Image generated by GammaAI, 7.2026

Deadly Doses: Toxicology Cases that Haunt the ED

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Learning Outcomes

Identify Common Toxicologic Emergencies

Recognize the most frequently encountered toxicologic emergencies in the emergency department, including key toxidromes and their associated clinical findings that guide rapid assessment and intervention.

Differentiate Across Age Groups

Understand how toxic exposures present differently across all populations, as well as in specialized groups including patients with mental health conditions and substance use disorders.

Apply Evidence-Based Interventions

Implement proven nursing interventions for the initial stabilization and ongoing management of patients presenting with toxicologic emergencies in the emergency setting.

Recognize Critical Red Flags

Identify clinical indicators that signal the need for advanced interventions such as antidote administration, airway support, or immediate poison control consultation.

Interpret Real-World Cases

Analyze actual case studies to strengthen clinical reasoning skills and enhance rapid recognition of life-threatening toxicologic presentations in practice.

Choose A Case

Case #1	**Case #2**	**Case #3**	**Case #4**	**Case #5**
2-year-old male; c/o respiratory distress & stridor	4-year-old male; c/o vomiting, tremors, confusion	23-year-old female; c/o heart palpitations and anxiety	37-year-old female; unconscious in POV, seizing	40's female; possible opioid OD, given IN Narcan

Case #1: Pediatric Respiratory Distress

Clinical Scenario

A 2-year-old child found in the bathroom at home with severe respiratory distress. EMS transported with ongoing coughing, stridor, and significant breathing difficulty. Albuterol treatment initiated in the field. No IV access established. EMS reports chemical smell.

History

PMHx: reactive airway. UTD on vaccines.

Clinical Question: What are your initial thoughts about this presentation?

https://images.stockcake.com/public/2/a/1/2a11bb57-e7ed-464c-bb10-d185aefbb445/smoke-meets-glass-stockcake.jpg

Case #1: Clinical Presentation

Exam Findings

A – stridor, tripoding

B – tachypneic, severe distress

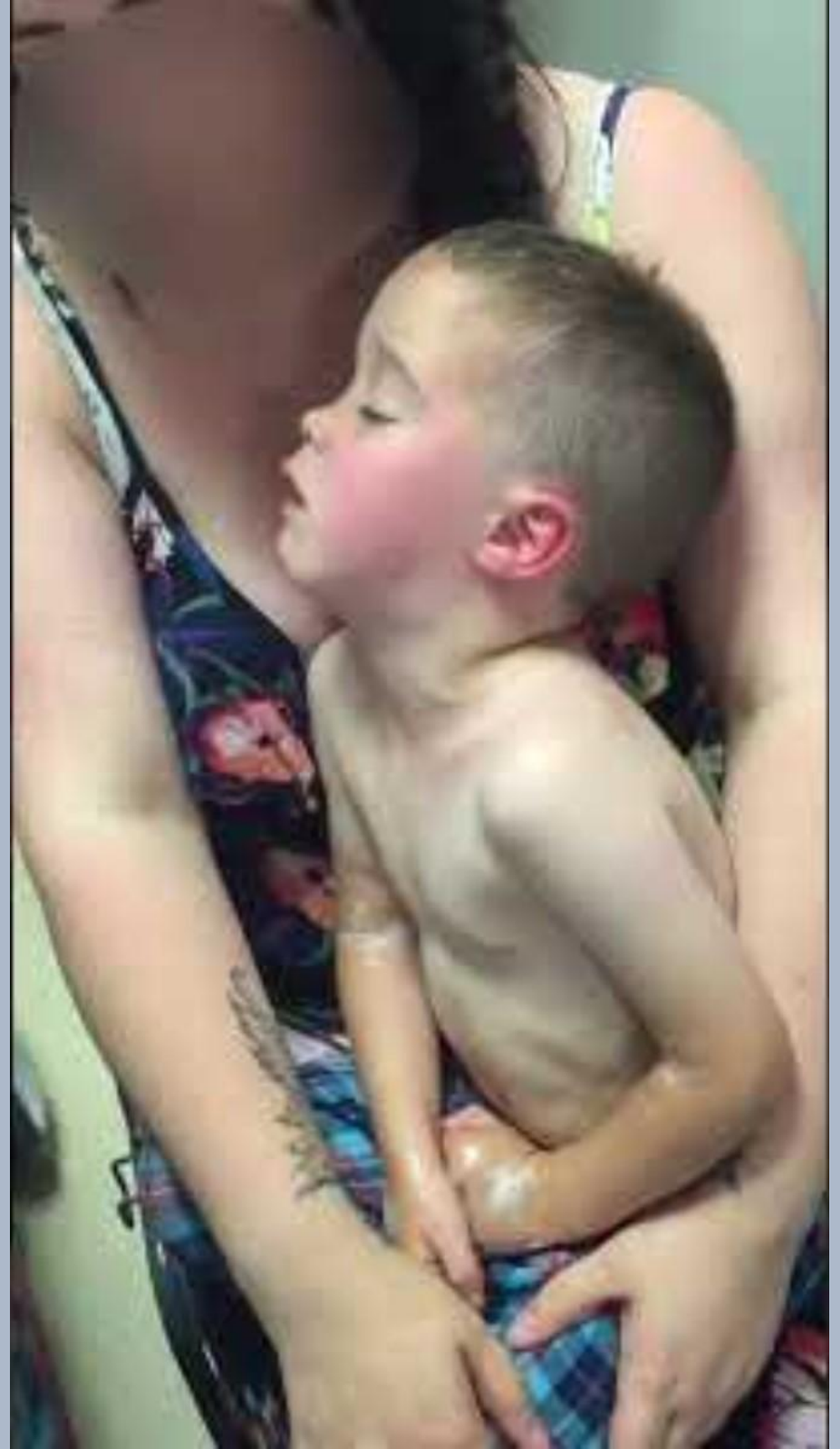
C – rapid pulse, pale skin

Neuro: awake, anxious, confused, reddened sclera

*Odor – “pool chemicals”

Vitals

HR 162, RR 50, O2 92%



Case #1: Differential Diagnoses

1

Chloramine Gas Inhalation

Chemical exposure from mixing bleach and ammonia (urine), creating toxic chloramine gas causing severe respiratory irritation and potential chemical pneumonitis.

2

Croup or Epiglottitis

Upper airway infection causing inflammation and obstruction, presenting with stridor and respiratory distress in the pediatric population.

3

Foreign Body Aspiration

Sudden onset respiratory distress from lodged object in airway, common in toddlers exploring their environment.

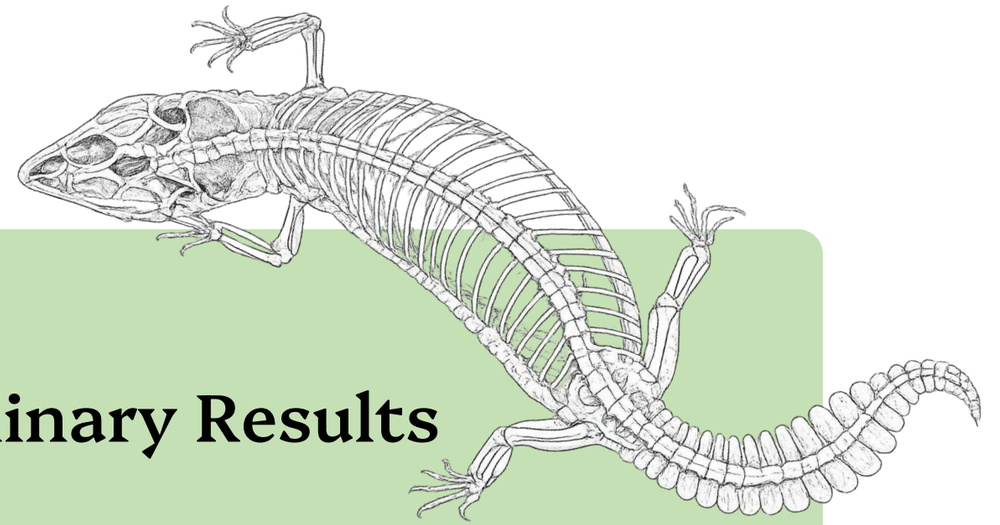
4

Reactive Airway Exacerbation

Bronchospasm and airway inflammation causing respiratory distress, potentially triggered by irritant exposure.

