ABC' s of Pediatric Toxicology

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Objectives

- List 3 toxic exposures commonly seen in the pediatric population.
- Recall 4 important questions to ask about history of event.
- Outline current recommendations for use of gastric lavage and charcoal therapy.
- Discuss features and common management for selected toxicity agents.

HUGE Problem

- 1-2 million reported exposures a year
- Probably only represents half of the exposures
- 53% less than 6 years old
- 39% less than 3 years old

Top 10 Peds Death-Causing Toxics

- Analgesics
- Antidepressants
- Stimulants
- Cardiovascular
- Sedative/Hypnotics
- Alcohols
- Gases and Fumes
- Chemicals
- Cleaning products
- Anticonvulsants

Important History

- What was taken, how much and when?
- Swallowed, inhaled, injected or absorbed through skin?
- Symptoms (specific toxidromes)
- Any treatment by parents, bystanders
- Seizures, vomiting, behavior change, level of consciousness

Poison Control Number

????800-222-1222

Miosis: Small Pinpoint Pupils

- C cholinergics, clonidine
- O opiates, organophosphates
- P phenothiazines, phenobarbital, pilocarpine
- S sedatives/hypnotics

Mydriasis: Dilated Pupils

- M
- A Antihistamine
- A Antidepressants
- A Anticholinergics
- S Sympathomimetics

Skin Importance

Diaphoretic Skin

- S Sympathomimetic
- O Organophosphates
- A ASA (Salicylates)
- P PCP
- Red skin
  - Carbon monoxide (late), boric acid
- Blue skin
  - Metheglobinemia, cyanide

Prevention and Minimization of Absorption

- Ipecac-rarely used, ?asp
- Gastric lavage- within 1 hour of ingestion, esp poly-pharmacy
- Activated charcoal-asp risk (protect "A")
- Cathartics-not effective, bad complications
- Whole bowel irrigation-agents not absorbed by charcoal

Lead

Acetominophen

- Most widely used analgesic
- Converted in liver by P-450 enzyme system,
- Toxic metabolites esp liver
- Toxic dose is
  - 140mg/kg in children
  - 7 grams total in adults

Stages

- Stage 1: Early (4-12 hrs) malaise, nausea, vomiting
- Stage 2: Asymptomatic (24-72 hrs) feel normal but liver enzymes begin to elevate
- Stage 3: Liver Failure : (48-96 hrs) coagulation problems, coma, death unless intervention
- Stage 4: Possible Resolution : (7-8 days)

Opioids

- Support airway - intubation
- Support breathing - ventilation
- Opioid reversal?????
  - controversial hotly debated topic
    - before or after intubation
    - endpoints for reversal
    - what naloxone dose
    - disposition

Methadone

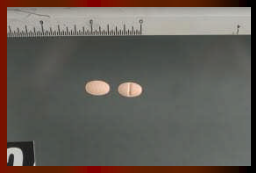
- Adjunctive for addictions
- Acute toxicity s/s after 9 hrs
- Miosis, CNS changes, dizzy, somnolence
- Age, wt, general health, time/amt/strength products ingested
- Usual resolution 24hrs

Methadone OD Treatment

- Airway mgmt
- Continuous NG charcoal
- IV Fluid flushing
- Symptomatic care
- Drug induced dysrhythmias hard to treat
- Naloxone +/- due to metabolites and effects on other sites besides opiate, ie serotonin

Alprazolam

- Potent benzodiazepine
- Most commonly misused benzo
- Physical dependence develops
- Withdrawal & rebound common
- S/s range dysphoria to MAJOR syndrome
- Expect poly-pharmacy



2008 Statistics

- 78000+ single substance reports to US Poison Control Centers
- 332 Toxicity (.004%)
- Death rare 8 (.0001%)
- Mixed w ETOH or other sedative-hypnotic
- Major risk of seizure w long-term use

Alprazolam Rx

- Supportive: ?ETT, IV, monitor, check glucose
- Decontamination: no Ipecac- risk of CNS depression & aspiration
- Lavage: only within 1 hour of ingestion & lethal co-ingestant
- Charcoal: single dose if under 4 hours and airway protected
- Naloxone: use cautiously, minute dose (.05 mg adult), if suspicion of opiate

What about Flumenazil??

