

UCSD Medical Toxicology

Please place your name here: _____

Date of Clerkship: _____

Please Circle Who You Are:

UCSD EM, Navy EM, UCI EM, Rady Peds EM, UCSD IM, UCSD Peds, UCSD Med Student, Outside Resident, Outside Med Student

Medical Toxicology Rotation

Arranging the Rotation

For **medical students** please contact Jessica Ramirez (jmr009@ucsd.edu) (619-543-6463) who is the medical student rotation coordinator.

For **residents and pediatric fellows** please contact **Maeve-Anne (Mae) Malong** (mmalong@ucsd.edu) (619-543-4627) who is the resident and fellow rotation coordinator.

Medical Toxicology Rotation

Welcome to the Medical Toxicology Rotation. We are happy to have you rotate through and are committed to teaching you as much as we can while you are here. **Included in this packet is a guide for the rotation and also a worksheet with checklists and questions that you will need to return (by email to Dr. Schneir) at the end of the rotation.**

___ABOUT A WEEK BEFORE YOU BEGIN THE ROTATION PLEASE EMAIL Dr. Schneir at aschneir@health.ucsd.edu TO LET HIM KNOW WHEN YOU START SO HE CAN ARRANGE YOU TO BE ASSIGNED A JOURNAL CLUB ARTICLE AND LET YOU KNOW WHERE TO MEET ON YOUR FIRST DAY

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Weekly Schedule

Monday: 0930 AM to 1200 Toxicology Journal Club
1200 to 1300 California Poison Control Center Conference (alternating Mondays)

Location: MPF building 4th floor conference room at Hillcrest

Note: Mondays are the most important days for rotators to be present. Please do your best not to schedule any other activity this day.

Tuesday: 1st Tuesday: EM conference 0700-1030 AM; La Jolla ACTRI auditorium, 1W-210; map at <https://maps.ucsd.edu/map/default.htm>

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2nd Tuesday: EM conference 0700-930 AM; Hillcrest 8th floor conference room 833 (main hospital is on southwest corner)

3rd Tuesday: EM conference 0700-varies; La Jolla LC 145 Med Ed

4th Tuesday: EM conference 1100-varies; Hillcrest first floor main hospital auditorium

5th Tuesday: EM conference 0700-930 AM; Hillcrest 8th floor conference room 833 (main hospital is on southwest corner)

Wednesday: Rounds (ask day prior when to arrive)

Thursday: 09:30 Poison Center Case Review (MPF 4th floor conference room)

Friday: 09:30 Poison Center Case Review (MPF 4th floor conference room)

Note: Always ask day prior what plan is for next day. Also, timing of bedside consultations and rounds are done based on attendings/fellows schedules.

Dress Code: Most days you will be in the hospital at some point seeing patients so please dress appropriately—wearing a white coat is preferred. Scrubs are fine. Ties are not needed (this is San Diego).

Components of Rotation

1. **Medical Toxicology Journal Clubs.** Journal Clubs are on Monday mornings between 09:30 and 12. There is an alternation each week between review of recent articles and a specific topic. Rotators will be assigned an article to present every Monday. The fellows will try to assign you an article that is relevant to your practice.

Presenting an article: Please succinctly review. If someone can read the entire article while you are presenting and you are still presenting—you are taking too long 😊

2. **California Poison Control Center Case Conferences.** Every other Monday from 1200 to 1300. Most of medical toxicologists in California discuss cases. Each site (San Diego, San Francisco, Fresno, and Sacramento) alternates presenting cases. All rotators are expected to attend.
3. **Presentations.** Once during the rotation, each rotator is required to do a presentation. **Presentations are done at the beginning of Journal Club on Mondays (you can present any Monday during the rotation).** You will see example presentations by fellows/rotators prior to yours.

