



Poison Problems: Toxidrome Lab

The toxicology patient can provide many clues through visual, and olfactory cues. This laboratory session will improve your ability to recognize and treat overdose patients. Using a “hands-on” approach, participants will be guided through clinical clues for various toxidromes. (This lab is limited to 40 participants.)

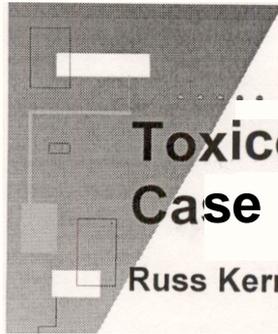
- Recognize common toxidromes that present to the emergency department.
- Develop a treatment plan for administering antidotes to common and unusual toxidromes.
- Experience the most common poisonings using a hands-on approach: visual olfactory.

TH-198
Thursday, October 14, 1999
8:00 AM - 9:55 AM
Room # N243
Las Vegas Convention Center

FACULTY

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Toxicology Lab : Case Presentations

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Emergency Medicine &
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Station Number

“For Better or Worse...”

A 35 yo woman Suspects that her philandering husband is poisoning her. Her legs are so painful that she can't walk. She has abdominal cramps & diarrhea.

- Afebrile; HR 106
- Clinically dehydrated
- Mouth sores & rash as shown
- Patchy alopecia
- Stocking glove neuropathy of legs

Is she correct ?
What poisons can do this ?

Her name is not Hillary

Station 1

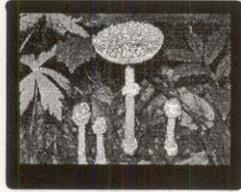
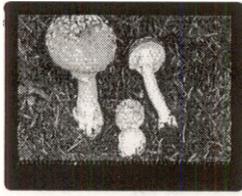
Hot Tamale



A 55 yo male with arthritis applied a new over the counter arthritis cream to his leg. Now he really hurts.

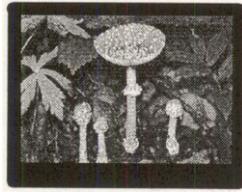
What was the toxin ?
How would you treat ?
In what circumstance might this toxin be a life threat ?

Station 2



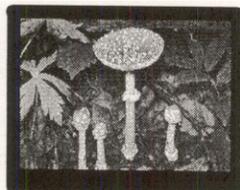
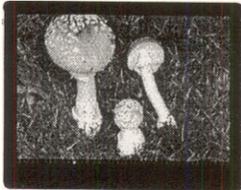
Edible ?
Poisonous ?
or
Really Poisonous ??

Station 3



Edible ?
Poisonous ?
or
Really Poisonous ??

Station 4



Edible ?
Poisonous ?
or
Really Poisonous ??

Station 5



Edible ?
Poisonous ?
or
Really Poisonous ??

Station 6

Case of the “Wild Man”

History: 35 yo male brought to ED because he’s “crazy”

- Agitated, mumbling incoherently
- T 100.9 F; HR 124; BP 155/89 mm Hg
- Flushed & dry
- Pupils 6 mm (NR); dry mouth
- Clear BS
- Quiet BS & palpable lower ABD mass
- Nonfocal; hyperreflexic with clonus

What is the diagnosis & specific treatment ?

Station 7

Another “Wild Man”

History: 37 yo male just d/c'd from etOH detoxification program is brought to ED agitated, c/o headache and vomiting

- T 100.9 F; HR 124; BP 92/68 mm Hg
- Flushed and diaphoretic
- No meningismus
- Clear breath sounds
- Normal bowel sounds
- Nonfocal neurological exam

Station 8

Another "Wild Man"

History: 37 yo male, just d/c'd from etOH detoxification program, is brought to ED agitated, c/o headache and vomiting

Station 8

What happened ?
What is the physiological basis ?
What toxins cause flushing ?

Nice Wheels !

A healthy male c/o severe digit pain 24 hr after cleaning rust off the wheels of his car. He wore gloves but found a small hole.

Station 9



What is the toxin ?
What are the treatment options ?

"Etch All Over"

..