Any others... ?

Case #1: Triage & Work Up



Triage Decision

ESI Level 1/2: High-risk patient with potential for rapid airway compromise requiring immediate assessment and intervention capabilities.

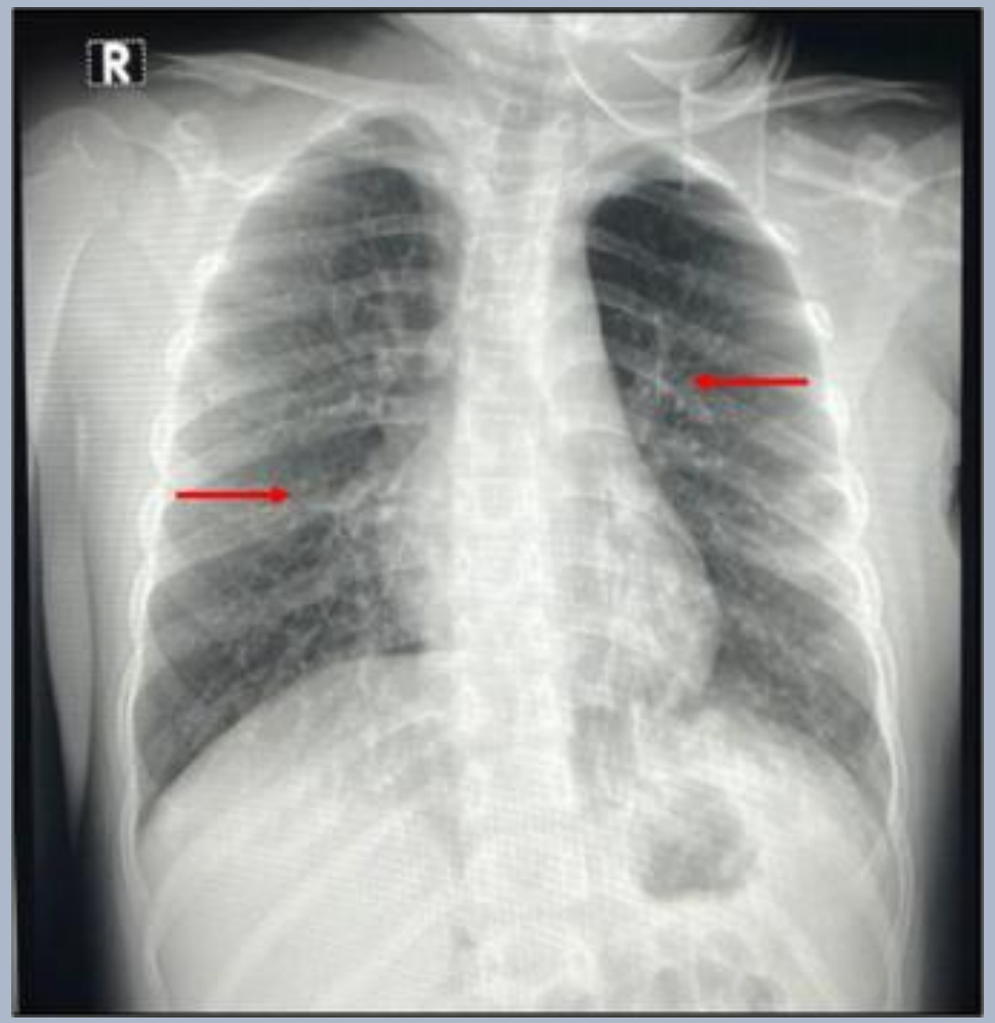
Initial Steps

- Do not agitate!
- Maintain airway with low threshold for intubation
- O2 – with close monitoring
- All the nebulized meds!
- Chest XR

Preliminary Results

- Course lung sounds
- Hypoxia despite O2
- CXR = pneumonitis

Symptoms progressively worsened despite nebulized meds – team was prepped for RSI.



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Case #1: Case Study Progression

Critical Discovery

Mother had been cleaning the bathroom and added bleach to the training potty, then forgot to rinse it.

When the child later urinated in the potty, the chemical reaction between bleach and ammonia (in urine) created potent **chloramine gas**.

Outcome

Intubation was unsuccessful and an emergency cricothyrotomy was performed. The patient was transferred to a children's hospital and discharged three weeks later following aggressive pulmonary supportive care.

Chlorine poisoning caused by improper mixing of household disinfectants during the COVID-19 pandemic: Case series

Guo-Dong Lin [1,2], Jie-Yi Wu [3], Xiao-Bo Peng [4], Xiao-Xia Lu [5], Zhong-Ying Liu [6], Zhi-Guo Pan [7], Ze-Wu Qiu [8], Jian-Guang Dong [9]

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PMCID: PMC9477020 PMID: 36157658

CONCLUSION

Improper mixing of household disinfectants may cause damage to the respiratory system due to chlorine poisoning. Corticosteroids may improve lung exudation in severe cases, and symptomatic supportive treatment should be performed early.

Case #1: Evidence into Practice

Epidemiology & Trends (Atalla et al., 2024)

- 68% increase in chlorine/chloramine exposures (2015–2022)
- 85% occurred in home settings, often during cleaning or disinfection
- Most cases mild to moderate, but severe lung injury still reported
- Reinforces need for public and clinical awareness after the pandemic surge in home cleaning

Mechanism & Risk (Lin et al., 2022)

- Mixing bleach (NaOCl) with ammonia or urine → forms **chloramine gas**
- Gas causes mucosal irritation, bronchospasm, and potential chemical pneumonitis
- Many exposures occur unintentionally, often involving household or childcare settings

Chemicals You Should Never Mix

Bleach + Ammonia

= Chloramine

Chloramine smells like chlorine. It irritates eyes, skin, and mucous membranes.

Bleach + Alcohol

= Chloroform

Chloroform can knock you out. It causes liver damage and potentially respiratory or cardiac failure.

Bleach + Vinegar

= Chlorine Gas

Chlorine is a toxic gas that attacks the eyes, respiratory system, and skin.

Peroxide + Vinegar

= Peracetic Acid

Peracetic acid is highly corrosive and irritates the eyes, skin, and respiratory system.

sciencenotes.org

https://www.livingwhole.com.au/wp-content/uploads/chemicals-you-should-never-mix.jpg

Case #1: Connecting the Clinical Dots

- Early symptoms: cough, eye/throat irritation, dyspnea, chest pain/tightness
- Severe exposure: wheezing, hypoxia, rales, possible ARDS
  - Pediatric patients have lower threshold
- Avoid secondary exposure by ensuring proper personal protective equipment for all staff members
- Initial management = bronchodilators, oxygen, symptom control

Focus on early airway assessment and oxygenation support. Don't hesitate to escalate interventions if respiratory status deteriorates despite initial treatment.

Choose A Case

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Case #2: Pediatric Neurologic Presentation

Clinical Scenario

A 4-year-old child presents via private vehicle with mother reporting vomiting, significant tremors, and confusion after being picked up from grandmother's house.

History

Recent respiratory viral illness. Grandmother denies that the child had access to any medication bottles.

Clinical Question: What are your initial thoughts about this presentation?

Case #2: Clinical Presentation

Exam Findings

A – patent, vomiting

B – tachypneic

C – flushed skin, rapid pulse

Neuro: lethargic, confused

*Odor – like Vicks VapoRub

Vitals

HR 120, BP 95/52, RR 36, O2 94%, Temp 98.9

Case #2: Differential Diagnoses

Seizure Disorder

New-onset or breakthrough seizure activity causing altered mental status, tremors, and post-ictal confusion in a previously healthy child.

