
</tr>
</tbody>
</table>

*Lower weight range relates to lower age value, higher weight range relates to higher age value.

References


Developmental Stages

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<tr>
<th>Age</th>
<th>2-3 months</th>
<th>3-4 months</th>
<th>4-5 months</th>
<th>5-6 months</th>
<th>6-12 months</th>
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<tbody>
<tr>
<td>Movements</td>
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Can draw shapes, people, face, animals, read and write, ride bicycle, skip, play sports
Can speak sentences, right (listening is important), can adapt behaviour
Can remember concepts, focus, learn numbers, read, write
Can perform complex tasks
Can count to 10, head, shoulders, knees & toes

Note.

Adapted from "Normal Ranges for Physiological Variables" by The Royal Children's Hospital Melbourne, 2014.

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