A plant worker was splashed by hydrofluoric acid used for glass etching. He sustained approximately 5 % BSA burns.

Station 10

What metabolic effect may occur ?
How would you manage this patient ?

“Cardiac Disaster I”

“A healthy 38 yo female overdoses on grandmother’s blood pressure Rx.

- Comatose
- BP = 82 mm Hg systolic
- No toxidrome
- [glucose] = 354 mg/dl
- pH = 7.18
- [K⁺] = 3.8 mMol/l



What is the most likely agent ?
How would you treat ?

Station 11

“Cardiac Disaster II”

A healthy 3 yo female ingested grandmother’s “heart medicine”:

- Confused & vomiting
- BP = 70 mm Hg systolic
- No toxidrome
- [glucose] = 96 mg/dl
- pH = 7.38
- [K⁺] = 6.2 mMol/l



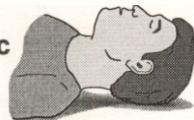
What is the most likely agent ?
What is the specific antidote ?

Station 12

“Cardiac Disaster III”

After overdosing on an unknown Rx, a 43 yo male has a generalized seizure followed by coma.

- BP = 68 mm Hg systolic
- Clear lung sounds
- [glucose] = 96 mg/dl
- pH = 7.25 & pCO₂ = 55 mm Hg



What is the most likely agent ?
What is the specific antidote ?
What other toxins can cause this ECG ?

Station 13

“Cardiac Disaster IV”

Depressed over a recent AMI, a 42 yo Type A Personality OD's on his cardiac Rx.

- . Lethargic
- BP = 62 mm Hg
- [glucose] = 113 mg/dl
- . pH = 7.30
- [K+] = 3.8 mMol/l



What is the most likely agent ?
How would you treat ?

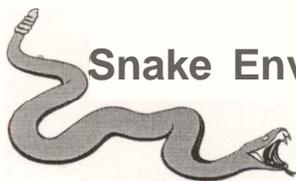
Station 14

Reptile"man"ia

Healthy 26 yo male was bitten on the digit while handing his “pet” snake 2 hr ago. He self administered first aid using the cut and suck technique immediately after the bite.

- Agitated (ethanol intoxicated -surprised?)
- Hot potato voice and drooling
- HR 105; BP 135/86 mm Hg
- No signs of coagulopathy
- Brisk cap refill 8 good pulses in affected arm
- No compartment syndrome

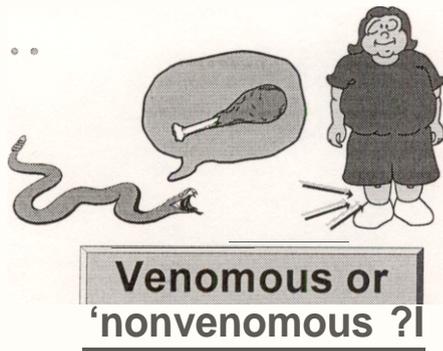
Station 15



Snake Envenomation

How would you manage
this patient's airway ?

Station 15



Station 16

"Red On Yellow ..."

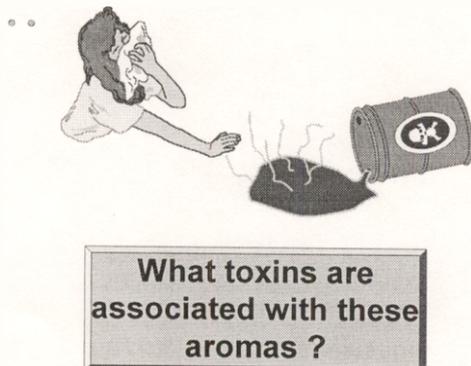
A curious child was bitten on the digit by a colorful snake. In the process of forcefully removing the snake, it nipped mom's digit.

- Both patients are asymptomatic
- Child has a digit abrasion, otherwise normal exam. Mom's P.E. is normal.

Select a course of management

- Discharge both home after updating tetanus
- Check PT, fibrinogen; d/c home if ok
- Give antivenin to the child only
- Give antivenin to both patients

Station 17



Station 18-22

“Down & Out”

.....