Alcohol Ingestion

Toxic alcohol exposure causing CNS depression, gastrointestinal upset, and potential metabolic derangements.

Head Trauma

Always part of a differential for children with concussive symptoms and unclear history of events.

Meningitis

Central nervous system infection causing altered consciousness, though absence of fever makes this less likely in this presentation.

Any others... ?

Healthcare providers if making up respiration rates was an Olympic sport

Case #2: Triage & Work Up

Triage Decision

ESI Level 2 – High-risk patient with AMS and potential for seizure or CNS depression requiring continuous monitoring

Initial Steps

- POC BGL
- Cardiac monitoring
- IV
- Labs: BMP, LFT, UDS, BAL, ABG
- STAT Head CT
- Prepare for loss of airway

Preliminary Results

- ABG showed metabolic acidosis with high lactate: 12 mmol/L
- ETOH elevated
- UDS negative
- BMP & LFTs within normal limits
- Head CT negative

During work up, the patient experienced multiple episodes of vomiting and began having generalized tonic-clonic seizure.

Case #2: Case Study Progression

Critical Discovery

Further investigation revealed that the grandmother had been using a homemade liniment containing both camphor and ethanol.

Outcome

Repeated seizure activity = intubation to protect airway. IV sedation and supportive management initiated.

Ultimately this child is admitted to PICU for close observation with a diagnosis of intoxication by camphor with secondary seizures.

He was extubated 48 hours later and discharged home neurologically intact after 72 hours.

https://naturamatters.blog/wp-content/uploads/2024/09/14c50-macerados.jpg

Case #2: Camphor Toxicity

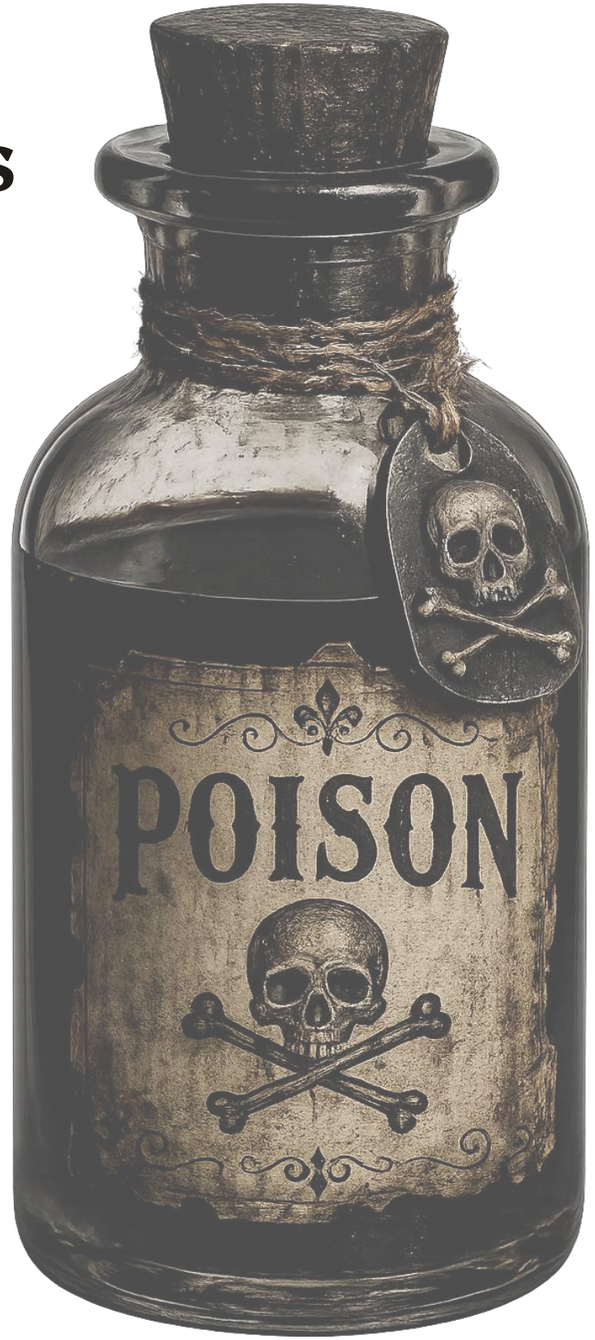
- Waxy, transparent solid derived from the wood of a camphor tree – distinctive smell
- Used topically in balms with many other uses, including as an ‘essential oil’
- Highly toxic with high-risk in pediatric ingestion
- Charcoal and induced vomiting are NOT recommended as treatment
- Rare but relevant!

https://draxe.com/wp-content/uploads/2021/06/CamphorOilFB.jpg

Case #2: Connecting the Clinical Dots

- While rare, maintain high suspicion for camphor ingestion in children – use all of your senses to assess!
- If suspected, be ready for seizure – have an airway plan
- Call Poison Control immediately!
- Support caregiver education: product labeling, safe storage, and avoiding homemade mixtures

Evidence-based triage, vigilant nursing assessment, and strong prevention education close the loop between research, practice, and patient safety.



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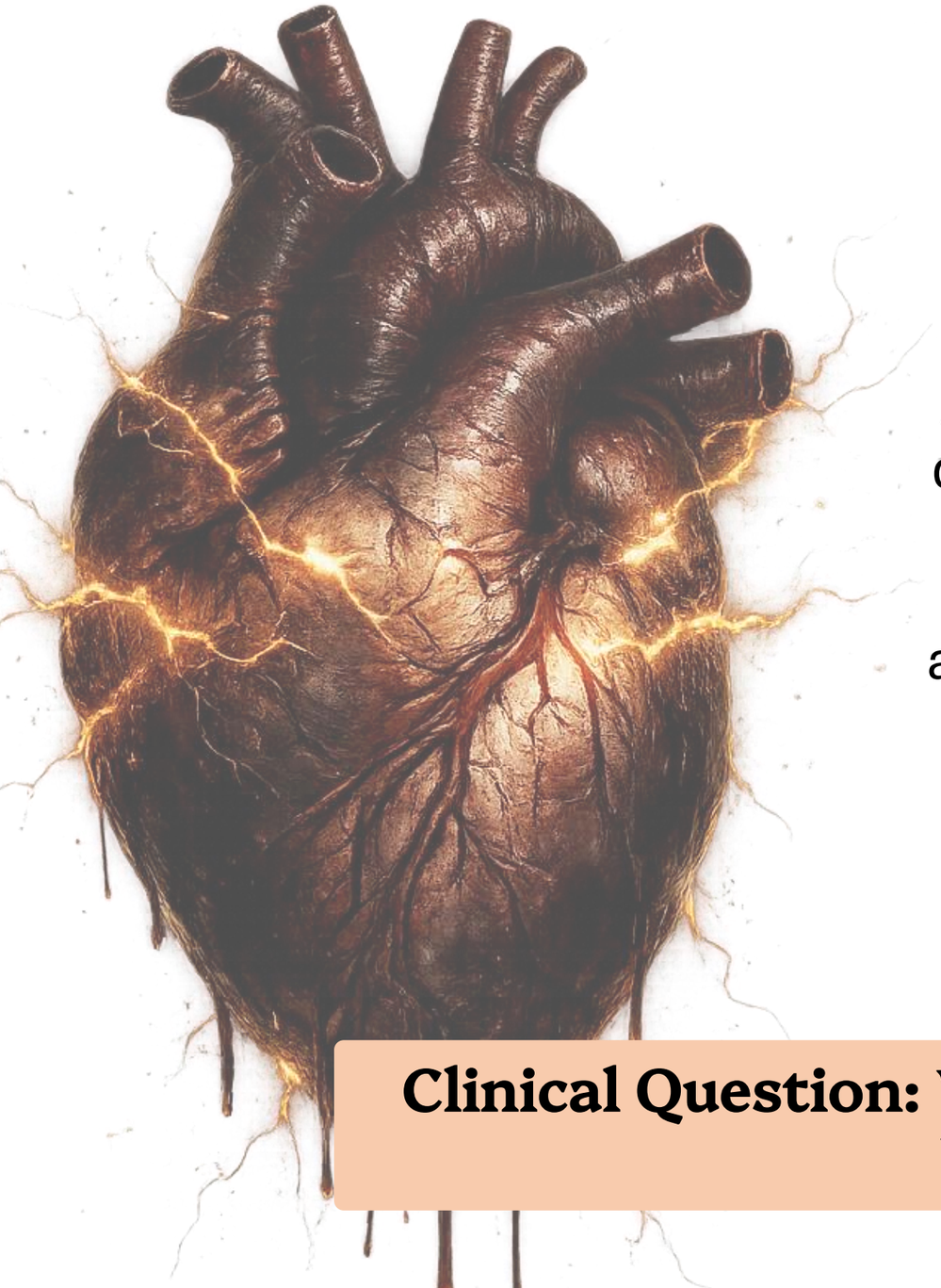


