



Central
New York
Regional
Poison
Control
Center

The CNYPC

April, 2001

Toxicology Letter

Vol. VI No. 2

A Quarterly Publication

SCHEDULED EVENTS:

Emergency Medicine Grand Rounds
Health Sciences Library Room 318
Second Wednesday of the Month, 11:00 AM

April 11, 2001, 11:00 AM

May 9, 2001, 11 AM

June 13, 2001, 11 AM

Toxicology Case Conference
CNYPC, 550 E Genesee Street
Poison Center Conference Room
Every Thursday 1:30 PM – 2:30 PM

PROGRAM ANNOUNCEMENT:

The Fifth Annual Toxicology Teaching Day will be held on November 7, 2001 at the University Sheraton.

A flyer will be coming shortly. If you would like advance information, please call 315-464-7078.

CNYPC TIDBITS:

Toxic Alcohols – Match to the Alcohol

- | | |
|-------------------------------|-----------------------------|
| A. methanol | 1. renal failure |
| B. isopropanol | 2. ketosis without acidosis |
| C. ethylene glycol | 3. ocular toxicity |
| D. propylene glycol formation | 4. lactic acid |

TOX TRIVIA:

1. What is the toxin responsible for Woolsorter's disease?
2. What was the toxin released in Bopol?
3. What homicidal poison is associated with burning toes, hair loss and multi-system organ failure?

Case History

Contributed by: T. Michele Caliva, RN, CSPI, Christine M. Stork, Pharm.D., ABAT

DILEMMA IN GASTROINTESTINAL DECONTAMINATION

Patients who are exposed to a toxin require a thorough initial assessment before appropriate management decisions can be made. The assessment should include:

- Evaluation of airway, breathing and circulation
- Assessment of mental status and r/o hypoglycemia
- ECG, including QRS measurements, especially in acute overdoses to r/o exposure to tricyclic antidepressants or other sodium channel antagonists
- Patient and exposure history
- Physical exam and routine baseline labs
- Toxidrome identification.

Once the patient assessment is completed and immediate life-saving interventions have been performed, it is time to consider the role of gastrointestinal decontamination. The goal of gastrointestinal decontamination is to remove a harmful substance from the body before it can be absorbed and cause systemic toxicity. Currently available methods of gastrointestinal decontamination include syrup of ipecac, orogastric lavage, activated charcoal, and whole bowel irrigation. We will address the appropriate use of the various gastrointestinal decontamination methods available using case demonstrations.

Case A: A 40-year-old unresponsive male is brought to the Emergency Department via ambulance. An empty bottle of # 100 Aspirin 325 mg tablets, as well as empty bottles of various cold medications were found in the patient's home.

Case B: A 16-year-old male presents to the Emergency Department after ingesting an unknown amount of Benadryl and 2 beers.

Orogastric Lavage

Orogastric lavage is most effective early after exposure, preferably within 1 hour, but is also useful later in cases where residual drug may be in the stomach. Orogastric lavage should be accomplished using the largest tube possible (40 F in adults and 24-28 French in children). With the patient in the left lateral decubitus position and airway adequately protected, normal saline (200-300 mL in adults and 10 mL/kg in a child) is instilled and withdrawn at regular intervals until the fluid is clear. Orogastric lavage should not be considered in patients who have ingested a toxin that is easily aspirated, such as a hydrocar-

DILEMMA IN GASTROINTESTINAL DECONTAMINATION

bon, is corrosive to the gastrointestinal tract (there are some exceptions), or when there is a medical or surgical condition compromising the integrity of the gastrointestinal tract. Complications of orogastric lavage include aspiration pneumonia, injury to the throat, stomach, or esophagus, or fluid and electrolyte imbalance. Studies in healthy subjects find that the amount of a given substance removed via orogastric lavage varies from 32% to 8% depending on the substance. Factors that influence the efficacy of lavage include: toxin location in the gastrointestinal tract, size of pills or substances ingested, and the size of lavage tube. Large trials in poisoned patients failed to demonstrate a change in outcome for the majority of patients treated with orogastric lavage vs. activated charcoal alone. As a result, orogastric lavage is now reserved for patients who, by history or physical examination, are thought to have ingested a life-threatening amount of a toxin. Case A meets this criteria because of the dose ingested, while case B does not.

Case A: A 2-year-old female is playing in the backyard with her father. She picks up a mushroom and eats it. Dad witnesses the ingestion and attempts to remove the mushroom from her mouth. He is able to remove some but the child swallows most of it.

Case B: An 18 month old boy reaches up on the counter and drinks 3 ounces of acetaminophen liquid from an open container. The amount ingested was calculated to be 180mg/kg.