Details: 10 minute presentation with a printed 1-2 page handout (**no powerpoint**) toxicology topic of your choice. Please **obtain, read, and cite primary**

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literature in your preparation of this (Wikipedia, eRowid, UpToDate can sometimes be helpful but are NOT primary literature). If there is any question regarding a relevant topic please let us know and we will help out. Please remember to focus on toxicology aspects. For example if reviewing a drug, reviewing therapeutic adverse effects, pharmacokinetics is good but we also want to know about actual overdoses.

*** _____ **Please email a copy of the presentation to Dr. Schneir**
aschneir@ucsd.edu.

4. **Bedside consultations.** Unless the fellows are out of town, they will always be taking primary call. **It is expected that during the day until 1400 that rotators will go and see new consultations with the fellow on call.** If there are multiple consults, the resident may be asked to see the patient first.

UCSD EM residents (2 week rotation): it is expected that you take call with the fellow one entire weekend during your rotation. Additionally you are expected to take a total of 2 weekday call days with the fellow during the 2 week block.

Please list the dates you took call: _____

Please list the diagnosis/presentation of the patients you evaluated when on call:

Navy EM residents, Pediatric EM fellows, PA fellows, and medical students (4 week rotation): It is expected that you take call with the fellow one entire weekend during your rotation. Additionally you are expected to take 6 weekday calls with the fellow during the 4 week block. For pediatric fellows, feel free to let toxicology fellow know if you want to see as many of the pediatric consults as you can.

Please list the dates you took call: _____

Please list the diagnosis/presentation of the patients you evaluated when on call:

UC Irvine EM, UCLA EM, UCSD Internal Medicine, Pediatric and other residents (2 week rotations):

It is expected that during the day until 1400 that rotators will go and see new consultations with the fellow on call. If there are multiple consults, the resident may be asked to see the patient first.

Please list the diagnosis/presentation of the patients you evaluated when doing so:

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Coordinating call:

- 1) The fellows will provide a calendar for you to list when you will be taking call with them. Additionally, on the days you are on call TEXT PAGE the fellow on call and tell him/her that you are on and give them the best number(s) to get reach you. If you are on call it expected that you come see the patients even at night.
5. **Phone consultations.** Every **Thursday and Friday at 09:30** the fellows will pull poison center cases that they desire to review. The fellow and faculty will discuss the cases and potentially direct the rotators in contacting the providers, obtaining more information and giving recommendations.
6. **Daily Rounds:** done on patients we are actively following. Timing of rounds is variable.
7. **Didactic Teaching:** done on various topics throughout the rotation by faculty and fellows.
8. **Online Teaching Modules.** At the website: <http://toxicology.ucsd.edu/modules.htm> there are powerpoint lectures with audio on various toxicology topics. Some of these lectures may be given to you live during the rotation and negate any need to review them online. **For the following rotators please watch the following lectures and place check box that you have completed:**

Emergency Medicine, Internal Medicine, Critical Care Residents and Medical Students:

- Antidote Update
- Botulism
- Carbon Monoxide
- Cardiac Glycosides
- Hot and Altered
- Snake Bites
- Urine Drugs of Abuse
- Wide Anion Gap Acidosis

Pediatric Residents/Fellows:

- Antidote Update
- One Pill Can Kill
- Tiny People Tiny Doses
- Urine Drugs of Abuse
- Wide Anion Gap Acidosis

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Directions to access the lectures: To access the online lectures go to the website, <http://toxicology.ucsd.edu/modules.htm>. After you click on a specific Module you may be directed to a Welcome Page where you will need to fill out some information. If you have trouble accessing a lecture, please try to access the link in a different browser or try and refresh the browsing history in your current browser. You can also try and access the modules from campus on a university computer.

9. **Reading.** There are 4 articles/reviews that have been placed on our website to read. **Pediatric residents/fellows: read “Toxicology Testing in Kids” and “Methemoglobin”.** **Everyone else: Read all 4 articles.** Please check below box that you have done. All of the articles are also printed out and in a black folder on the shelf in the toxicology conference room.