Case #3: Young Adult Anxiety & Palpitations

Clinical Scenario

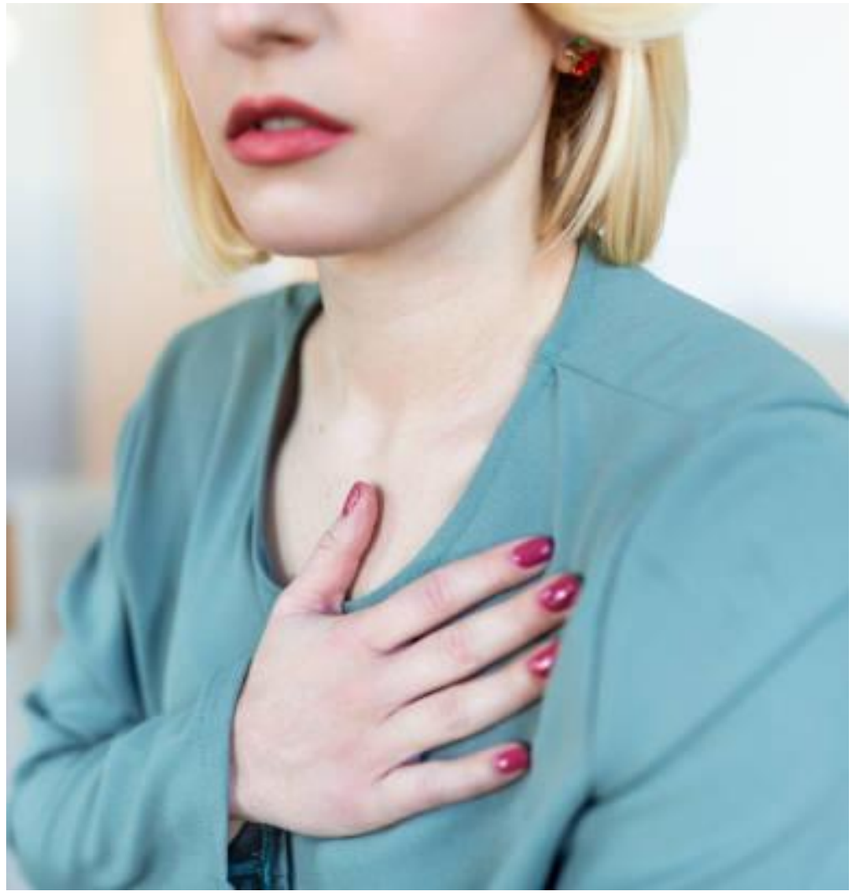
A 23-year-old college student presents to the emergency department with complaints of palpitations, tremors, and significant anxiety – comes from home where she had a syncopal episode in the shower. Patient appears agitated and reports feeling "like my heart is racing out of my chest and skipping around.”

History

No medical history. No medications.

Clinical Question: What are your initial thoughts about this presentation?

Case #3: Clinical Presentation



https://media.istockphoto.com/id/1384161309/photo/young-woman-having-chestpain-acute-pain-possible-heart-attack-effect-of-stress-and-unhealthy.jpg?s=612x612&w=0&k=20&c=SiGG6teJebb0K2DeJEr23oVHwM7-kM8C-oBnHCwsbQw=

Exam Findings

A – patent

B – tachypneic

C – pale skin, rapid pulse

Neuro: awake, alert, anxious and severely tremorous

Vitals

HR 119, BP 115/75, RR 24, O2 98%, Temp 97.9

Case #3: Differential Diagnoses

Panic Attack

Acute anxiety episode causing palpitations, tremors, and hyperventilation. However, vital sign abnormalities and low-grade fever suggest organic etiology.

Hyperthyroidism

Thyroid storm or thyrotoxicosis causing sympathetic hyperactivity with tachycardia, hypertension, and anxiety symptoms.

Cocaine/Amphetamine Use

Sympathomimetic drug toxicity causing characteristic vital sign abnormalities and agitation in young adult population.

Cardiac Arrhythmia

Primary cardiac dysrhythmia causing palpitations and hemodynamic changes, though patient age makes this less likely without underlying condition.

Any others... ?

Case #3: Triage & Work Up

Triage Decision

ESI Level 3: Stable vital signs but symptomatic patient requiring cardiac monitoring and evaluation for potentially serious underlying cause.

Initial Steps

- EKG
- IV w/labs
- UDS/pregnancy
- CTA Chest

Preliminary Results

- EKG = sinus tach w/occasional PVCs
- CTA negative
- UDS/preg negative
- TSH/Thyroxine WNL
- Mild hypokalemia
- CK: 1,200
- Creatinine: 5.1
- BUN: 30

After IVF x 1.5L, the patient only produced 90mL of urine over 4 hours.

Case #3: Case Study Progression

Critical Discovery

The patient admitted to marathon training with reduced water intake – leading to revelation that she consumes 4-5 energy drinks + workout supplements per day with limited water intake. Estimated **daily caffeine intake** = 1,000 mg for several weeks.

Outcome

Admitted with AKI secondary to dehydration, caffeine overdose, and acute interstitial nephritis (AIN) to inpatient step-down due to possible need for CCRT.

Discharged home after 48 with improving kidney function.

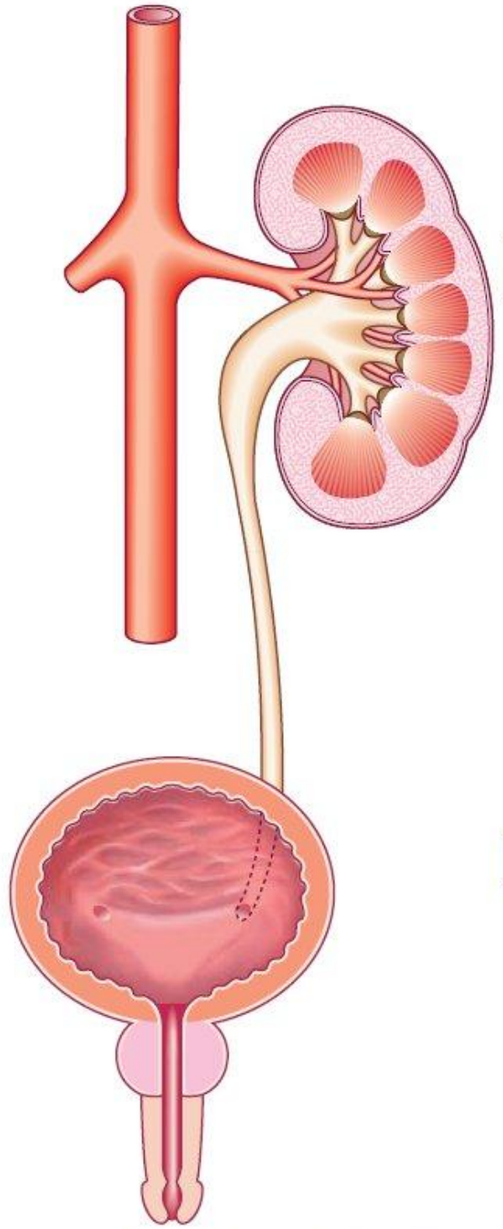
Caffeine content of popular energy drinks

