Child Welfare: When EMS Confronts Complex Pediatric Problems

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EMS and Children

- **Statistics:**
  - 13% of EMS transports but mostly BLS
  - 62% are for injury or poisoning
  - ~12 million special needs kids in US

- **Pedi concerns for EMS**
  - ↑ risk for errors due to limited:
    - history and exam
    - experience (EMS and local EDs)
    - clinical research evidence
  - Special anatomy, VS, equipment, protocols
  - Emotional impact
Some Pedi Pearls for EMS

- Obstructed airway
- Pediatric Hearts
- Patient Safety
- Toxicology
- Children with special healthcare needs
Upper Airway Obstruction

- **Recognition!!**
- **Take suction, oxygen, airway box in with you**
- **Half:**
  - of all obstructed airways for EMS are in kids < 5 yrs
  - of these children are < 1 yr old
  - resolve before EMS arrives (and only 3 of 182 needed ALS from San Diego study)
- **Most common foreign bodies:**
  - Age < 4 months: Liquids
  - Solid foods: Candy, chips, cookies; grapes, hot dogs
  - Objects: Coins, paper, toys, marbles
- **Partial obstruction:** Position of comfort & txp
Complete Obstruction: Foreign Bodies—Try the Usual

- **Responsive:**
  - < 1 yr old: back slaps and chest thrusts
  - ≥1 yr old: abdominal thrusts (Heimlich)

- **Unresponsive/not breathing:**
  - Position: head tilt/chin lift; jaw thrust
  - Tongue/jaw lift, look, remove/suction
  - Try to ventilate
  - Chest compressions/look again/reattempt ventilation
  - PLUS more options before needle cric
PLUS:

- Magill vs.

Ring (sponge stick) forceps

- Large NPA by mouth, attach to suction
Video Laryngoscopy
PLUS:

- **Bag-mask ventilation:**
  - Two person, two handed, tight seal
  - High pressure (occlude pop-off valve)
  - If able to ventilate, then haul a ___ to ED

- **Try small ETT — may bypass FB or:**
  - May push FB into one mainstem
  - May push goop into ETT (then remove)
  - May push ETT into mainstem below goop
  (This is NOT a substitute for leaving the suction in the truck)
**Hearts: Chest Pain in Children**

- **Unusual sx, seen in ~ 0.3% of ED visits**
- **> 90% are NOT cardiac in origin:**
  - musculoskeletal
  - pulmonary (asthma, infection)
  - GI
  - sickle cell
  - idiopathic
  - psychogenic
- **So 12 leads usually non-dx**
- **If cardiac, rarely ischemic:**
  - No great markers from sx/sx
  - Arrhythmias (SVT)
  - Mitral valve prolapse
  - Myocarditis, pericarditis
  - So kids don’t get NTG or aspirin
But kids can get acute MIs too!

- Anomalous coronary arteries
- Myocardial bridging
- Arterial vasculitis
- Hypertrophic cardiomyopathy
- Obstructive heart lesions
- Sickle cell disease
- Marfan syndrome
- Hypercoagulable states

- Familial hyperlipidemia
- Chronic hypertension
- Diabetes
- Kawasaki disease
- Family hx of SCD or CAD at young age
- Cocaine/meth
Children with Tetralogy of Fallot exhibit bluish skin during episodes of crying or feeding.

“Tet spell”
Pedi Safety

- **Transport restraint: Do it!**

- **Hospital Choices:**
  - Nearest ED may not be best choice, even for “can’t get an airway”
  - EDs need neonate, infant, pedi equipment
  - EM physicians and nurses need to keep skills up too
Child Safety: Math errors (EMS quiz)

- ETT size:
  - 27% knew correct formula for pedi ETTs
  - Of those, 29% calculated the wrong size

- Calculating drug doses: 35% error rate
  - Decimal points, mg → ml
  - Use the tape—plus chart with your concentrations

- COMPUTERS!!!
Children with special healthcare needs

- “those who have or are at increased risk for a chronic physical, developmental, behavioral, or emotional condition and who also require health and related services of a type or amount beyond that required by children generally”
- Parents know “If any problem, call 911”
- Wide spectrum of disorders, complications, devices—can’t learn them all
Approach to Emergencies

- **A, B, C s**
- Start with usual protocols
- Listen to caregivers
- Involve caregivers and ask for help—focus them, calm them
- Medical devices:
  - Treat the child, not the device
  - Look for supplies and info—"go bags"
  - Look for contact #, call for help
  - Bring all "stuff" to ED
Trachs

- Obstruction
- Dislodgment
- Infection
- Bleeding
Feeding tubes
Down syndrome

- Multiple organ systems
- Atlantoaxial instability = spinal cord risk
Other Associations

- Spina bifida & Latex allergies
- Hydrocephalus & CNS shunt blockage
- Marfan syndrome & spontaneous PTX, aortic dissection
- Muscular dystrophy & “quiet” respiratory failure
- Osteogenesis imperfecta & fractures
Resources for EMS

- **Prehospital Protocols for Children with Special Health Care Needs (from CNMC):**
  - trachs, vents, central lines, CSF shunts, feeding tubes, apnea monitors, nerve stimulators, colostomy

- **Special Children’s Outreach and Prehospital Education course with teaching package and videos**
Poisonings: When small doses can kill
(1-2 pills or tsp lethal for 10 kg toddler)

- Calcium channel blockers
- Chloroquine
- Chlorpromazine
- Clonidine
- Clozapine
- Diphenoxylate
- Hyoscyamine
- Imidazolines (Afrin)
- Imipramine/TCAs
- Methadone
- Quinine
- Sulfonylureas
- Theophylline
- Thioridazine
- Acetonitrile
- Ammonium fluoride
- Benzocaine
- Butyrolactone
- Camphor
- Hydrocarbons
- Lindane
- Methanol
- Methyl salicylate (oil of wintergreen)
- Pennyroyal oil
- Selenious acid
- Superwarfarins
- Toxic alcohols
Pedi poisonings:

- Don’t be fooled when child looks fine
- Call Poison Information Center

1-800-222-1222
The other “special needs” kids:
Teenagers and the things they do

- Clubbing: Poly – overdose
Teenagers—Self Embedding
Teens and Older—Head Bangers

“Been dazed and confused for so long....”
(Led Zeppelin)
References and Resources

- EMSC model pedi protocols: PEC 2004;8:343
- Airway obstruction—EMS data: Vilke et al, PEC 2004;8:196
- Foreign body extraction: Higgins, PEC 2003;7:316
- Calculation errors: Bernius et al, PEC 2008;12:486
- Tox: Henry, Harris; Pediatric Clin NA 2006;53:
- EMS C, SCOPE, protocols re special needs: www.childrensnational.org/EMSC; jbpub.com
- EMS C & clearinghouse: www.ems-c.org
- EMS C: http://mchb.hrsa.gov/cshcn05
- PEPP course: www.peppsite.com, Jones & Bartlett
- Center for Pedi EM: Paramedic Teaching Resource for Instructors in Prehospital Pediatrics
- Emerg Pedi Care course: naemt.org/education/epc_a.asp
- Prehospital Pediatric Care Curriculum (EMTs): health.state.ny.us/nysdoh/ems/ppectoc.htm
- Disaster response: www.bdls.com; www.aap.org/advocacy/emergprep.htm
- Special needs protocol template: Singh et al, PEC 2003;7:336