- ___ Toxicology Testing
- ___ Methemoglobinemia
- ___ Serotonin Toxicity
- ___ Charcoal

Access at <http://toxicology.ucsd.edu/Tox%20Rotation.htm>

10. **Text.** The latest edition of *Poisoning & Drug Overdose* Editor Kent Olson is a great quick reference, particularly when performing bedside consultations. One copy will be left in the conference room for all to use as desired (please leave it there).

Medical students will be provided a copy to borrow during the rotation-has to be returned to get a grade.

Navy residents should have a copy provided/rotated by Navy.

UCSD Emergency Residents will have a copy to borrow during the rotation.

11. **Questions:** See syllabus worksheet questions below. Please work on them during the rotation—the didactic teaching, online lectures, articles, and handbook etc. will allow you to answer these. All fellows and faculty are happy to help you with them. Please email the completed packet to Dr. Schneir.

Below is Applicable for Medical Students Only

12. Poison Center: Please email Lee Cantrell, the managing director to arrange a time during the month to meet at the actual poison center. **Do not show up unannounced!!** His email is: lcantrell@calpoison.org It is located in the main hospital (first floor west of the reception desk in the lobby room 1-145 in southwing code to get in is 543). **Medical students are required to visit at least once during the rotation and listen to at least 5 calls. Please list nature of the 5 calls you listened to below:**

1. _____
2. _____

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3. _____
4. _____
5. _____

12. Observed History and Physical Examination: At least once during the clerkship it is expected that you perform an observed history and physical examination. This can be observed by either the fellows or faculty.

___ **Check here that you have done.**

13. Medical Student Mid-Rotation Feedback: please email Dr. Schneir half-way through rotation regarding feedback and this will be provided.

___ **Check here that you have done.**

14. Grading: UCSD is pass/fail/honors. To pass the clerkship all assignments must be completed in a satisfactory manner. To achieve honors, performance on all assignments is expected to be excellent. To receive their grade students must complete the course and faculty evaluations provided by the School of Medicine. The identity of individual students will not be shared with the course instructors.

Questions for Rotators on Medical Toxicology Rotation UCSD

(Internal Medicine Residents Please Skip Any Peds Questions)

1. Routine blood tests and their interpretation are generally far more important than specific toxicological testing. Blood gases although not routinely needed can give critical information quickly in poisoned patients.

Simple, clinically helpful blood gas reading rules:

- for every acute rise in pCO₂ of 10, the pH will go down about 0.1
- for every acute drop in pCO₂ of 10, the pH will go up about 0.1
- in an acute metabolic acidosis with normal respiratory compensation, the second 2 numbers of the pH will equate with the pCO₂; example 7.30/30

Interpret the following blood gases (acid/base disturbance and whether compensation is present).

| <u>Gas</u> | <u>Interpretation</u> | <u>Medical Condition?</u> |
|-----------------------------|-----------------------|---------------------------|
| pH 7.40 PCO ₂ 60 | | |

The following can be associated with specific drug toxicity.

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| | <u>Interpretation</u> | <u>Potential Drug (s)</u> |
|-----------------|-----------------------|---------------------------|
| pH 7.20 pCO2 60 | | |
| pH 7.20 pCO2 20 | | |
| pH 7.60 pCO2 20 | | |
| pH 7.46 pCO2 20 | | |

2. Winters equation estimates what the expected pCO₂ will be in the setting of an acute metabolic acidosis with normal respiratory compensation. It utilizes the measured HCO₃ on a chemistry (blood gases calculate HCO₃).

$$? pCO_2 = 1.5 \times (HCO_3) + 8 (+ 3)$$

In an acute metabolic acidosis with normal respiratory compensation, and a serum HCO₃ of 10:

What would be the predicted pCO₂? _____

What would be the predicted pH? _____

3. Tricyclic antidepressants have many properties that manifest clinically in overdose.

The first three properties are the most important:

1. **Antimuscarinic (antagonize muscarinic acetylcholine receptors)**
Clinical manifestations: (confusion/coma, mydriasis, dry skin, tachycardia, urinary retention).
Treatment: supportive
2. **Na⁺ channel blockade:**
Clinical manifestations: QRS prolongation possible dysrhythmias, convulsions
Principle treatment:
QRS prolongation? _____
convulsions? _____
3. **Alpha-1 blockade** (peripheral vasodilation)
Clinical manifestation: hypotension
Treatment (after assuring not hypovolumic)? _____