86mg | 86mg | 200mg | 200mg | 200mg | 200mg | 200mg | 300mg

https://recsports.ufl.edu/energy-drinks-sip-it-or-skip-it/

Case #3: High-dose Energy Drinks & AKI

- Caffeine is an adenosine receptor antagonist (A1 & A2)
- Mechanisms include:
  - Renal vasoconstriction → reduced renal blood flow → drop in GFR = **pre-renal injury**
  - Severe dehydration + diuresis (caffeine is a potent diuretic!) = **pre-renal injury**
  - Rhabdomyolysis – stimulant + prolonged hyperadrenergic state = **intra-renal tubular necrosis**
  - Catecholamine release → electrolyte shifts = renal stress and worsens **intra-renal tubular injury**



PRE-RENAL

Impaired perfusion:
- Cardiac failure
- Sepsis
- Blood loss
- Dehydration
- Vascular occlusion

RENAL

Glomerulonephritis
Small-vessel vasculitis
Acute tubular necrosis
- Drugs
- Toxins
- Prolonged hypotension

Interstitial nephritis
- Drugs
- Toxins
- Inflammatory disease
- Infection

POST-RENAL

Urinary calculi
Retroperitoneal fibrosis
Benign prostatic enlargement
Prostate cancer
Cervical cancer
Urethral stricture/valves
Meatal stenosis/phimosis

Causes of acute kidney injury.

Source : Davidsons Essentials of Medicine, 2e

Case #3: Connecting the Clinical Dots

- Overdose is often seen in otherwise healthy individuals for study enhancement, workouts, and night-shift fatigue
- Key red flags = palpitations, tremors, anxiety with associated lightheadedness or syncope
- Nursing priority includes early 12-lead and cardiac monitoring for arrhythmias
- IV hydration for renal protection and volume correction
- Benzodiazepines may be useful to reduce catecholamine surge!

Caffeine isn't harmless. Excessive intake can mimic drug toxicity, trigger arrhythmias, and lead to AKI. Screening, early recognition, and preventative education are a must!

Choose A Case

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Case #4: Acute Seizure, Circumstances Unknown

Clinical Scenario

POV arrives with unconscious woman in the back seat. Man runs inside and yells, “Please help me, my wife is having a seizure, and I think she has done something to herself!”

Reaching the car, we see an adult female lying in the seat in full clonus. She’s not breathing and covered in vomit. There are multiple packages of OTC medicines scattered in the car.

History

Husband: “She’s been having a really hard time. She’s seeing a counselor but she’s irritable and lost her drive – she just lays around. Today she said she was going to the store and when I noticed she had been gone for hours I ran outside to find her moaning and del in the car and

Clinical Question: What are your initial thoughts about this presentation?

Case #4: Clinical Presentation

Exam Findings

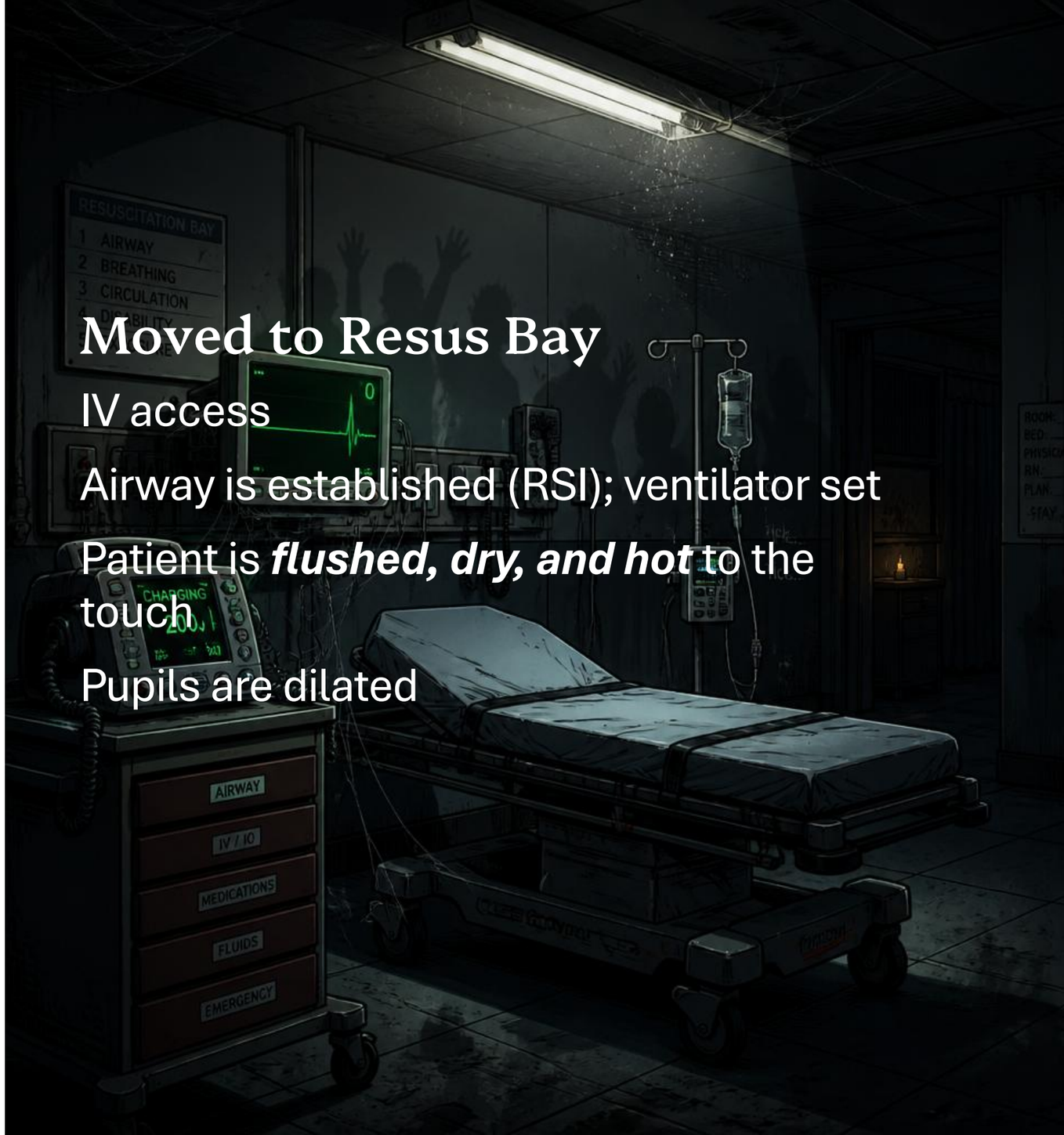
A – unresponsive & vomit is present (jaw-thrust & suction)

B – agonal (BVM manual ventilation)

C – pulses present, irregular, fast, bounding

Vitals

HR 150s, BP 104/76, RR 4-8, O2 80s, Temp 101.2



Moved to Resus Bay

IV access

Airway is established (RSI); ventilator set

Patient is ***flushed, dry, and hot*** to the touch

Pupils are dilated

Case #4: Differential Diagnoses

New Onset Seizure Disorder

First seizure often presents in adulthood without clear trigger (epilepsy).

Unknown Substance Overdose

Evidence supports ingestion based on history and presentation – which substance and how to treat?

