Kids Aren’t Just Little Adults

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Body

Body Surface Area:
- During infancy brain and skin occupy a greater proportion of body weight

Increased risk: dehydration & hypothermia

Increased insensible loss
- Insensible + Lungs + Urine + Fecal
- Factors influencing loss include: respiratory rate, humidity, body temperature, skin integrity.

Thermoinstability
- Preemies at greatest risk
Head

- **Anterior Fontanel**
  - Open and palpable for 1st year
  - Diamond shaped

- **Posterior Fontanel**
  - Closes between 2-3 months
  - Triangular shaped
Head (cont.)

- Head size
  - Proportionally larger than body
  - Susceptible to head and neck injuries

- Developmentally
  - Should be able to hold head erect and midline while vertical at about 4 months of age
**Infant**

- **Trachea:**
  - 4mm diameter
  - Little smooth muscle
  - Diaphragmatic breathers
    - Ribs - flexible, primarily cartilage
    - Intercostal muscles not developed
  - Alveoli: 25 million

**Child**

- **Trachea:**
  - 10mm diameter
  - By 1yr: smooth muscle development similar to adult
  - Use of intercostal muscles for breathing begins about age 6yr.
  - Alveoli: 8yrs. = 300 million
    - Alveoli change size & shape
    - Grow in numbers until about 12yrs.
Respiratory

- Higher baseline RR
  - Neonate 30-50
  - 5-7yrs 20-25
  - 1-4yrs 20-30
  - 8-15yrs 12-20

- Small lung volume

- Prolonged distress
  - Interferes with PO
  - Tired
Intercostal Retractions

Sternal Retractions

Subcostal Retractions

Normal nostrils  Flared nostrils

Intercostal Retractions

Sternal Retractions
Cardiac Function

Cardiac Output

- Until about 5yrs: rate-dependent, not stroke volume dependent

Cardiac Muscle

- Developing, less compliant
- Very sensitive to volume overload

By 5yrs: Heart function is comparable to the healthy adult

- Neonate 70-190
- 1-2 yrs 80-130
- 2-4 yrs 80-120
- 5-7yrs 75-115
- 8-11yrs 70-110
Cardiac Function

Expect an increased HR in children during:
- Stress
- Fever
- Respiratory Distress

**Bradycardia** is a sign of severe hypoxemia.

Generally, cardiac arrest in children is a result of prolonged hypoxemia, respiratory failure.
Gastrointestinal System

- No Fruit juices, sports drinks, soda
  - Diarrhea
  - Dehydration
Fluid Balance

Kidneys and tubular system grows until adolescence.

- Most growth occurs between birth and 5yrs.

Kidneys

- Until about 2 yrs of age
  - Poor at eliminating some drugs from the body
  - Less effective at concentrating urine
  - Less efficient with acid-base balance
  - Less efficient with electrolyte balance

Urinary Output

- Greater ml/kg output during infancy, decreases with age
  - General rule 1ml/kg/hr
Maintenance Fluids

4mls/kg/hour (for 1ˢᵗ 10kg) +
2ls/kg/hour for 2ⁿᵈ 10kg) +
1ml/hour for each additional kg

total volume per hour
Hemodynamics

Blood Volume
- Approximately 80mL blood volume per kg of body weight

Things to think about
- Multiple blood draws in a day
- Volumes for each blood draw
- Amount of waste when drawing from central line
Mongolian blue spots
Infants: Trust vs Mistrust

Build Trust
- Start with non-threatening activities
- Use distraction

Decrease fears: Separation anxiety
- Examine in parent’s lap
- Have parents assist with assessment
Infants: Trust vs Mistrust

Promote Safety

- Weight based medications
- Close monitoring of I&O, VS, trends
- Back to Sleep
- Side rails in high position
- Accurate identification
- Home safety
Toddlers: Autonomy vs Shame and Doubt

- Promote independence
  - ME do it!
  - Growing muscles lack coordination
- Minimize Fear: of unknown
  - People, places, routines
  - Allow for security item
Toddlers: Autonomy vs Shame and Doubt