Syrup of Ipecac

Syrup of Ipecac is derived from the roots of *C. acuminata* or *C. ipecacuanha*. The active components of these plants are the alkaloids, cephaline and emetine. Syrup of ipecac produces vomiting through both direct irritation, and through stimulation of the chemoreceptor trigger zone (vomiting center) in the brain. The dose is 30 mL in adults, 15 mL for children 1-12 years of age and 10 mL for children 6 months to 1 year of age. Emesis is expected in 20-30 minutes and the dose can be repeated once. Similar to orogastric lavage, syrup of ipecac removes approximately 30% of a toxin if administered within the first hour after ingestion. Also, similar to orogastric lavage, studies do not demonstrate a change in outcome due to administration of syrup of ipecac in the majority of cases. The inability to use syrup of ipecac in patients with a potential for a change in mental status, seizures, or where an oral antidote will be effective has led to its diminished use. Syrup of ipecac may be of some value in the scenario described in Case A, where the ingestion is early and witnessed, and there is a potential for delayed toxicity which may be life threatening. In Case B, the use of syrup of ipecac would not be indicated because this patient has taken a toxic amount of acetaminophen (above 150mg/kg) which requires

(CONT.)

activated charcoal and may also require oral antidote administration.

Case A: A 29-year-old female presents to the ED after ingesting several 500mg acetaminophen tablets. She states that the ingestion occurred 1 hour ago.

Case B: A five-year-old male and his 3-year-old sister present to the ED after ingesting several pre-natal vitamins with iron.

Single Dose Activated charcoal (SDAC):

Activated charcoal is a black odorless powder that is produced from wood or coconut that is burned and then treated with steam or carbon dioxide. It is available both in the powder or aqueous form. It is the latter form that is most often used in the healthcare setting. The dose of AC is 1 g/kg orally which is the largest, well-tolerated dose in most patients. Activated charcoal adheres to toxins in the gastrointestinal tract, thereby preventing absorption into the body and thus preventing systemic toxicity. It is most effective when administered early where it is more likely to reach the toxin in the gastrointestinal tract, but continues to be of use later in select circumstances. Some toxins, such as alcohols, heavy metals, lithium, and iron adhere poorly to activated charcoal, if at all. Activated charcoal should not be administered if there is medical, surgical, or chemical (i.e. caustic ingestion) gastrointestinal compromise. In Case A, administration of activated charcoal is indicated as it is shown to effectively lower anticipated acetaminophen serum concentrations. In Case B, activated charcoal would be of limited value unless a co-ingestant is considered, because it does not bind to iron.

Multiple-Dose Activated Charcoal (MDAC):

Case A: A 50-year-old female presents to the ED after ingesting 20 Valium tablets.

Case B: A 19-year-old male is brought in by ambulance after admitting that he ingested several sustained release Theophylline tablets. Multiple dosing of activated charcoal may be beneficial in those cases where a large amount of a toxin is ingested and it is unlikely that a single dose of activated charcoal (1g/kg) would be enough to result in the desired binding ratio of 10:1 (activated charcoal to drug). In addition, multiple doses of activated charcoal should be considered for those toxins that exhibit enterohepatic metabolism of an active metabolite or those that can exhibit enteroenteric recirculation. The frequency of multiple doses of activated charcoal is determined by the relative efficacy of the activated charcoal in relation to the severity of the anticipated effects of the toxin. Generally, 0.25-2g/kg of activated charcoal can be used every 1-6 hours. Common toxins that exhibit enterohepatic recirculation of an

DILEMMA IN GASTROINTESTINAL DECONTAMINATION

(CONT.)

active metabolite include amitriptyline, carbamazepine, and dapsone. Enteroenteric re-circulation occurs when there is a negative relative concentration of toxin in the gut, and toxin diffuses passively from the mesenteric circulation into the gut lumen and is trapped. Examples of toxins that exhibit enteroenteric recirculation include theophylline, phenobarbital, and phenytoin. Case B would be an example where multiple dosing of activated charcoal is recommended, due to enteroenteric recirculation. Case A does not meet the criteria for multiple dosing of activated charcoal.

Whole Bowel Irrigation (WBI)

Case A: A 14 year old female presents to the ED after ingesting 15 Calan SR tablets.

Case B: A 14 year old female presents to the ED after overdosing on an unknown amount of Paxil 20 mg tablets.

Whole bowel irrigation places large amounts of high molecular weight polyethylene glycol electrolyte solution (PEG solution) that is electrolyte neutral into the gut lumen in an attempt to clear the contents of the gastrointestinal tract in a short amount of time. The appropriate dose of PEG solution in an adult is 2 L/hr and up to 500 ml/hr for children. Continuous administration of the solution should occur until the rectal effluent is clear (4-6 hours). Side effects associated with WBI are limited to nausea, vomiting, and cramping. Contraindications include an unstable patient, obstruction and hemorrhage.

