Toxicology Quick Cases

Case 1

You are called to the home of a 28 y/o ♀ who presents A&O x 2, lethargic, C/O nausea and headache. Pt describes a 2-day Hx of headache and nausea. Pt's boyfriend states that when he arrived this morning "she was acting pretty dopey". VS: RR = 22/min deep and unlabored, HR = 92/min S/R, BP = 124/80 mmHg, SpO_2 = 100% on RA. Pt also states "to make things worse, I woke up this morning and my parakeets had died overnight".

1. What type of poisoning/toxicity is the patient most likely suffering from?

Carbon monoxide (CO) poisoning. CO binds to hemoglobin with about a 250 times greater affinity than does oxygen, so it effectively displaces oxygen on hemoglobin. And, once it's on the hemoglobin, it's hard to get it off. This results in less O_2 carried by the red blood cell, and a functional anemia exists. Tissue hypoxia develops, and organs such as the central nervous system and heart are affected.

2. Is there a scene safety issue? How would you protect yourself?

Oh yeah. If you are in the house, get out! If you are not yet in, do not go in!

3. What is the route of the poisoning?

Inhalation.

4. What is your treatment for this patient? List it out below.

1. **Call for ALS.**
2. **Oxygen via NRM 15 lpm (high-flow O_2 needed to displace CO from hemoglobin, will shorten the half-life of CO bound to hemoglobin)**
3. **Transport to ED. Call medical control, see if they recommend transport to hospital with hyperbaric chamber.**

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Case 2

A 44 y/o F presents CAO in mild distress c/o diarrhea and N/V x 3 days. VS: RR = 18/min deep unlabored, HR = 102/min S/R, BP = 98/50 mmHg, SpO_2 = 96% on RA. You note that the pt is very self-sufficient and that she grows her own fruits & vegetables, has her own well, and has cows & goats on her property. She also lives next door to a livestock feedlot & slaughterhouse. Identify the likely cause of the patient's complaint and list your treatment steps in order.

1. What type of poisoning/toxicity is the patient most likely suffering from?
Food poisoning is an illness that occurs when food contaminated with bacteria, viruses, parasites, or chemical is ingested. In this case, based on an event that actually occurred in the CV's Central Valley, the food was contaminated with E.Coli that had contaminated water running off the feedlot & slaughterhouse property. E. Coli affects the intestinal mucosa, preventing the absorption of water in the large intestine, resulting in propound diarrhea.

2. Is there a scene safety issue? How would you protect yourself?
Kinda, you don't want to get feces on you! Gloves, maybe even a gown/booties/face mask if the patient is contaminated with feces secondary to severe diarrhea. Wrap patient up in blanket if needed to to keep stretcher, yourself, and ambulance feces-free.

3. What is the route of the poisoning?
Ingestion

4. What is your treatment for this patient? List it out below.
   1. **Call for ALS**
   2. **Lay patient supine or in a position of comfort**
   3. **Oxygen via NC @ 2-6 lpm (NRM OK but probably not necessary)**
   4. **Transport to ED**

Note: Patient is in compensated shock secondary to hypovolemia, possibly starting to decompensate.

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Case 3

A 4 y/o M presents CA in NAD after ingestion of a "small amount" of antifreeze about 15 minutes prior to EMS arrival. PE is unremarkable, and VS are HR = 92/min S/R, RR = 20/min GTV, BP = 82/40 mmHg, SpO_2 = 98% RA. The mother states she called you "just to check him out, he's going to be fine, right?"

1. What type of poisoning/toxicity is the patient most likely suffering from?

Ethylene glycol poisoning. The major cause of toxicity is not the ethylene glycol itself but its metabolites. Following ingestion the symptoms of poisoning follow a three stage progression starting with intoxication and vomiting. Metabolic acidosis and cardiovascular dysfunction occur in stage two, and stage three is characterized by acute kidney failure. Then you die.

2. Is there a scene safety issue? How would you protect yourself?

Not really as long as you don't lick or drink the antifreeze. Gloves needed only. Decontaminate the patient if there is any antifreeze on him or his clothes, etc.

3. What is the route of the poisoning?

Ingestion.

4. What is your treatment for this patient? List it out below.

Call poison control if have any questions! Heck, call them even if you do not have any questions!

1. **Call ALS**
2. **Oxygen via NC @ 2 lpm (NRM OK but probably not necessary)**
3. **Position of comfort**
4. **Transport to ED in POC**

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Case 4

A 22 y/o F presents supine on her couch unconscious with snoring respirations, responsive to deep pain only. Her roommate states that her only PMH is a recent back injury. RR = 4/min and shallow, HR = 52/min weak and regular, BP = 72/P, and SpO_2 = 62% on RA. PE reveals pinpoint pupils and peripheral cyanosis.

1. What type of poisoning/toxicity is the patient most likely suffering from?

Opiate OD secondary to prescription painkiller ingestion. With a history of recent back injury, you should be asking about and searching for prescription painkillers in the home. Or, she Also, perform a good clinical exam and look for things like track marks (in IV drug users) or in this case, painkiller medication patches. This patient is exhibiting the classic signs of opiate OD that include CNS depression, respiratory depression, bradycardia, and miosis. Remember that not all opiates (for example Demerol, Talwin, Darvon, and Darvocet) will cause miosis.