A 27 yo sanitation engineer collapses after entering a manhole. A fellow employee also collapses while trying to help his buddy.

What is the toxin ?

Station 18**"Really Bad Day at Work"**

.....

A 34 yo biochemist is found in cardiac arrest in his lab. (empty beaker by his side)

What is the toxin ?

Station 19**“Silent Spring”**

.....

A 33 yo crop duster is brought to the ED c/o eye pain, vomiting, & dyspnea. He has tachypnea, 2mm pupils, hypersalivation, & coarse rhonchi

What is the toxin ?

Station 20

“Rug Rat”

A 5 yo child ingested an unknown rodenticide & presents with hypotension, hyperglycemia, & ketoacidosis.

What is the toxin ?

Station 21

“Oh, How Sweet”

A 3 yo child is found at home. She has agitation, vomiting, T = 39.7 C, tachypnea, and anion gap metabolic acidosis.

What is the toxin ?

Station 22

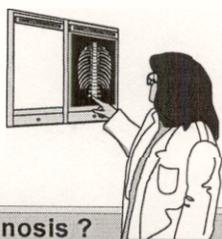
“OTC Trouble”

A 58yo smoker comes to the ED with respiratory distress. Her only medication is an OTC compound that she takes for chronic abdominal pain.

- 38.7 C (101.7 F)
- Tachypneic & dry rales
- No S₃ or peripheral edema
- Abdominal tenderness & heme + stool
- pH = 7.18 & pCO₂ = 22 mm Hg
- [H₂CO₃] = 13 mMol/l

Station 23

OTC Trouble



- What is the diagnosis ?
- What is the source ?
- Options for enhanced elimination ?
- What other toxins produce similar radiographic findings ?

Station 23

Analgesic OD

A 27 yo female ingested an OTC analgesic 2 hr ago. She has vomited several times & c/o of ringing in her ears.

- Agitated & tachypneic
- T 101 F
- Diaphoretic
- Heme + stool
- pH = 7.20 & pCO₂ = 24 mm Hg
- [H₂CO₃] = 14 (anion gap 22)

What is the urine test ?

Station 24



Toxic or Nontoxic ?

Station 25

Case of the Toxic Candy

18 mo female ingested unknown amount of mom's iron supplement 1 hr ago. She vomited twice.

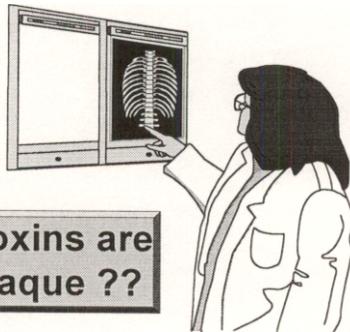
- Awake, active
- HR 140 & Systolic BP 90
- Moist mucous membranes
- Clear breath sounds
- Mild epigastric tenderness
- Stool heme test negative



What is the optimal decontamination method ??

Station 26

Radiography in Overdose



What toxins are radiopaque ??

Station 26

“Midas Touch”

38 yo is brought to the ED with depressed mental status after his favorite recreational pursuit.

What metabolic abnormality is associated with his hobby ?

Station 27

Alcohol Substitutes

30 yo alcoholic is found comatose.

- T 97.0 F; HR 105; RR 36; BP 140/86
- Kussmaul respirations
- EtOH = 0 mg/dl
- Bedside glucose = 100 mg/dl
- pH = 7.10 & pCO₂ = 18 mm Hg
- [H₂CO₃] = 7 mMol/L (anion gap = 32)
- Microscopic urinalysis as shown



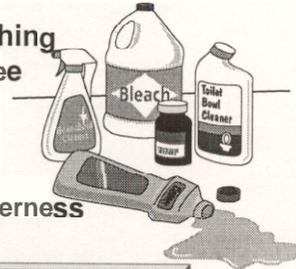
What is the specific treatment ?

Station 28

Clean as a Whistle

A 16 mo old toddler is found playing in cleaning supplies at home. She vomited once.

- Awake, active, coughing
- Smells like a pine tree
- HR 140 & RR 32
- Oxygen sat 92%
- Occasional wheeze
- Mild epigastric tenderness



What is the appropriate treatment and disposition ??