Promote Safety
- Weight based medications
- Size appropriate equipment
- Toy safety
- Environment safety
  - Windows
  - Water
  - Cords
  - Boiling water
Pre-Schoolers: Initiative vs Guilt

- Give choices, simple explanations
- Allow to touch inspect, use equipment
- Cause → Effect often confusing
- Minimize fears:
  - The dark, monsters
  - Being left alone
  - Insides will come out
  - Concrete language
  - Honesty counts
Pre-Schoolers: Initiative vs Guilt

Promote Safety
- Weight based medication
- Size appropriate equipment
- I&O, VS trends
- Safe environment for
  - Exploration
  - Traffic safety
  - Car seats
  - Toys
School Age: Industry vs Inferiority

Promote involvement
- Elicit cooperation
  - Engage and listen to the child
- Explain what you are doing and why
- Teach about body- how things work
- Respect them, provide privacy with safe limits
School Age: Industry vs Inferiority

- Promote involvement
  - Involve child in planning care
  - Ensure continuity of school
    - Show interest, offer help with homework

- Minimize Fears: loss of control
  - Be honest
  - Let them design, participate in care plan
School Age: Industry vs Inferiority

Promote safety

- Weight-based medications
- VS trends
- Size appropriate equipment
- No climbing in the house
- Car Seats
- Bike Helmets/Traffic Safety
- Chemicals, Medications out of reach
School Age: Industry vs Inferiority

Promote safety

- Childhood deaths (age ≤18):
  - *674 from heart disease*
  - *1,930 from cancer*
  - *1,117 from birth defects*
  - *12,388 from trauma*
Adolescents: Identity vs Role Confusion

- Listen non-judgmentally
  - May feel safe talking to you
  - Provide confidentiality
- Provide healthy boundaries
- Respect privacy
- Friends are important for support
Adolescents: Identity vs Role Confusion

- Explain what you are doing and why
  - Be prepared with scientific answers for their questions
- Minimize fears: change in body image
  - What is normal growth/development
Adolescents: Identity vs Role

Confusion

Promote safety
- Weight based medications (<40kg)
- Education about self care
- Drug education
- STD prevention, safe sex

Promote school
60 second Assessment

- Appropriate for stated age
- Alert, LOC
- Position, muscle tone
- Color/perfusion
- Respiratory effort
60 second Assessment

- Touch what you can
  - Put hand on chest
  - RR, HR, congestion
  - Easy squeeze on finger
    - Capillary refill
    - Skin turgor

- Parents can hold
  - You look, listen, feel
Assessment - warming up

- Auscultation
  - Listen to parent first
  - Listen to front or back first?
- Cardiac assessment – can you hold your breath?
- Pulse rate via auscultation
Red Flags

Decreased LOC
- Listless
- Lethargic (big red flag)
- Decreased muscular tone
- Minimal response to interventions

May be related to
- Sepsis
- Hypoxia
- Temperature alterations
- Hypoglycemia/dehydration
- Suspicious trauma/neglect
- Pain
Neurological Red Flags

Neurological changes
- Usually due to increased intracranial pressure (ICP)
  - Change in responsiveness (irritibility, lethargy)
  - Inability to follow commands
  - Decreased spontaneous movement
  - Pupil dilation with decreased response to light

Late Signs
- Hypertension, bradycardia, irregular respirations, apnea
Respiratory Red Flags

- Changes in breathing
  - Retractions, RR >60 or <12, mottled
  - Head bobbing, expiratory grunt/hum

- Decreased LOC

- Late signs
  - Cyanosis (oral), poor air entry, apnea, gasping
  - Decreased perfusion, bradycardia
Pediatric Red Flags

Shock
- Tachycardia/bradycardia
- Decreased perfusion to skin/brain/kidneys
  - Decreased urine
  - Decreased responsiveness

Late sign of trouble in kids:
- Hypotension
When we care for a child we also care for their family.

When we approach children at their developmental level, when we listen to what they have to tell us, we can make our interaction with them a positive one.
Questions??

References:


Mosby Nursing Skills

http://www.childresspediatrictrauma.org