- Caution—will precipitate withdrawal in chronic users—seizure
- Contraindicated in mixed OD (ie TCA)- will cause seizure & dysrhythmias
- "OK" for single benzo OD, in benzo naïve patients (ie procedural sedation *oops*)

Cocaine

- Various % on streets
- Powder, rock or crack
- Highly addictive
- Sympathomimetic
- Tachyarrhythmias
- Chest pain, ACS
- Seizures (esp kids less than 12yrs)

Treatment: Cocaine

- Benzodiazepines:
  - 1-2 mg lorazepam IV > 12 yrs
  - .05-1mg/kg lorazepam < 12yrs
    - Repeat prn to control hypertension, chest pain, seizure
- CP/ACS Usual O-N-A (no morphine)
  - Benzo's—chill them out
  - Lido, bicarb, heparin
  - NO BETA BLOCKERS - will worsen
  - Cath lab to decide reperfusion
- Check glucose

Methamphetamine

- Powerfully addictive CNS stimulant
- First synthesized in Germany
- Still made legitimately
- Primarily produced in clandestine labs
- 2 common lab types:
- Birch reduction (anhydrous ammonia)
- Red P Cook (phosphine gas)

DANGER

- Simple common chemicals
- Everyday law enforcement
- Everyday Fire/EMS work
- Every day human service work
- HAZMAT

Meth Basics

- Appearance varies (powder, chunk, crystal, color)
- Injected, snorted, smoked, oral
- Rapid absorbtion peak 2-3 hrs, lasts 8hrs
- Major stimulant effects
- Withdrawal causes moodswings/depression
- Wt loss, brain damage, teeth/bones

Beta Blockers (& Ca Channel)

- Toddlers @ grandparents
- Hypertension, angina, tachycardia….
- Propranolol most common
- Overdose usually benign
- One third asymptomatic
- Watch temp and glucose
- Treatment options

Acids/Alkalis

- Extent of burn injury (1st, 2nd, 3rd degree) after ingestion, dermal/ocular exposure determined by:
  - pH of the product (most severe burns with pH <2 and >12
  - duration of contact
  - product formulation: liquid, granules, gels, powders, etc.
  - effectiveness of irrigation (dermal/opthalmic)

Button Batteries

- Recent rise in major complications
- Kids under 4-6 years
- 92% fatal major cases 20mm lithium cells
- 56% unwitnessed and initially misdiagnosed
- Endoscopic removal within 2 hours of ingestion

Alcohols

- Ethanol-CNS depression, watch glucose
- Methanol-formaldehyde, formic acid, then blindness
- Ethylene glycol-kidney failure -lavage, antizol or ethanol

Carbon Monoxide

- Toxic effects due to cellular hypoxia
- Concentration >20% = neurologic impairment, >60% = death
- Pulse ox may be falsely normal
- Treatment
  - 100% O2
  - Hyperbaric therapy

Organophosphates : Toxidrome

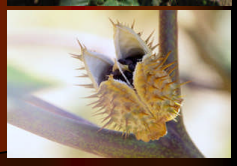
- S Salivation and Bronchorrhea
- L Lacrimation
- U Urination
- D Defecation
- G GI nausea/vomiting
- E Eyes pinpoint pupils

Anticholinergics:Toxidrome

- Warm, dry, flushed skin
- Dry mouth
- Mydriasis
- Tachycardia
- Delirium

Jimson Weed

- Moon flower seeds
- Devil's Trumpet
- Hallucinations, combative, altered behavior
- Comatose
- Rx: supportive



Peyote

- Lephophora williamsii
- Spineless cactus
- Blloms March-May, occ Sept
- Psychoactive alkaloids (mescaline)
- Ritualistic use by endogenous American Indians
- Effects 10-12 hrs

I don't like spiders and snakes….

Prevention is the Key!!

- Small amounts may cause significant toxicity and death
- Parents/caregivers may underestimate the danger from small ingestions
- Onset of symptoms may be delayed for hours
- Best time to treat any ingestion is before symptom onset
- Symptom onset indicates presence of toxic metabolites