Pediatric Decontamination
The smaller the patient, the bigger the problem

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Disclosure
- Nothing to declare

Learning Objectives
- Differences in children – physiological, behavioral
- Triage
- Pre Decon interventions - Antidote dosing
- Decon for children
Why do we care?

- Easy, high value targets
- Labor intensive
- Equipment / training

Chemical Incidents

Radiation Incidents
Your Neighborhood?

Exposure

- Fail to recognize danger
- Unable to rescue themselves
- Unable to report exposures
- Often clustered

Chemical

- Inhalation – increased resp rate, lower to ground
- Absorption – greater surface area to body mass ratio, skin more permeable, more susceptible to fluid losses
Radiation

- Rapidly dividing cells
- Immature Immune System
- Increased uptake + longer life $\Rightarrow$ cancer

Pre – Hospital Issues

- Lack of training
  - Vital signs, normal behavior
- Poor or no preparation
  - Few peds drills, not realistic
- Limited peds equipment and medications
- Errors in triage

Disaster Triage Categories

- Black – not expected to survive, DOA
- Red – emergent, life threatening injury
- Yellow – urgent, significant injury
- Green – walking wounded or worried well
Disaster Triage Algorithms

Risk Assessment

- Nature of the agent
- Extent of exposure
- Route of exposure
- Duration of exposure

If you know the agent, get information:
- Call the Local Poison Center (1-800-222-1222)
- CDC/NIOSH website: www.cdc.gov/niosh/idih/
- 800-CDC-INFO

Protective Wear

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Gear</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nerve agent or wet liquid</td>
<td>PAPR splash suit</td>
</tr>
<tr>
<td>Unknown agent (non-nerve agent)</td>
<td>N95 mask &amp; goggles splash suit</td>
</tr>
<tr>
<td>Known agent: bio or radioactive</td>
<td>N95 mask &amp; goggles standard trauma gear</td>
</tr>
</tbody>
</table>
General Rule

- Whatever exposure the patient had, the hospital staff will have far less
- Never assume patient properly decontaminated

Chemical Screening

- ‘SLUDGE’ is a convenient way to remember the signs and symptoms of nerve gas exposure.
- S= Salivation
- L= Lacrimation (tearing)
- U= Urination
- D= Defecation or Diarrhea
- G= GI Distress
- E= Emesis (vomiting)

Chemical Antidotes

- Atropine
  - 0.05mg/kg IM or 0.02mg/kg IV
  - Toddler = 0.5mg, child 1mg, >90 pounds = 2mg
  - No max dose
- 2-PAM (Pralidoxime)
  - 15mg/kg IM or 20-50 mg/kg IV over 15 mins
  - Autoinjector conc = 300mg/ml
  - Max dose 600 mg, may give 3 times
- Duodote kit = 2-PAM 600mg, Atropine 2.1mg
Radiation Screening

Radioactive Iodine

- Potassium iodide (KI) indications
  - Nuclear explosions
  - Nuclear reactor incidents

- KI **not indicated** for "dirty bombs"
  - No nuclear reaction
  - No radioactive iodide present

Potassium Iodide (KI) Dosing

- Adults/Adolescents – 1 tab (130mg)
- Children 3-12 years – ½ tab (65mg)
- 1 month – 3 years – ¼ tab (32.5 mg)
- Birth – 1 month – 1/8 tab (16.25mg)
- Dosage: take for 10 days
- 65mg tabs and liquid may be available
- Do not ingest 'Tincture of Iodine' - Poison!
Strategic National Stockpile
- Federal push packs
- Available within 12 hours
- Limited liquid preparations

Hospital Issues
- PROTECT YOUR FACILITY!!!
- EARLY ACTIVATION
Hospital Issues

- Limited expertise
  - PEM, PICU, burns, trauma, peds surgeons
- Lack of appropriate supplies
  - Wards, equipment, medications
  - Cribs, diapers, baby food, formula