4. Reuptake inhibition of dopamine, norepinephrine.
Clinical manifestation: initial hypertension; tachycardia

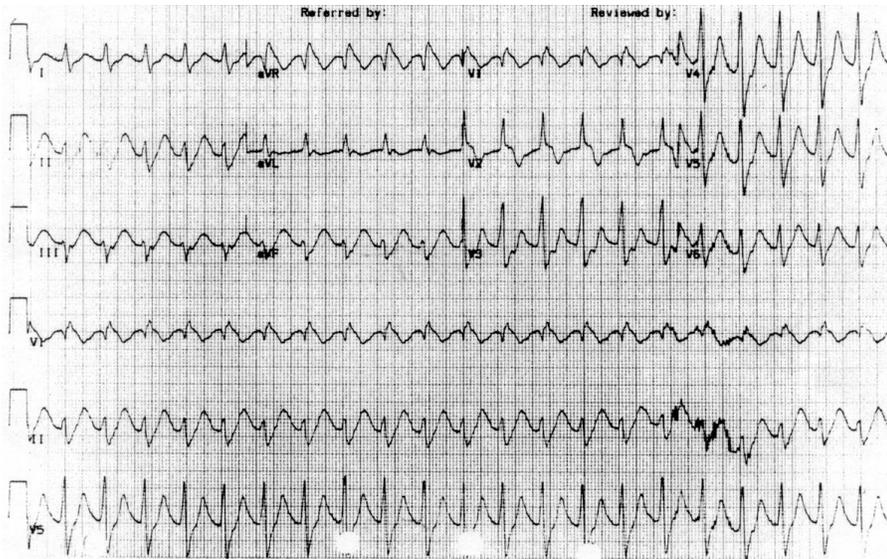
comment: since dopamine is converted to norepinephrine, intravenous dopamine may be less effective; first pressor of choice norepinephrine

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5. GABA antagonism:
Clinical manifestation: higher risk convulsions
6. K⁺ channel blockade:
Clinical Manifestation: QT prolongation

comment: avoid administering QT prolonging agents ex. haloperidol; tachycardia (see why from other properties) helps decrease risk of torsade which is very rare with acute overdose.

The ECG below demonstrates many of the classic findings that tricyclic antidepressants may manifest. In fact many sodium-channel blocking drugs (example: diphenhydramine, venlafaxine) may cause similar findings.



These include:

1. _____
2. _____
3. Terminal rightward axis manifested by **large S wave in I and large R wave in aVR**. Why does this finding occur? Right bundle is more susceptible to sodium channel blockade. Would be very unusual to have left bundle pattern from acute sodium channel blockade.
4. List 5 reasons why is it considered standard of care to check an acetaminophen concentration on all patients who intentionally overdose? Please do not miss the most important one (it has to do whether you can tell if someone took it!)
 1. _____
 2. _____

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3. _____
 4. _____
 5. _____
5. Carbon monoxide binds to iron (in hemoglobin, myoglobin, and cytochromes) and inhibits both the transport of oxygen to cells and utilization of oxygen within cells. Name 3 characteristics of carbon monoxide (the gas itself, not its clinical manifestations, nor what it binds to) that make it so dangerous? (hint: one major one that can be put #1 is that it is odorless)
1. _____
 2. _____
 3. _____
6. T or F Headache is the most common symptom of carbon monoxide poisoning.
7. Name two screening questions that can help determine if the symptoms a patient has are related to carbon monoxide poisoning?
1. _____
 2. _____
8. Give two reasons why urine drugs of abuse screens are nearly worthless in managing the poisoned (or potentially poisoned) patient or the patient with significant altered level of consciousness?
- a. _____
 - b. _____
9. T or F Acetaminophen can effectively treat hyperthermia.
10. Name 5 toxidromes/clinical syndromes induced by drugs that can cause hyperthermia. (hyperthermia reflects thermoregulatory failure and is NOT a fever that is generally prostaglandin and or cytokine mediated via the hypothalamus).
1. _____
 2. _____
 3. _____
 4. _____
 5. _____
10. Name the serotonin, norepinephrine reuptake inhibitor that has sodium channel blockade and therefore can cause QRS prolongation. _____
11. What is the treatment for tricyclic antidepressant-induced convulsions?(answer is NOT sodium bicarbonate)_____

