Pediatric Ingestion Injuries: Assessment & Treatment

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Case #1 Presentation

- Dispatched to Sandstone Ridge Campground in Mirror Lake State Park, E10320 Fern Dell Rd., Baraboo, WI to transport a 14 month old male to AFCH after ingestion of a laundry detergent pod
General Assessment

- **General Appearance**
  - Sleepy, red watery eyes, vomiting & drooling

- **Work of Breathing**
  - Gasping & audible wheezes. Tachypneic with increased work of breathing

- **Circulation to Skin**
  - Flushed

- **General Impression?**
Exposures to Laundry Packets

9,797 KIDS 5 AND YOUNGER

Exposed to single-load laundry packets from Jan. 1, 2016, to October 31, 2016
Smith says, “The water-soluble membrane will quickly begin to dissolve in their mouth, and/or pop when the child bites it, which shoots concentrated detergent down their throat and into their airway,”

The detergent can also squirt into their eyes and onto their skin.
Dangers of Ingesting Laundry Detergent

Injuries from Ingesting Laundry Detergent Pods

- Burns of the mouth, throat, esophagus & stomach
- Poisoning
- Severe eye irritation & burns
- Burns to the skin & mucous membranes
- Burns due to aspiration
Case Continuation: Airway

- Vomit & blood in mouth, nose & on clothing
- Gurgling, coughing, drooling & gagging
- Stridor, ? hoarse cry
- Suctioned, but continues to vomit & wretch
Signs of Impending Airway Obstruction

- Stridor
- Hoarseness
- Dysphonia or aphonia
- Respiratory distress, tachypnea, hyperpnea
- Cough
- Drooling
Case # 1 Breathing

- Respiratory Rate 40-50’s with gagging coughing
- Audible wheezing throughout
- Significant retractions
- SpO2 90% on RA placed on 15 L NRB
Symptoms of Serious Ingestion Injuries

- Dyspnea
- Dysphagia
- Oral pain
- Chest pain
- Abdominal pain
- Nausea and vomiting
Circulation

- Flushed HR 130 +, regular
- Capillary refill ~ 2 seconds
- BP 100/42
Other Signs of Significant Injuries

- Tachycardia
- Hematemesis
- Hypotension
- Shock
- Acute peritonitis – Guarding, rebound tenderness & diminished bowel sounds
Disability

The toddler is sleepy & lethargic

? Response to verbal stimuli
Exposure & Extent of Injury
Case Continuation: Fluid Needs

- Extent of burns to the skin of the face, neck & chest ~ 1.5%
- 1 peripheral IV placed - NS
Toddler Signs & Symptoms

- Pain
- Changes in skin condition - red, blistered
- Sloughing of skin, mucosa
- Edema
Circumstances of the Injury

- Hazardous chemicals in laundry detergent pod
- Child took pod out of closed container while mom doing laundry
- Child bit the pod which squirted in the toddlers mouth, nose, face and eyes
- Mom tried to rinse detergent off skin and out of mouth, but toddler began coughing and vomiting
Pre-Hospital Goals

- Prevent further tissue injury — Remove clothing. Rinse chemicals from eyes and skin. If possible have child rinse mouth with water.
- Maintain airway - Suction
- Administering O2 - Assist breathing
- Rapid transport to appropriate facility
- Keep warm!  ■ Psychological support
- Minimize infection
Transfer to AFCH, the Burn Center?

- ~ 1.5% TBSA partial thickness burns
- Burns of the face, eyes
- Full thickness burns
- Inhalation injuries
- Ingestion injuries
What’s in a Laundry Pod - Alkalis-Strong Base

- Tissue damage by liquification, necrosis & protein denaturation
- Oven cleaners, drain cleaners, fertilizers, industrial cleaners, cement & concrete
Case Continuation: Laundry Pod
Alkaline Ingestion Burns

- Burns to squamous epithelial cells of the oropharynx, hypopharynx, and esophagus.
- Immediate tissue edema, may progress to create airway obstruction
Alkaline Ingestion Burns
Complications

- Full-thickness burns result in strictures & esophageal perforations
Corrosive Ingestion Burns

- Alkali drain cleaners and acidic toilet bowl cleaners still are responsible for the most fatalities.
- In adults, 10% of caustic ingestions result in death.
- Used in suicides.
Assessment of Chemical Burn Injuries

- Safety
- Type of chemical
- Concentration of chemical
- Volume of chemical
- Mechanisms of injury
  - Splash
  - Ingestion
  - Aspiration/Inhalation
Management of Chemical Burn Injuries

- Use of protective gear
- Stop the burning process
  - Remove all clothing
  - Brush off powdered chemicals
  - In stable patients irrigation takes priority over transportation
Eye Irrigation with NS or LR

- Irrigate affected eye medial aspect outward
- Can irrigate both eyes by using a nasal cannula
Do not induce vomiting or attempt to neutralize the substance!!
Neutralization attempts can cause heat/exothermic reaction
LOADS OF TEMPTATION
Single-load liquid laundry packets look like candy, toys and teething rings...
...but they’re POISON!

Preventing poisoning is simple.
Avoid temptation:
Store laundry packets locked up and out of sight.

Call Poison Help at 1-800-222-1222

Other ingestion hazards

**Button batteries**- found in many household items, can cause internal damage within hours

**Detergent pods**- resemble candy, no childproof containers required

**Liquid nicotine for E- cigarettes**- Kid friendly flavors, childproof containers not required everywhere

Key Points

- Burns from detergent & dishwashing pods burns are epidemic
- Healthcare providers need to rapidly identify & treat chemical injuries & resultant life threats
Due to increased prevalence of devices with button batteries, ingestions have been increasing in recent years.
According to the AAP, more than 6,000 button batteries are ingested in the United States each year. If swallowed by children, they are often lodged in the esophagus and react very quickly with saliva.
Damage Occurs Faster than You Think
3 Choices

- Battery gets lodged in the esophagus “facing forward”
- Battery gets lodged in the esophagus facing backwards
- Battery makes it into the stomach or beyond
Anatomy
What Structures can be Involved

Figure 1. Battery in the esophagus.
Figure 2. Aorta and fistula are noted in the upper left of the specimen.
Figure 3. Aorta with multiple burned holes in the esophagus.
Presentation

- Cough
- Drooling
- Gagging
- Dysphagia
- Stridor
- Vomiting
Treatment

- http://www.poison.org/battery/guideline
- National Battery Ingestion hotline
  - 202-625-3333
- Batteries in the esophagus are surgical emergencies, tissue necrosis can occur in as little as 2 hours
- Batteries that have passed into the stomach or intestines can usually be monitored with serial x-rays
Ramifications

- Strictures
- Perforations
- Tracheoesophageal Fistulas
- Aortoesophageal Fistulas
- Vocal Cord Paralysis
- Mediastinitis
Key Take Aways Impact on life

- Often require G-Tube feedings for several months, especially if TEF forms
- May require tracheostomy placement
- Severe cases have required Extracorporeal Membrane Oxygenation due to tracheal damage