Pediatric Decon Problems

- Poor / regressive communication skills
- Inability to follow directions
- Unwilling to disrobe, separate from items
- Require supervision
- Afraid of shower
- Emotional involvement of caregiver and responders

Fear !!!
**Arrival**

- EMS/Fire will decon patients at the scene
- 60-80% of people will bypass EMS and self-present to hospitals
- Closer hospital > risk
- Contaminated?
  - Keep non-contaminated patients separate
  - Most patients who are able to self-present have mild contamination and can self-decontaminate
  - Undressing is 90% of decon

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**Arrival**

- Life saving interventions pre-decon
  - Basic airway maneuvers
  - Control hemorrhage
  - IM Antidotes
  - Order through decon – Red tags first

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**Arrival**

- Keep families together
  - Exception: red parent, green child
- Need more assistance
  - Fear of shower (hand held sprayers)
  - Inability to wash self
  - Modesty issues > 8 yrs old
- Hypothermia
  - Greater surface to body mass ratio
  - 98 degrees minimum
Identification / Tracking

- Unaccompanied
  - ID band, pictures: face, entire child
  - Report to database NCMEC, HERDS
- Accompanied
  - Maternity ID bands: name/DOB of parent and child
  - Pediatric safe area(s) in hospital
    - Well staffed
    - Decrease hazards, secure area
    - Age appropriate distractions

Disrobing

- All clothing removed
  - Place in bag with unique ID number
- Jewelry and comfort items placed in different bag
- Protect modesty / ensure warmth between disrobing area and decon shower
  - Poncho
  - Sheets
Shower Basics

- Use warm water – 98.6° minimum
- Length of time unknown, variable
- Entire body, no exceptions
- Remove bandages / dressings
- Water – mild liquid soap OK
- Do NOT use bleach / chemicals
- Long board / C-collar – hand held sprayers

Non-Ambulatory Children

- Caregiver assistance when possible
- Stretcher +/- backboard, C-collar if trauma
- Hand held sprayers
- PROTECT AIRWAY!
8-18 Years Old

- Separate by gender
- Ensure modesty
- Need supervision for complete decon
  - Need both genders in hot zone

2-8 Years Old

- Separate by gender if able
- Slowest group
  - Incomplete washing
  - Fear or shower or first responder
- Need extensive supervision
  - Need both genders in hot zone
  - Allow caregiver to remain with child

0-2 Years Old

- Never carry infant through shower
  - Stretcher, basket
  - Remain in contact entire time
- Greatest risk
  - Airway and hypothermia
- Caregiver unable to decon self and infant
Special Needs Children

- Increased risk - poor protoplasm
- Remove appliances if symptomatic
  - Trach, home ventilator, GT
  - Replace in cold zone
- Decon water resistant equipment
  - Non waterproof – keep in hot zone
- Caregiver to accompany if possible

Post Shower

- Dry at once
- Covering for modesty and warmth
- Repeat triage
  - Separate peds red / yellow / green zones
- Ensure ID for tracking
  - Keep with caregiver
Post Medical Evaluation

- Child friendly area
- Age appropriate distractions
- Safe and contained
- Supervised
- Psych services
- Event
- Decon process
- Future changes

Take Home Points

- Advance planning
- Train and retrain
- Include children
- Children > risk morbidity / mortality
- Increased surface area to body mass ratio
- Faster respiratory rates
- Rapidly dividing cells
- Fail to recognize danger

Take Home Points

- Children more labor intensive
- Fear/regressive behavior prolong process
- Use caregiver when possible
- ID / tracking for reunification
- Pediatric Antidote dosing
- Peds capable responder in hot zone
Take Home Points

- Decon Shower
- Everyone / everything
- Keep warm
- Separate by gender
- Same gender personnel
- Children slower
- Never carry child

References / Resources


- The Decontamination of Children, DVD, AHRQ, Children’s Hospital Boston

- OSHA Best Practices for Hospital First Receivers of Victims from Mass Casualty Incidents Involving the Release of Hazardous Substances, Jan 2005

  http://www.osha.gov/dts/osta/bestpractices
Questions

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