Intimate Partner Violence

Always consider with: unwitnessed found-down patient, unusual history or events leading to presentation, evidence of traumatic injuries with no explanation.

Any others… ?

Case #4: Triage & Work Up

Triage Decision

ESI Level 1: Immediate life threat due to status seizure and airway risk.

Initial Steps

- Benzodiazepine load*
- EKG
- IV w/labs (BMP, Mag, Phos, CK)
- ABG
- Pregnancy
- UA/UDS
- Acetaminophen & salicylate level
- Head CT

Preliminary Results

- EKG = tachycardia with widened QRS
- ABG = metabolic acidosis, hypercapnia
- Preg, UDS negative
- HCT negative

Given EKG, sodium bicarb is ordered.
ICU admission is initiated.

Case #4: Case Study Progression

Critical Discovery

Screening the OTC drugs from the car it was estimated that at least thirty 25mg Benadryl tablets were ingested along with others.

Confirmation of anticholinergic toxicity.

Outcome

Physostigmine?

Seizures controlled with diazepam. Cardiac arrhythmia corrected – serial EKGs q 15-30 min. Patient was sent to ICU and discharged to inpatient psych.

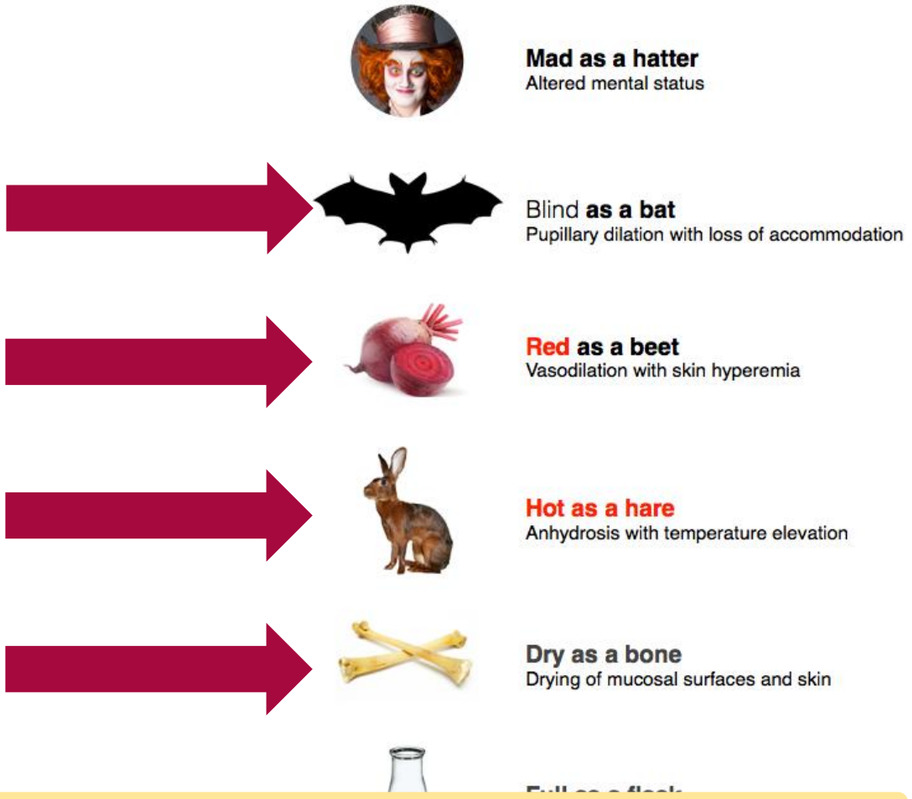
She later sent a thank you card to the emergency staff.

https://emedz.net/blog/wp-content/uploads/2020/05/physostigmine-uses-dose-side-effects-brands-scaled.jpg

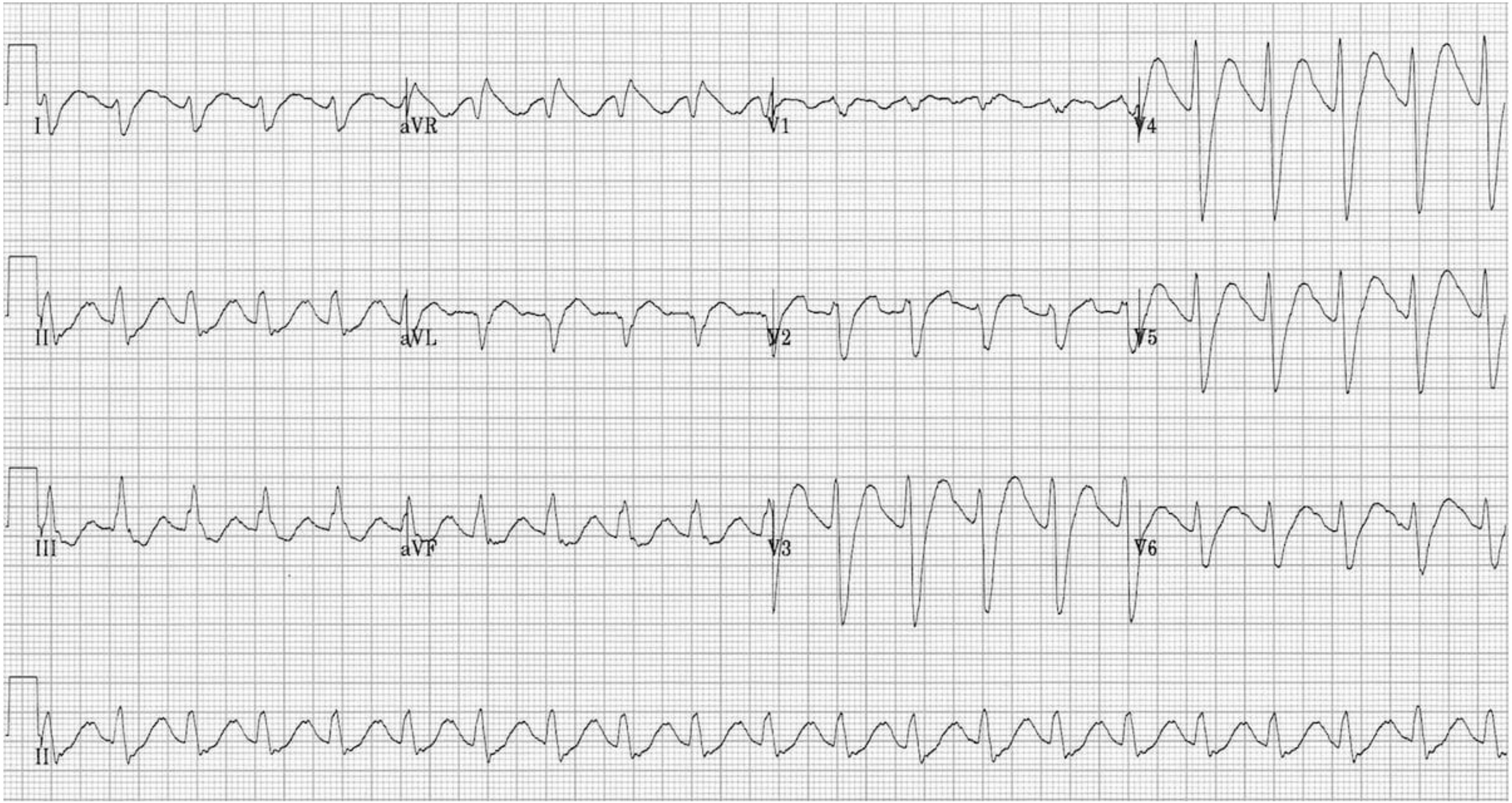
Case #4: Anticholinergic Overdose

Clinical Features

- Hyperthermia - often severe, may exceed 104°F
- Dry skin/mucosa - absent sweating
- Flushed appearance - erythematous skin
- Mydriasis - dilated pupils
- Delirium & agitation - altered mental status
- Urinary retention - anticholinergic effects
- Tachycardia - cardiac effects
- Decreased bowel sounds - GI effects