Because WBI does not have much clinical data to support its use, it is reserved for the clearance of those toxins where activated charcoal is not useful either because of adherence properties or because of a large dose of ingested toxin. In addition, the toxin must have slow absorption qualities for it to be effectively removed. WBI is indicated in situations such as Case A, where not only has a sustained release product been ingested, but this drug overdose has potentially life-threatening effects that historically occur despite the use of multiple doses of activated charcoal. In this case, early and aggressive intervention with WBI is indicated. In Case B, a single dose of activated charcoal and supportive care are the only treatment required.

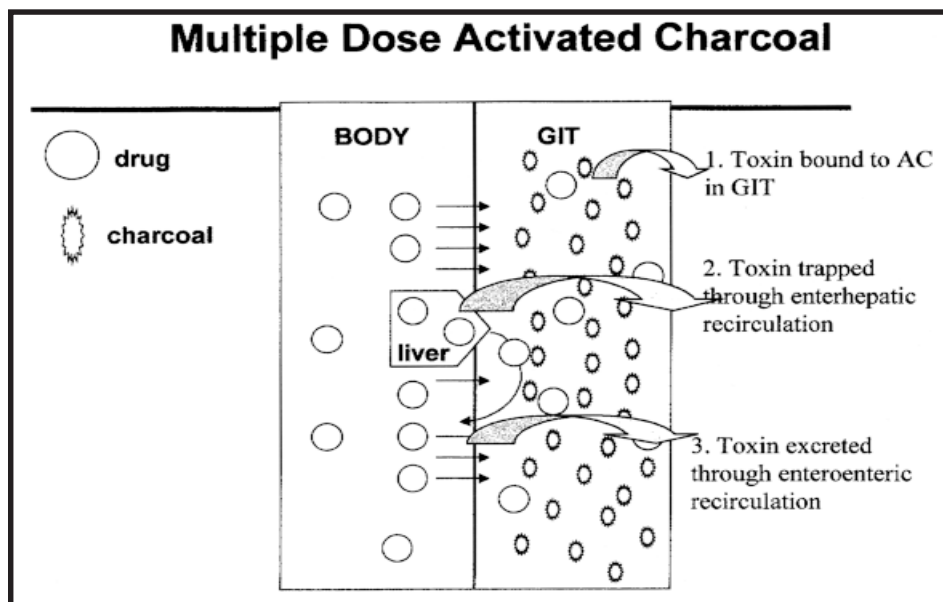
Cathartics:

The effectiveness of cathartics is not well established. No studies demonstrate that cathartics are beneficial after toxin exposure. It is our position that the use of cathartics should be considered rarely and on an individual basis.

References:

Pond SM, Lewis-Driver DJ, Williams GM, et al: Gastric Emptying in acute overdose: a prospective randomized controlled trial. *Med J Australia* 1995;163:345-349.

Kulig K, Bar-Or D, Cantrill SV et al.: Management of acutely poisoned patients without gastric emptying. *Ann Emerg Med* 1985;14:562-567.



CNYPCC Tidbits answers:

- A. 3
- B. 2
- C. 1
- D. 4

Tox Trivia answers:

- 1. Anthrax
- 2. Isocyanate
- 3. Thallium (or arsenic)

SPI CORNER TOPIC: "NATURAL" VIAGRA - NATURE'S ANSWER TO IMPOTENCE

Contributed by: Susan Bruce, PharmD Candidate

Anyone can buy "viagra" without a prescription. Although these products do not contain Pfizer's sildenafil - the FDA approved prescription medication, the Viagra craze continues and people will try almost anything. This holds true especially if it is less expensive than paying for an office visit to a physician and a prescription for Viagra.

Following are a few examples of the strategies people are using to sell their products, claiming to achieve the same effects as the real Viagra.

Lebanon's natural version is a wild root, shirsh zallouh, a small shrub with tiny white or yellow flowers and thin leaves. It grows wild in the mountains of Lebanon.