Station 29

This is not a Viagra Joke !

A 33 yo male developed coma while repairing a lawnmower engine in his shop. His CO was 32%. He received HBO & did well until 3 days later:

- Appears rigid, but wakeful
- Answers questions very slowly
- Bradykinetic spontaneous movement
- Marked muscle weakness
- Stiff joints

Diagnosis ? Where is the lesion ?

Station 30

Painful Puffer

30 yo male developed acute substernal chest pain after smoking crack cocaine & marijuana.

- . No acute distress
- T 98.7 F; HR 88
- Clear bilateral breath sounds
- Velcro sound during cardiac auscultation

What is the x-ray abnormality ?

What is the differential diagnosis for cocaine-associated chest pain ?

Station 31

Poisonous Picnic

35 yo male developed abdominal cramps, diarrhea, & dehydration after attending a family picnic. He was tx'd in the ED with fluids & antiemetics. He returns to the ED 2 days later saying "I'm worse and others are ill."

- . Looks ill
- T 98.7 F; HR 118
- Mydriasis
- . Dysphagia
- Weak neck muscles
- pCO₂ = 49 mm Hg

What is the diagnosis ?

Station 32

Atom Ants

21 yo barefoot man stepped on an ant hill and sustained multiple bites 24 hr ago. "I think I 'm allergic." He has intense, pruritic burning pain on his foot.

What type of ants ?

Station 33

Spiderman

Previously healthy 42 yo male with pictured leg lesion caused by a spider bite ten days ago. He has no systemic symptoms. T = 102 F.

Station 34

Which of the following are appropriate for this patient ?

- Dapsone
- Hyperbaric oxygen
- Antibiotics (staph & strep coverage)
- Electroshock therapy
- Cyproheptadine

Spiderman II

Healthy 28 yo male was bitten by the pictured spider 2 hr ago. He complains of leg, abdominal, and back pain.

Station 35

- Marked discomfort
- HR 119; BP 155/96 mm Hg
- Diaphoretic
- No peritonitis
- Muscular back spasm present

What treatment would you offer ?

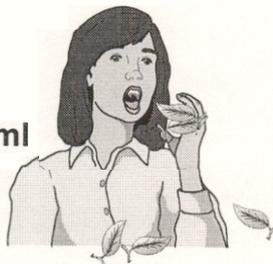
Near_(ium) Disaster

• • • • • A 27 yo female ingested this plant in a suicide attemp. She vomited several times.

Station 36

- HR50
- ECG as shown
- [K+] = 5.5 mMol/l
- [Digoxin] = 1.8 ng/ml

What is the plant ?



“Pet Peeve”



Station 37

35 yo female was stung by the pictured fish while cleaning the family aquarium. She c/o of intense pain.

What is the treatment ?

Floating Misfortune

Station 38

A young man contacts the pictured sea creature while swimming. He c/o of intense pain and rash.

**How do you decontaminate ?
What symptomatic treatment ?**

Toxicology Lab Case Wrap-Up: Answer Key
ACEP Scientific Assembly
Oct 11-14, 1999
Russ Kerns. MD

Station 1:

- 1) She is right – Mercury poisoning
- 2) The most common intentional exposure is likely a heavy metals (Arsenic, Mercury Thallium, Selenium)

Station 2:

- 1) Capsaicin
- 2) Treat like a local thermal injury
- 3) Bronchospasm due to pepper spray

Station 3:

Boletus species-edible

Station 4:

Amanita species – hepatotoxic and potentially lethal

Station 5:

Chlorophyllum -may cause severe gastroenteritis, but not lethal

Station 6:

??? species – but I would not eat it!!!