EKG is Critical: Diphenhydramine and other anticholinergics block sodium and potassium channels, leading to QRS widening and QTc prolongation with risk of life-threatening ventricular dysrhythmias.



https://litfl.com/wp-content/uploads/2018/08/ECG-TCA-overdose-Sodium-Channel-Blocking-Agent-Toxicity.jpg

Case #4: Toxidromes

Toxidrome	Vital Signs	Pupils	Skin	Mental Status
Opioid	↓RR, ↓BP	Constricted	Normal	Depressed
Cholinergic	↓ HR	Constricted	Diaphoresis	Depressed, confused, seizures
Anticholinergic	↑HR, ↑BP, ↑Temp	Dilated	Dry	Depressed, confused, hallucinations, seizures
Sedative-Hypnotic	Normal	Normal	Normal	Depressed
Hallucinogenic	↑HR	Normal, Dilated	Normal	Confused, Hallucinations
Sympathomimetic	↑HR↑BP↑RR	Dilated	Diaphoresis	Alert, agitated, seizures

Case #4: Connecting the Clinical Dots

- Clinical diagnosis – delirium/seizure, hot/dry skin, dilated pupils, tachycardia = anticholinergic toxidrome
- History can be very important to provide context and confirm suspected ingestion
- More than 600 compounds contain anticholinergic properties!

Care priorities always lead back to the basics: airway management, rapid seizure control, toxidrome recognition, arrhythmia treatment.

Recognition of the anticholinergic toxidrome is a necessary clinical skill!

Choose A Case

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Case #5: Possible Opioid Overdose

Clinical Scenario

EMS is en route with a 40’s female found unresponsive in an airport parking lot by bystanders. IN naloxone administered by bystander prior to EMS arrival. Patient now with marked agitation and active vomiting. Refusing IV access and combative with crew.

History

Unknown.

Clinical Question: What are your initial thoughts about this presentation?

Case #5: Clinical Presentation

Exam Findings

A – patent, vomiting

B – agonal to tachypneic

C – palpable pulse

Neuro: AMS ranging from unresponsive to extreme agitation, pupils pinpoint

Vitals

HR 110s, BP undetermined, RR varied, O2 95%

Case #5: Differential Diagnoses

Isolated Opioid Overdose

Pure opioid toxicity with CNS and respiratory depression, though incomplete response to Narcan suggests polysubstance involvement or long-acting opioid requiring repeated dosing.

Polysubstance Overdose

Combined opioid and benzodiazepine or other CNS depressant causing deeper sedation and respiratory depression not fully reversible with naloxone alone.

Hypoglycemia

Severe low blood sugar causing altered consciousness, though naloxone response suggests opioid involvement. May be concurrent condition requiring separate treatment.

Traumatic Brain Injury

Head trauma from fall during overdose event causing altered mental status, potentially explaining incomplete response to naloxone and agitation.

CNS Infection

Meningitis or encephalitis causing altered consciousness, though acute presentation and naloxone response make overdose more likely primary etiology.

Case #5: Opioid Overdose

- **Hepatic metabolism – renal elimination**
- **Sedation; respiratory depression**
  - Get an airway and start bagging!
  - CO2 monitor is crucial!
- **Treatment**
  - Naloxone
    - Dosing: typically, 0.4mg IV
      - If patient is a code, start with 1-2mg
    - May last 30min or up to 2hrs = watch closely for need for subsequent doses
      - Methadone half-life is 15-60hrs

Figure 14.4
Morphine causes enhanced parasympathetic stimulation to the eye, resulting in pinpoint pupils.

https://twitter.com/pharmacy16_talk/status/951355004908163073

Case #5: Triage & Work Up

Triage Decision

ESI Level 1: Critical patient requiring immediate airway management, resuscitation capabilities, and continuous monitoring for respiratory depression.

Initial Steps

- Airway w/vent management
- CXR → Chest, Abd, Pelvis
- ABG
- IV w/labs (all of them)
- NS bolus
- Narcan ready

Preliminary Results

- ABG = completely deranged!
- Chest XR = ETT good to go, unknown objects in abdominal window
- HCT negative
- Abd/Pelvis CT = what tha???

Labs: extremely elevated WBC, liver failure, electrolyte derangements, AKI

Case #5: Case Study Progression

Critical Discovery

CT Tech, “Holy crap! She’s packed!”

The team quickly realizes that the patient has several foreign objects in her bowel – highly suggestive of drug packets.

Outcome

It was assumed that one of the packets ruptured causing significant exposure to an opioid drug.

There were 12 packets of Fentanyl wrapped in balloons throughout the patient’s abdomen. Emergency laparotomy was performed to remove them. The patient was discharged after 4 weeks of ICU & Surg care.

https://encrypted-tbn0.gstatic.com/images?q=tbn:ANd9GcSujFdNYCcSfuKoMKRgQedIDpzKQg2WW0ObIA&s

