Decontamination of the Poisoned Patient

Dean Filandrosos, Pharm.D.
Associate Director
Senior Clinical Toxicologist
Prosar International Poison Center

Objectives

- Become familiar with the various methods of gastric decontamination as well as the indications and contraindications for each
- Understand how to perform the various methods
- Know the potential adverse effects of each method

Ocular Decontamination

2 options
1. Non corrosive material
   - 15 minute irrigation with lukewarm water/saline
   - If symptoms persist, see MD
Ocular Decontamination

2. Corrosive material
   • Rinse for 20 or more minutes on site
   • Then have evaluated by MD
   • Irrigation in ED may last up to 2 hours
   • Usually at least 2 Liters per eye

Ocular Decontamination

• Should check conjunctival pH
  – Should be around 8 (nl 6.5-7.6)
  – Wait about 10 min before checking

• Fluorescein/slit lamp staining done to check for burns and depth

Ocular Decontamination

Irrigation solutions:
• Water, Ringers, saline, PEG all have been used
• Water just as good in most cases and practical
• Metals (e.g Na, K, Phos) in eye may react with water but it still seems to work well
Dermal Decontamination

2 options
1. Non corrosive material
   • Rinse for 15 minutes, see MD if sx persist
2. Corrosive
   • Acids vs alkalis
     – liquefaction necrosis vs coagulation necrosis

Dermal Decontamination

2. Corrosives
   • Rinse for 20 minutes and see MD if significant burn develops
     – Significant burns: anything beyond a first degree burn e.g blisters present
   • Unroof blister

Problems in Poison Management

INCIDENCE
• Overdose patients encountered infrequently

HISTORY
• Often unobtainable or unreliable

CLINICAL PRESENTATION
• Often multiple organ system involvement
• Interpatient and dose related variability
Problems in Poisoning Management

THERAPY
- Must be PROMPT and appropriate
- Few antidotes available
- Enhanced drug removal: costly, inefficient, and often ineffective
- Laboratory screening test limitations

Methods of Gastric Decontamination
- INDUCTION OF EMESIS
- GASTRIC LAVAGE
- ACTIVATED CHARCOAL
- CATHARTICS
- WHOLE BOWEL IRRIGATION
- CHEMICAL COMPLEXATION AND CHELATION
- GASTROSCOPY/GASTROTOMY

Syrup of Ipecac

PHARMACOLOGY
- Alkaloidal content
- Mechanism of action
- Indications for use
  - Is amount potentially toxic?
  - When did ingestion occur?
  - Risks?
Syrup of Ipecac

ADVERSE REACTIONS
• 25% of patients experience side effects
  • diarrhea
  • lethargy
  • prolonged vomiting
  • EKG changes

Syrup of Ipecac

ABUSE
• Bulimia nervosa
• Anorexia nervosa

Syrup of Ipecac

CONTRAINDICATIONS
• Decreased LOC (or anticipated)
• Tricyclic antidepressants (TCAs)
• Camphor
• Nicotine
• Caustics
• Hypoglycemics
• Hydrocarbons
Syrup of Ipecac

COMPLICATIONS

- Aspiration
- Delays administration of activated charcoal
- Mallory Weiss tear

Overall: Very high margin of safety

DOSING

- Age considerations
  - < 9 mo - administer in ED (10 ml)
  - 9-12 mo - 10 ml
  - 1-7 yrs - 15 ml
  - > 7 yrs and adults - 30 ml
- Administer with fluid
- Other emetics

RESPONSE RATE

- Time to onset of vomiting
  - 12.0 - 30.7 min
- Number of vomiting episodes
  - 1 - 6 times over 1 or more hours
- Emesis success rate
  - Emesis after first dose: 81%
  - Emesis after second dose: 15%
Syrup of Ipecac

Efficacy

• Controversial!!!
  Extent of gastric evacuation varies from:
  17 - 62% (very time dependant)

AACT Position Statement

• Insufficient data supporting use of ipecac
• Amount of a substance removed depends on the time post exposure when administered
• No evidence that ipecac improves patient outcomes
• Routine use in emergency departments should be abandoned

When do I recommend Ipecac?

• Use in the home treatment of potential poisonings is still standard of practice
• Potentially toxic amount ingested of a substance that has occurred within 30 minutes for which there are no contraindications to the administration of ipecac
Gastric Lavage

Performance depends upon:

- What was ingested?
- When was it ingested?
- Patient presentation

PRECAUTIONS

- Cuffed endotracheal tube
- Tube/patient positioning

EQUIPMENT

- Large bore orogastric tube (36-42 Fr)
- Gravity flow kit

CONTRAINDICATIONS

- Patient with decreased LOC unless airway protected
- Ingestion of corrosives
- Ingestion of hydrocarbon with high aspiration risk
- Patients at risk for GI injury due to underlying disease state
Gastric Lavage

COMPLICATIONS

• Aspiration
• Laryngospasm
• Minor arrhythmias
• Mechanical injury
• Hypernatremia

