

Paediatric Assessment: The Basics

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Paediatric Clinical Development Seminar

2014



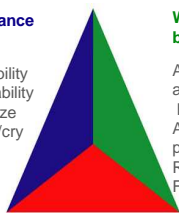
Paediatric assessment

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



Appearance

Tone
Intractability
Consolability
Look/gaze
Speech/cry



Work of breathing

Abnormal airway/
breath sounds
Abnormal positioning
Retractions
Flaring

Circulation

Pallor
Mottling
Cyanosis

Paediatric Assessment Triangle (PAT)

Adapted from "The paediatric assessment triangle: a powerful tool for the prehospital provider," by T. Horvath & M. Gausche-Hill, 2011, *Journal of Paramedic Practice*, 3(1), 20-25; "Pediatric Emergencies," by R. Dieckmann, n.d.



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
 - Mucous, secretions (bronchiolitis)
 - Oedema (croup, tonsillitis, pharyngitis, epiglottitis)
 - Flexion/hyperextension of the neck
- Increased risk of aspiration



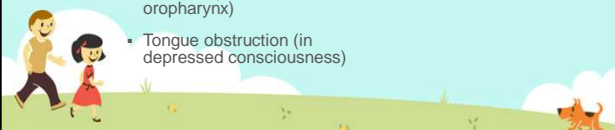
Airway

Assessment

- Crying
- Hoarse voice (laryngeal swelling)
- Stridor (croup, upper a/w FB)
- Secretions, vomit
- Oedema (tonsils, oropharynx)
- Tongue obstruction (in depressed consciousness)

Intervention

- Age-appropriate airway manoeuvres and adjuncts
- Suction secretions (nasal, oral)



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



Breathing

Assessment

- Cyanosis
- Work of breathing
 - Nasal flaring
 - Grunting (infants)
 - Head bobbing (infants)
 - Exaggerated abdominal breathing / paradoxical 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



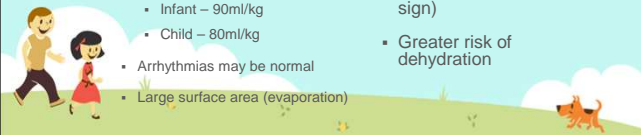
Circulation

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
- Arrhythmias 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



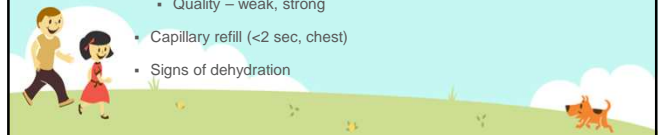
Circulation

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)



Disability

Assessment

- Bulging fontanelle – RICP; 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)

	Response (eyes open)	Best verbal response	Best motor response
6			Spontaneous or obeys verbal commands
5		Appropriate words or social smile, fixes, follows	Localises to stimuli
4	Spontaneously	Cries but consolable; less than usual words	Withdraws to stimuli
3	To verbal stimuli	Persistently irritable	Abnormal flexion to pain (decorticate)
2	To painful stimuli	Moans to pain	Abnormal extension to pain (decerebrate)
1	No response to pain	No response to pain	No response to pain

Note. Adapted from "Glasgow Coma Scale (GCS) – level of consciousness" in Head Injury Guidelines by The Royal Children's Hospital Melbourne, 2014.

Modified GCS (>4 years)

	Response (eyes open)	Best verbal response	Best motor response
6			Obeys verbal commands
5		Orientated and converses	Localises to stimuli
4	Spontaneously	Confused and converses	Withdraws to stimuli
3	To verbal stimuli	Inappropriate words	Abnormal flexion to pain (decorticate)
2	To painful stimuli	Incomprehensible sounds	Abnormal extension to pain (decerebrate)
1	No response to pain	No response to pain	No response to pain

Note. Adapted from "Glasgow Coma Scale (GCS) – level of consciousness" in Head Injury Guidelines by The Royal Children's Hospital Melbourne, 2014.

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 (CHIPPSS)
 - Children aged 0-4 years who are unable to self-report pain



FLACC	0	1	2
Face	No particular expression or smile	Occasional grime/cfrown, withdrawn, disinterested	Frequent to constant frown, clenched jaw, quivering chin
Legs	Normal position or relaxed	Uneasy, restless, tense	Kicking, or legs drawn up
Activity	Lying quietly, normal position, moves easily	Squirming, shifting back and forth, tense	Arched, rigid, or jerking
Cry	No cry (awake or asleep)	Moans or whimpers, occasional complaints	Crying steadily, screams or sobs, frequent complaints
Consolability	Content, relaxed	Reassured by occasional touching, hugging or 'talking to'. Distractable	Difficult to console or comfort

Note. Adapted from "Behavioural scale: FLACC Scale" in Assessing pain in children, by The Royal Children's Hospital Melbourne, 2014.

Exposure / Environment

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

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)

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

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

Note: *Lower weight range relates to lower age value, higher weight range relates to higher age value. Adapted from "Normal Ranges for Physiological Variables" by The Royal Children's Hospital Melbourne, 2014.

Developmental Stages

0-3 months	3-6 months	6-12 months	1-2 years	2-3 years	3-5 years	>5 years
<ul style="list-style-type: none"> - Movements mostly uncontrolled - Lifts head - Puts things in mouth - Smiles - Communicate by crying (hungry, tired, pain, discomfort, anxiety) - Follows objects with eyes - Distracted by talking, toys 	<ul style="list-style-type: none"> - Transfers objects between hands - Play with feet - Sits up - Rolls over - Babbling - Makes eye contact - Attracted by bright coloured or moving objects (musical/ noisy toys) - Friendly towards most people 	<ul style="list-style-type: none"> - Recognise people, wary of strangers - Crawling /standing - Grasping objects, drinking from a cup - Enjoys playing, music, nursery rhymes, clapping, peek-a-boo, looking at pictures - Can't concentrate for long - Words 	<ul style="list-style-type: none"> - Walking - Exploring - Draw scribbles - Interested in books, nursery rhymes - Switches between independence & dependence, can do tasks on own - May be aggressive, likes to say "no", egocentric - Likes reassurance 	<ul style="list-style-type: none"> - Running / falling - Say "no" a lot, temper tantrums, understands taking turns - Fear loud noises, strangers, animals - Coordinated actions, start to dress themselves, catch a ball - Can speak sentences - Knows name & gender, knows colours 	<ul style="list-style-type: none"> - Running, climbing, outdoor activities - Exploring, looking for answers, "why" - Curious about body parts - Plays with others, sympathy/affection for younger children - Can converse with adults, talk to them about what they are doing, will listen, will ask questions, likes praise - Imaginary play (fairies, animals, nurse, doctor) - Can perform tasks - Can count to 10, "head, shoulders, knees & toes" - Toilet trained 	<ul style="list-style-type: none"> - Can draw shapes / people, tie shoes, read and write - Rides bicycle, skips, plays sports - Understands rules/logic/ right & wrong (explanation is important), can adapt behaviour - Understands time, other dimensions - Can remember events - Social, team sports, cooperate

Note: Adapted from "Growth and development" [Fact sheets], by Queensland Health, 2013.

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