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12. What is the treatment for diphenhydramine-induced QRS prolongation? _____
13. T or F Carboxyhemoglobin and methemoglobin can be measured accurately on venous blood.
14. T or F Alcoholic ketoacidosis is typically characterized by a relatively normal mental status.
15. Hyperammonemia in the absence of hepatotoxicity is characteristic of which drug? _____ Name the antidote for it. _____.
16. Regarding rattlesnake bites:
1. T or F Antibiotics are indicated prophylactically.
 2. There are two potentially abnormal laboratory findings that are the main focus of initial and serial monitoring in patients with rattlesnake bites. One is seen on a hematologic test and is NOT hemolysis or DIC which has never been described with rattlesnake bites but is _____. The other is _____ (and is not the INR).
17. Examples of routine lab tests that are critical in the evaluation of certain poisonings. Name the lab test.
- a. Precedes cardiac manifestations of acute cardiac glycoside poisoning _____.
 - b. Precedes cardiovascular manifestations of calcium channel blocker poisoning _____.
 - c. First laboratory evidence of systemic fluoride poisoning is _____. Hypomagnesemia and delayed onset hyperkalemia can also occur.
 - d. Expected with significant caffeine or theophylline poisoning. _____
 - e. Typically present in acute poisoning with chloroquine or hydroxychloroquine and is thought to be due to a transcellular shift. (clue: same answer as d above).
18. Multiple plants have cardiac glycosides (either digoxin or very similarly acting drugs). Two of them are below.

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1. Name the plant? Clue: It is in the median of I-5 throughout California.



2. _____ . Clue: name derives from the fact that flower can hold your digit.

19. What type of toxidrome does the following plant induce when ingested (typically seeds are made into a tea)? _____

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20. The following plant will cause the same toxicity. What is its name?

_____.



21. What toxin is derived from this bean/seed? (Clue: it was successfully utilized in a weaponized umbrella by an assassin in London. A model of the umbrella is in the spy museum in Washington D.C.) Ingestions of the bean are generally benign as the hard shell is thought to prevent absorption of the toxin.)



22. An injection drug user presents with ptosis, mydriasis, and has dysphagia. This is a really close mimick of myasthenia gravis as both cause a descending paralysis. In anyone with weakness a good neurological exam including looking for ptosis should be done. What toxin are you concerned about?

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23. Toxicity from this agent can closely mimick tetanus in that it causes spasms in response to minimal stimuli. Clue: in the U.S. can be purchased to kill gophers.

Interesting fact: *Clostridium botulinum* and *Clostridium tetani* both have toxins that prevent the release of neurotransmitters. Botulinum toxin prevents from release of acetylcholine from muscarinic receptors (autonomic effects) and at the neuromuscular junction (weakness). Tetanospasmin prevents the release of glycine. The toxin for the answer in 23 antagonizes the glycine receptor.

24. Rhinorrhea, sneezing, yawning and piloerection are symptoms and signs that can occur in withdrawal from _____? Others include mydriasis, diarrhea and abdominal pain.

25. T or F Opioid withdrawal is typically associated with an altered level of consciousness.

26. Name 2 drugs that when administered therapeutically to a patient who is on lithium can produce lithium toxicity. Lithium is not metabolized, is almost 100% eliminated renally and has a narrow therapeutic index.

1. _____
2. _____

27. Name 2 other drugs (in addition to lithium) that are particularly susceptible to drug-drug interactions. Clue: commonalities of these drugs include a narrow therapeutic index and that they are typically monitored by a drug level and/or other lab test.