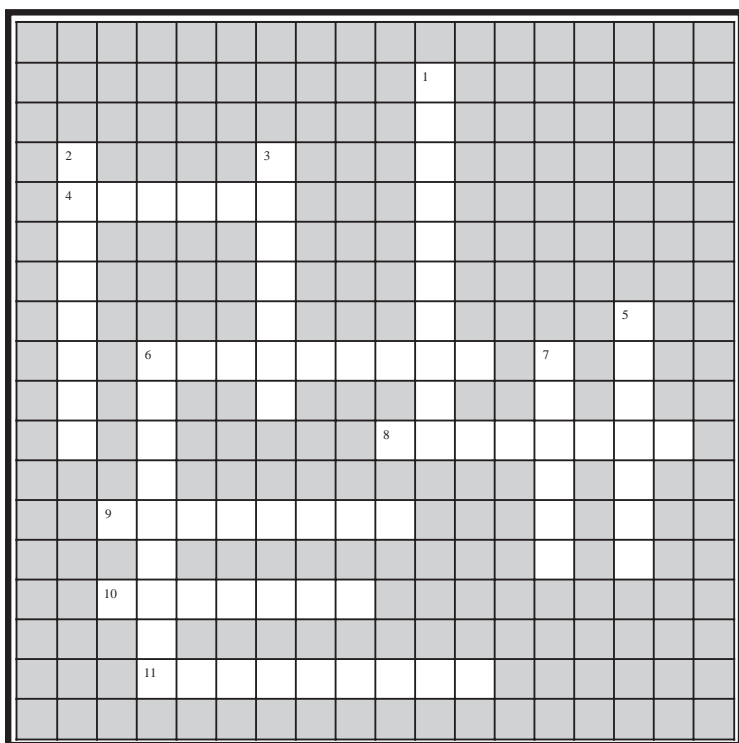
Apparently, shirsh zallouh has been used in Lebanon for generations, but its popularity is becoming worldwide. An extract is made from the root, and a pharmacist in Beirut claims the "taste is a little rough" so it is best to place the drops in milk or juice. Trying to find information about the shrub that this product is from is difficult, let alone its medicinal possibilities. A product called Milagro claims to have all the nutrients essential for "increased desire, enhanced erectile functions, ejaculatory control and improved fertility," even though the actual nutrients are never listed. Lu Rong (also known as Deer Antler Velvet) is a Chinese medicine that has been available for 3000 years. The English translation reveals that the product comes from "the soft velvet-like covering of deer antlers while they are still growing and still in a cartilaginous state, before they harden into bone." Known "ingredients" include calcium, phosphorus, sulfur, magnesium, potassium, sodium, manganese, zinc, copper, iron, selenium, cobalt, the major

amino acids, collagen, anti-inflammatory prostaglandins, gangliosides, natural sex hormones and steroids.

Moving to another part of the globe, Male Plus, the "Amazon Herbal for Men", contains four herbs from the Amazon Rainforest. The main ingredient is extract of Muira puama, which is thought to increase libido and successfully treat "organic- and psychogenic-related impotency." The other ingredients (Catuaba [an aphrodisiac], Sarsaparilla, and Damiana [an aphrodisiac]) work with Muira pauma. Herbal Male Formula is a combination of the following: wildcrafted American ginseng, yohimbe bark, Chinese and Korean ginseng, saw palmetto berries, sarsaparilla root, kola nut, ginger rhizome, Siberian ginseng, juniper berries, and uva ursi leaves. The makers claim use of the product will help men who have lost their "maleness" to "provide more male energy, increase sexual drive and desire, and enhance the male sense of well being."

One last example is androstenedione. Along with stimulation of the user's sex drive, are the usual claims for increases in "muscle size, strength and recovery from exercise."

The reliability of herbal products and their manufacturers for the intended therapeutic claim does not need to be reiterated. However, it is important for us to be aware of what is out there and what people are experimenting with. Until regulation of natural products is a function of the FDA, we need to evaluate the little information available for safety and efficacy. Poor production leading to contaminated products, or misuse of the products could result in harm to the user, which may lead to a call to the poison center.



Across: 4. iodine; 6. clonidine; 8. pillosoc; 10. seldane; 11. ritonavir
Down: 1. cadizensr; 2. kloppin; 3. feidene; 5. codeine; 6. cardenesr; 7. prozac

DAINGEROUS SOUND-ALIKES

Medications with similar names are often a source of error

Contributed by: Margo M. Spain

Down

1. CCB, Antianginal, antihypertensive and antimigraine
2. I'm a benzodiazepine/anticonvulsant. Sometimes I am given for restless legs.
3. My generic name is piroxicam. Don't forget food with this pain reliever
5. Opiate family found in many antihistamines, decongestants and expectorants
7. This antidepressant, SSRI can be fatal if taken with MAOI's
6. CCB, antihypertensive and antianginal agent. I relax coronary artery smooth muscle

Across

4. NSAID – osteoarthritis. May increase phenytoin and lithium levels.
6. Antihypertensive prototype, alpha adrenergic agonist
8. Gastric acid pump inhibitor
9. Antiviral action against HIV
10. Produces less drowsiness than other antihistamines because it does not cross the blood-brain barrier
11. Anti-infective antiviral protease inhibitor