2. Is there a scene safety issue? How would you protect yourself?

No. Gloves only needed.

3. What is the route of the poisoning?

In this case, probably ingestion. Opiates can be used via the oral and rectal route, injected, snorted, and even absorbed transdermal (through the skin) via a medication patch.

4. What is your treatment for this patient? List it out below.

1. **Call ALS**
2. **Lay supine**
3. **Open airway with MJT, then Insert OPA/NPA**
4. **BVM ventilation with 100% O_2 @ 15-25 lpm**
5. **Transport to ED**

Toxicology Quick Cases

Case 5

You and your partner are dispatched to the BART station at Montgomery & Powell for an unknown medical problem. Upon arrival, you find a 32 y/o M sitting on the sidewalk at the top of the station stairs, vomiting. You note that his pupils are pinpoint, his eyes are tearing and he is salivating excessively. He keeps saying that his throat burns, and that he is having trouble catching his breath. You note that he has a rapid, strong, and regular radial pulse and is breathing about 24/min with deep tidal volume. While you are evaluating the patient, someone runs up the stairs from the BART station and tells you that there is someone having a seizure down by the service booth.

1. What type of poisoning/toxicity is the patient most likely suffering from?

Cyanide toxicity. Cyanide poisoning interferes with the normal cellular production of ATP (energy). As a result, cells don't produce enough energy, and they stop working and/or die. When this happens to central nervous system (your brain) or heart tissue, this is bad.

2. Is there a scene safety issue? How would you protect yourself?

Oh yeah! DO NOT GO DOWN THERE!!! In fact, you probably want to leave the scene and call for additional resources.

3. What is the route of the poisoning?

Inhalation

4. What is your treatment for this patient? List it out below.

1. **Call for ALS**
2. **Decontamination at scene prior to transport**
3. **Oxygen administration via NRM @ 15 lpm**
4. **Transport to ED in POC**

Toxicology Quick Cases

Case 6

A 43 y/o F presents CA&O though agitated and anxious in police custody. The arresting officer tells you "She's complaining of chest pain, but she's just trying to get out of going to jail. We got her for cocaine possession". Your physical exam reveals warm and moist skin and dilated pupils bilaterally. HR = 102/min strong & regular, BP = 142/100 mmHg, RR = 20/min GTV, SpO_2 = 95% RA. She says "I'm having some pain in my chest."

1. What type of poisoning/toxicity is the patient most likely suffering from?

Cocaine toxicity, sympathomimetic toxicity. Patients with cocaine toxicity are at high risk for acute myocardial infarction (AMI). Cocaine ingestion results in increased sympathetic nervous system activity, so we see things like tachycardia and increased work of the heart. Well, you increase the work of the heart, you increase the oxygen demand of the heart tissue. Unfortunately, cocaine ingestion also result in coronary artery constriction, so you have decreased blood (and therefore oxygen) supply to the heart. So, increased demand for oxygen to heart tissue yet decreased oxygen supply to heart tissue = AMI. A complaint of cheat pain in a patient who has ingested cocaine should be taken seriously.

2. Is there a scene safety issue? How would you protect yourself?

Nope. Unless the patient has cocaine powder on them, gloves only.

3. What is the route of the poisoning?

Inhalation, via snorting the powdered drug or smoking it.

4. What is your treatment for this patient? List it out below.

1. **Call for ALS**
2. **Oxygen via NC @ 2-6 lpm (NRM OK)**
3. **Transport to ED in POC**

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Case 7

68 y/o F presents A&O x2, supine in bed at a SNF without complaint. Staff reports that pt arrived at facility 4 days ago after 3-day stay at local hospital for surgical repair of R hip fracture. Staff describes a 4-day history of weakness, fever, nausea, and loss of appetite. Today pt is noticeably more confused with memory loss and tremors. PE reveals dilated pupils and diaphoresis. RR = 14/min GTV unlabored, HR = 102/min strong & irregular, BP = 156/110 mmHg, SpO_2 = 96% RA, skin cool, slightly pale & diaphoretic. Identify the likely cause of the patient's condition and list your treatment steps in order.

1. What type of poisoning/toxicity is the patient most likely suffering from?

Alcohol withdrawal. Specifically, this patient is experiencing delirium tremens (DT). Symptoms of DT typically appear 48-96 hours after the fall of blood alcohol levels in a patient habituated to alcohol (i.e. a chronic alcohol abuser). This patient suffered a medical event and ended up in a care facility without access to alcohol and is subsequently suffering withdrawal symptoms. DT can progress to seizures, which is bad.

2. Is there a scene safety issue? How would you protect yourself?

Nope.

3. What is the route of the poisoning?

Ingestion, initially!

4. What is your treatment for this patient? List it out below.

1. **Call ALS**
2. **O_2 via NC 2-6 lpm (NRM OK but probably not necessary)**
3. **Transport to ED in POC**