ALIQUOT SIZE

• 200 - 300 mls in adults
• 10 ml/kg in children

TYPE OF FLUID

• Normal saline vs. Tap water

LAVAGE FLUID TEMPERATURE

• Room temperature (22 C) vs. Warm (46 C)

EPIGASTRIC MASSAGE

• Concretions, bezoars
Gastric Lavage

AACT Position Statement

• Gastric lavage should not be employed routinely
• No certain evidence exists that it improves patient outcomes and it may cause significant morbidity
• May be considered in a potentially life threatening ingestion occurring within 60 minutes

Gastric Lavage

When do I recommend gastric lavage

• Patients presenting within 60 minutes of a potentially life threatening ingestion where there are no contraindications to use and safe procedures can be implemented
  Exceptions: e.g. ASA, cyclic antidepressants
• Patients presenting unconscious with an unknown time of ingestion

Activated Charcoal

CHARACTERISTICS

• Strong adsorbent secondary to large surface area
• Charcoal to toxin ratio should be 10 : 1
• Equivalents
  1 TBS = 3.5 - 6gms
Activated Charcoal

**DOSAGE**

- 30 - 100 gms in adults
- 15 - 30 gms in children
- Average 1 - 2 gms / kg

**CONTRAINDICATIONS**

- Lithium, iron - poorly bound
- Cyanide - poorly bound
- Petroleum distillates - contraindicated
- Acids, alkalis - contraindicated, lead to emesis
- Unprotected airway with a depressed LOC

**COMPLICATIONS**

- Aspiration
- Inadvertent placement
- Corneal abrasions
Activated Charcoal

AACT Position Statement

• Activated charcoal more likely to be efficacious if administered within 1 hour of ingestion and may be beneficial if used within this time limit
• Insufficient data to support or exclude use after 1 hour

Activated Charcoal

When do I recommend activated charcoal?

• Use in any potentially toxic ingestion of a substance that is bound to activated charcoal when there are no contraindications to its use
• Activated charcoal should be administered within a reasonable amount of time post ingestion

Multi-dose Activated Charcoal

• Interrupts enterohepatic or enteroenteric recirculation of drugs
• Has been shown to decrease half life for: ASA, phenobarbital, carbamzepine, quinine, theophylline
• Has not been shown to improve patient outcome nor decrease length of hospital stay
• Phenobarbital study: elimination half life decreased but duration of intubation did not
Multi-dose Activated Charcoal

**DOSING**
- 20 - 25 gms (or half initial dose) q 2-4 hrs
- give cathartic with every 2nd or 3rd dose

**BOWEL SOUNDS MUST BE PRESENT**
- Ileus formation

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Multi-dose Activated Charcoal

When do I recommend multi-dose charcoal?

- Potentially toxic ingestions of theophylline, valproic acid, salicylates, where there is no contraindications to its use

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Cathartics

**CONCEPTS**

1. Prevents absorption of toxin
   - Decrease GI transit time
   - Remove toxin from contact with mucosa

2. Expedite transit of reversible AC-Toxin complex
Cathartics

Magnesium Sulfate
  • Adults: 20 -30 grams
  • Pediatrics: 250 mg/kg

Magnesium Citrate
  • Adult: 12 ounces
  • Pediatrics: 1cc / kg

Sorbitol
  • Available premixed with charcoal in 30 - 70 % concentrations

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<thead>
<tr>
<th>Cathartics</th>
<th>DESCRIPTION</th>
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<tr>
<td>TRANSIT TIMES (hrs)</td>
<td>Uses polyethylene glycol solution (Golytely)</td>
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| SORBITOL | 1.6 |
| Mg CITRATE | 4.4 |
| MgS04 | 12.0 |
| CONTROLS | 26.0 |

Whole Bowel Irrigation

DESCRIPTION
  • Acts similarly to a bowel prep
  • Safe and effective in specific cases
Whole Bowel Irrigation

**DOSING**
- Adults: 1.5-2 L/hr
- Children: 9 mo-6 yrs = 500 ml/hr; 6 - 12 yrs 1 L/hr
- Duration of treatment should be until rectal effluent is clear or evidence exists that substance is still present in the GI tract
- Facilitating administration

**CONTRAINDICATIONS**
- Bowel obstruction/perforation
- Uncontrollable emesis
- Unprotected airway in a patient with a decreased LOC
- Clinically significant GI hemorrhage

**COMPLICATIONS**
- Nausea, vomiting, bloating
- Aspiration
- Use with activated charcoal
Whole Bowel Irrigation

AACT Position Statement

• There is no conclusive evidence that whole bowel irrigation improves outcomes
• There is insufficient data to support or exclude use for potentially toxic ingestions of metals or illicit drug packets- it remains a theoretical option

When do I recommend whole bowel irrigation?

• Potentially toxic ingestions of iron, lithium, other substances, which do not bind to charcoal and have moved beyond the stomach where there are no contraindications to use, sustained release preparations
• Use with activated charcoal should be avoided if possible
• Illicit drug packet ingestions (body packers)