1. _____
2. _____

28. Roughly what is the average amount of ethanol metabolized per hour (mg/dL)? When studied in an ED population of children, adolescents and adults the range is surprisingly narrow. _____

29. Name 3 characteristics of drugs make them amenable to removal by hemodialysis?

1. _____
2. _____
3. _____

30. A patient presents with coma and lab testing reveals an AST much higher than the ALT, normal total bilirubin and acute kidney injury. (Ethanol has nothing do with answer).

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1. What additional lab test should these lab abnormalities trigger you checking? _____
 2. What condition should be checked for on this patient (generally found on their extremities)? _____
31. Name three agents for which hemodialysis is commonly used to treat severe toxicity.
1. _____
 2. _____
 3. _____
32. The presence of a wide anion gap acidosis is ultimately caused by the excess of either _____, _____ (acetoacetate and/or beta-hydroxybutyrate), or an organic acid. Examples of organic acids include urea, formic acid (methanol metabolite), glycolic acid (ethylene glycol metabolite).
33. For the following list give the primary cause of anion gap acidosis (ketoacid and or lactate, or other organic acid). **One answer has both!**
- Acetaminophen = _____
Alcoholic ketoacidosis = ketoacid
Methanol = _____ (is not lactate or ketoacid)
Metformin = _____
Urea = urea (duh!)
DKA = ketoacid
Phenformin = _____
Propylene glycol = _____
Isoniazid = _____
Inhibitors of Oxidative Phosphorylation (cyanide, carbon monoxide) = _____
Iron = _____
Lactate = lactate (duh!)
Ethylene glycol = _____ (is not lactate or ketoacid)
Salicylates = _____
34. A patient has a significant anion gap acidosis. The absence of the following clinical findings would exclude acute poisoning from which of the following agents found above.
- Vomiting and diarrhea? _____
Convulsions? _____
35. What is the main reason patients with acute isoniazid poisoning have a metabolic acidosis (the presence of this clinical finding is responsible for the answer above)? An animal study demonstrated this in that the animals that were poisoned but paralyzed did not develop an acidosis. _____

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36. What is the major clinical manifestation of toxicity associated with abuse (people may snort it) and overdose of bupropion (tachycardia and hallucinations typically precede it)?

37. T or F QRS prolongation in the setting of poisoning is evidence of sodium channel blockade.

38. A patient presents after accidentally ingesting a “heart” medication. The ecg reveals occasional PVC’s and the serum potassium is 6.0. The most likely agent is?

39. A patient accidentally ingests an unknown medication. Physical examination reveals sedation, miosis, and respiratory depression. Naloxone administration reverses all of the adverse effects. What medication could induce these symptoms that is NOT an opioids? _____

Clue: any drug in this class of alpha-2 agonists can cause the above.

40. Bradycardia and hypotension can be caused by many drugs including beta blockers, calcium channel blockers, alpha-two agonists, and cardiac glycosides.

Match the physical examination or laboratory finding with each.

1. Miosis: _____
2. Hyperglycemia (universal and occurs even prior to hypotension): _____
3. Hypoglycemia (well reported but rare): _____
4. Hyperkalemia (two answers):_1)_____2)_____

41. Regarding beta blockers calcium channel blockers. In overdose which one would generally be expected to manifest with cold and clammy skin? _____

versus warm and dry skin? _____

Clue: which causes pure cardiac effects and which also vasodilates

42. Name 6 agents that have been used in date rape. Make sure not to miss the one that is by far the most common. Clue: it is in many hand sanitizers.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