Station 7:

- 1) Anticholinergic poisoning from **Jimson** Weed
- 2) Treatment includes intravenous fluids, benzodiazepines, foley catheter, and physostigmine for severe agitation

Station 8:

- 1) Disulfiram reaction: **disulfiram** inhibits aldehyde dehydrogenase resulting in acetaldehyde accumulation (aldehydes are noxious compounds -flushing, agitation, headache, nausea and vomiting)
- 2) Toxin-induced flushing reactions:

Disulfiram-like reactions: DDC, metronidazole, coprinus mushroom, chloral hydrate
 Anticholinergic drugs and plants
 MAO inhibitor and food interactions
 MSG (Chinese restaurant syndrome)
 Food poisoning (scombroid)

Station 9:

- 1) hydrofluoric acid
- 2) intraarterial calcium if topical calcium does not rapidly relieve pain
 Consider intravenous magnesium also.

Station 10:

- 1) Hypocalcemia, acidosis, coagulopathy, cardiac dysrhythmia
- 2) Give exogenous calcium and magnesium

Station 11:

- 1) Hyperglycemia is a common finding with CCBs
- 2) Calcium, glucagon, vasoactive agents, pacer, kitchen sink

Station 12:

- 1) Hyperkalemia is associated with acute digoxin toxicity. Serum K⁺ > 5.0 is an indication for antidotal therapy
- 2) Digoxin specific antibodies

Station 13:

- 1) Wide complex tachycardia is due to sodium channel blockade and the most common drug with sodium channel antagonism is cyclic antidepressants
- 2) Treat with sodium bicarb boluses for QRS > 120 ms or if dysrhythmia occurs
- 3) Cocaine, propoxyphene, thioridazine, mesoridazine, Class Ia & Ic antidysrhythmics, quinine

Station 14:

- 1) Some beta-blockers (propranolol and acebutolol), calcium channel blockers, and propafenone have multiple toxic mechanisms such as β -blockade and sodium channel blockade. These agents may cause wide complex bradycardia. Digoxin may also cause wide complex bradycardia.

2) This **patient** took acebutolol and was treated **with** glucagon

Station 15:

- 1) Nasotracheal intubation
- 2) Antivenin

Station 16:

Venomous (Copperhead)

Station 17:

Answer: give antivenin to the child only. Coral snakes have small teeth and must chew to envenomate. Therefore mom doesn't need treatment. Treatment is indicated if **neurologic** symptoms are present or if there is a history of the snake chewing or hanging on. Elapidae have primarily neurotoxicity, not local toxicity or coagulopathy. Neurotoxicity may occur without any local bite findings.

Stations 18-22:

Sulfur:	hydrogen sulfide ("knock-down gas")
Almonds	cyanide
Garlic	organophosphates , arsenic
Peanuts	Vacor (PNU), a rodenticide that acts like streptozocin (pancreatic toxin) leading to diabetic ketoacidosis
Wintergreen	methyl salicylate

Station 23:

- 1) Chronic salicylism
- 2) Peptobismol
- 3) Hemodialysis
- 4) Salicylate, opioids, phenothiazines, **CCBs**, crack cocaine, inhalation injury, organophosphates

Station 24:

Ferric chloride when added to urine containing salicylate will turn the urine purple

Station 25:

Poinsettias are not toxic

Station 26:

Iron, Potassium, body packers/stuffers (foreign bodies), heavy metals

Station 27:

Bicarbonate-wasting renal tubular acidosis (reversible after removing patient from exposure)

Station 28:

- 1) inhibit alcohol dehydrogenase (etoh or fomepizole)
- 2) dialysis

Station 29:

Despite an unimpressive CXR (? RML infiltrate) he is symptomatic and needs admit for supportive pulmonary care

Station 30:

- 1) Delayed neurological sequelae (secondary Parkinson's)
- 2) Basal ganglia

Station 31:

- 1) Pneumomediastinum
- 2) AMI, PTX, crack lung, aortic dissection

Station 32:

Botulism

Station 33:

Fire Ants

Station 34:

Antibiotics are the correct choice. None of the other listed treatments are of proven efficacy.

Station 35:

Opioids and skeletal muscle relaxants (benzodiazepines and magnesium) are most effective. If refractory pain or hypertension develop, antivenin is available.

Station 36:

Oleander contains a cardiac glycoside very similar to digoxin

Station 37:

Hot water immersion

Station 38:

- 1) Pull off tentacles with a sandy towel
- 2) Baking soda
- 3) Analgesics and antihistamines