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43. Name 3 drugs that can cause methemoglobinemia.
1. _____
 2. _____
 3. _____
44. A patient appears “drunk” but has no ethanol present. A chem 7 is normal (no acidosis) but an osmol gap exists and ketones are positive in the urine. What is the most likely agent (It is NOT methanol nor ethylene glycol as both will eventually cause an acidosis and will not produce ketones)? Clue: causes a ketosis but no acidosis_____.
45. T or F Fluorescein is added to ethylene glycol (antifreeze) so physicians can identify the presence of it in the urine.
46. A patient has a generalized convulsion while out boating with his family. He presents confused with normal vital signs. Name the potential non-ingested toxin that needs to be considered._____
47. A patient ingests pills that are used to treat his mothers “positive ppd” and develops convulsions. What is the antidote?_____
48. T or F Generally, the presence of vomiting and diarrhea within 6 hours after a mushroom ingestion predicts the ingestion of a benign (non-hepatotoxic) mushroom.(This is THE most important clinical question regarding hepatotoxic mushrooms)
49. T or F Lead toxicity predominantly manifests as a sensory neuropathy.
50. What is the predominant reason iron poisoning causes a metabolic acidosis? (Clue: is NOT ferric conversion to ferrous and release of hydrogen, nor effect on oxidative phosphorylation)_____
51. T or F There is no benefit of beginning N-acetylcysteine treatment for the vast majority of acute acetaminophen overdoses at 0-4 hours s/p ingestion as compared with 4-8 hours.
- Antidote specific:
52. This drug antagonizes the release of preformed insulin and is used after glucose to treat sulfonylurea toxicity:_____
53. This drug bypasses the beta receptor and is used to treat beta blocker toxicity:_____. Starting bolus dose is 5 to 10 milligrams.

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54. Very high dosing (1-2 unit/kg bolus followed by 0.5-1 unit/kg/hour) of this drug is used to treat calcium channel blocker poisoning:_____.
55. The incredibly effective antidote for acetaminophen poisoning is:_____
56. This drug is a an acetylcholinesterase inhibitor and can be used to reverse antimuscarinic-induced delirium:_____
57. This drug blocks alcohol dehydrogenase and is used to prevent the metabolism of ethylene glycol and methanol:_____.
_____ is used to remove the toxic alcohol and its toxic metabolites.
58. The current favored antidote for cyanide poisoning is:_____.
It is bright red and when given turns the skin and plasma red.
59. The treatment for methemoglobinemia is:_____. Give a blue drug to treat a blue patient.
60. The drug used to treat malignant hyperthermia:_____.
61. Administered in organophosphorous poisoning. Correct endpoint is drying of secretions:_____.

Toxicology Unknowns (Classic presentations: name the poison/syndrome)

1. COPD patient presents with convulsion, tremors, tachycardia, wide pulse pressure and is noted to have hypokalemia. (answer not albuterol or other pure beta agonist which could do same thing) _____
2. Patient with bipolar disorder presents tremulous, confused, hyperreflexic. One is a syndrome/toxicity_____ one is toxicity from drug they could be on_____.
3. Psychiatric patient who has had no changes/additions of any medications presents with severe rigidity, confusion, elevated CPK and a rectal temperature of 107 F. _____
4. Patient presents with severe vomiting and diarrhea and subsequently develops multi-system organ failure and alopecia. (**look this up most get it wrong!** and answer is not arsenic, nor is it thallium. No alopecia with arsenic and thallium although characterized by alopecia has less profound initial gi symptoms and more neuropathy)_____

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Pediatric Specific Questions (Internal Medicine can Skip)

62. T or F Initial dosing of antivenom for rattlesnake envenomation is identical in children and adults.
63. What is the pediatric dosing of glucose for hypoglycemia?
 1. Neonates? _____
 2. Children? _____
64. How do you dose activated charcoal to children? _____
65. What toxic pharmaceutical additive has been occasionally added to acetaminophen and has caused outbreaks of pediatric deaths characterized by renal failure?
_____.
66. A child presents with ataxia and hypoglycemia. The hypoglycemia is corrected but the patient is still ataxic. Name the most likely agent (it is NOT a sulfonylurea, nor is it insulin!) _____.
67. Child presents with significant vomiting and diarrhea. KUB reveals pills in stomach. Poison? _____.
68. Name 3 sources of non-ingested ethanol:
 1. _____
 2. _____
 3. _____