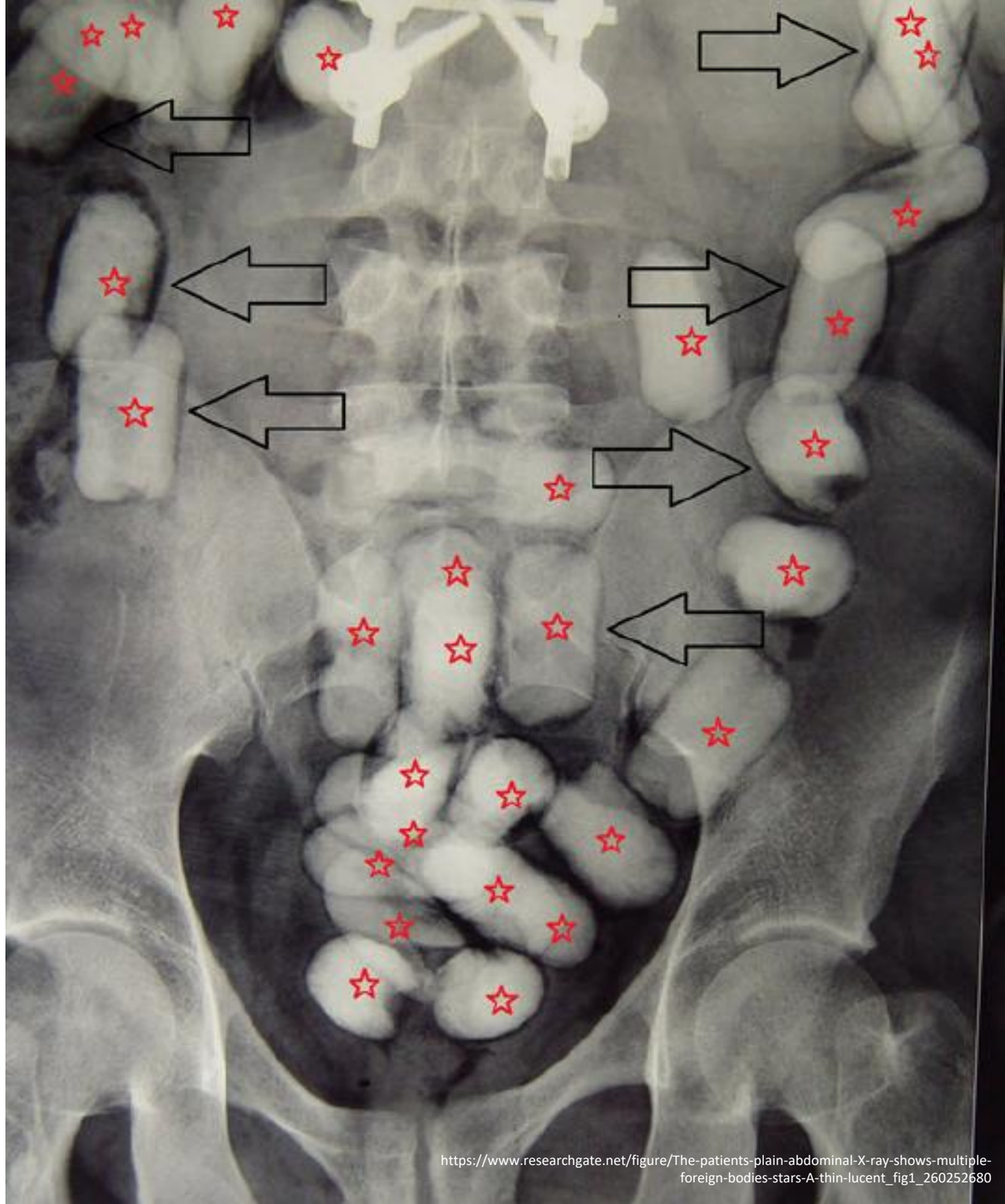
Case #5: Body Stuffers

- Spontaneous ingestion of poorly packed drugs
  - Ex: swallowing a bag of contraband prior to arrest
  - Oral, rectal, or vaginal insertion
- Usually admitted for 24hrs
  - Shorter if contraband is removed and no sign of toxidrome
- Likely will not require WBI

https://www.sunherald.com/news/local/crime/article67872197.html

Case #5: Body Packers

- “Drug mules”
- Carefully planned & packaged ingestion
- AC or WBI to dispel packets
- OR if unable to pass
- Monitor for signs of toxidrome!
  - Consider burst or leaking packet



https://www.researchgate.net/figure/The-patients-plain-abdominal-X-ray-shows-multiple-foreign-bodies-stars-A-thin-lucent_fig1_260252680

Case #5: Internal Decontamination

Activated Charcoal (AC)

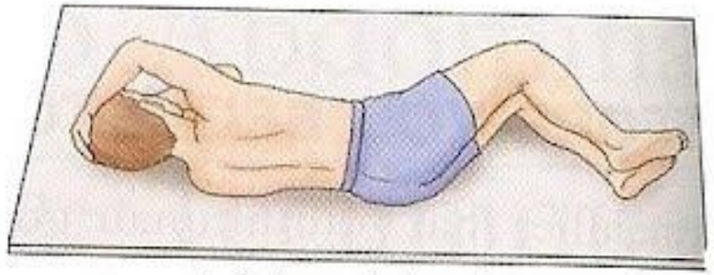
- **Give early** – biggest benefit is in the 1st hour; *not harmful if given late*
- Ensure swallow screen is done!
- Contraindications?

Whole Bowel Irrigation (WBI)

- Used for toxins not absorbed by AC*
- NGT
- Polyethylene glycol – 2L per hour until stool is clear

Gastric Lavage

- **Large** NGT (36F)
- Left lateral decubitus position
- Beneficial if used early 1-4 hrs
- Contraindications?



Left lateral decubitus

Case #5: Connecting the Clinical Dots

- Extended observation critical for long-acting opioids including methadone, sustained-release formulations, and fentanyl analogs.
- Naloxone half-life (60-90 minutes) is shorter than most opioids. Watch for recurrent respiratory depression 2-4 hours after initial reversal. Consider naloxone infusion for persistent risk.
- Titrate naloxone slowly to restore adequate respiratory effort without precipitating severe withdrawal symptoms. **Goal is spontaneous breathing, not complete alertness.**
  - Smaller incremental doses (0.04-0.4 mg) prevent acute withdrawal syndrome which causes agitation, vomiting, and potential aspiration.
- End-tidal CO_2 monitoring provides early warning before oxygen desaturation occurs.

Assume any patient with pinpoint pupils and AMS has opioid overdose until proven otherwise! Remember: you're reversing respiratory depression, not treating addiction.

As a Side Note:

- Colorado ENA QSIP – Statewide Harm Reduction Initiative
  - Expand community access to naloxone and increase awareness of opioid overdose response
  - Worked with public health agencies and EDs to distribute **FREE** naloxone kits and education resources statewide
  - Delivered training for nurses, first responders, and community members on overdose recognition and naloxone administration

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Choose A Case

Case #1	**Case #2**	**Case #3**	**Case #4**	**Case #5**
2-year-old male; c/o respiratory distress & stridor	4-year-old male; c/o vomiting, tremors, confusion	23-year-old female; c/o heart palpitations and anxiety	37-year-old female; unconscious in POV, seizing	40's female; possible opioid OD, given IN Narcan

References

Chandwani, N., & Karamchandani, K. (2023). Camphor oil toxicity: A case report. Cureus, 15(8), e43345. https://doi.org/10.7759/cureus.43345

Muralidhar, A., & Kumar, R. (2025). A case report of camphor toxicity in a one-year-old male patient. BMC Pediatrics, 25(1), 54. https://doi.org/10.1186/s12887-025-05488-w

Ramos, J. M., et al. (2017). Severe camphor poisoning: A seven-year observational study. Clinical Toxicology, 55(9), 936–943. https://doi.org/10.1016/j.clinph.2017.03.012

Tanen, D. A., et al. (1999). *Severe lung injury after exposure to chloramine gas from household cleaners*. *The New England Journal of Medicine*, 341, 848-849. https://doi.org/10.1056/NEJM199909093411115

Atalla, A., Shulman, J., Rose, J., & Lynch, M. (2024). *Trends in chlorine and chloramine gas exposures reported to United States poison centers*. *Clinical Toxicology (Philadelphia)*, 62(9), 589-595. https://doi.org/10.1080/15563650.2024.2390139

Lin, G. D., et al. (2022). *Household disinfectants may cause toxic reactions and produce toxic gases, including chlorine. [Journal]*. https://pmc.ncbi.nlm.nih.gov/articles/PMC9477020/

Murt, A. (2025). *Energy drink-induced acute kidney injury: A case report and review of the literature. Journal of Medical Case Reports, 19*(1), 522. https://doi.org/10.1186/s13256-025-05614-3

Al Yacoub, R., Luczkiewicz, D., & Kerr, C. W. (2020). *Acute kidney injury and hepatitis associated with energy drink consumption: A case report. Journal of Medical Case Reports, 14*(1), 23. https://doi.org/10.1186/s13256-019-2340-0

Koide, N., Sato, N., Kondo, D., & Hirose, Y. (2020). *Caffeine overdose complicated by acute kidney injury despite mild creatine kinase elevation. Case Reports in Acute Medicine, 3*(1), 12–16. https://doi.org/10.1159/000507181

References

Gummin, D. D., Mowry, J. B., Beuhler, M. C., Spyker, D. A., Brooks, D. E., Dibert, K. W., & Ryan, M. L. (2023). *2022 Annual Report of the American Association of Poison Control Centers' National Poison Data System (NPDS): 40th Annual Report*. Clinical Toxicology, 61(12), 1053–1223. https://doi.org/10.1080/15563650.2023.2252067

Institute of Medicine (IOM). (2022). *Adverse drug events in older adults: A growing public health concern*. National Academies Press. https://doi.org/10.17226/26298

Reed, J. M., Carr, J. A., & Cook, L. J. (2020). Emergency nurses' confidence in managing toxicologic emergencies: A national survey. *Journal of Emergency Nursing*, 46(4), 478–485. https://doi.org/10.1016/j.jen.2020.01.001

University of Oklahoma Health Sciences Center. (2025, March). *Oklahoma Poison Center observes National Poison Prevention Week*. OU News. https://www.ou.edu/news/articles/2025/march/oklahoma-poison-center-poison-prevention-week

Arens AM, Kearney T. Adverse Effects of Physostigmine. J Med Toxicol. 2019 Jul;15(3):184-191. doi: 10.1007/s13181-019-00697-z. Epub 2019 Feb 11. Erratum in: J Med Toxicol. 2019 Oct;15(4):310. doi: 10.1007/s13181-019-00730-1. PMID: 30747326; PMCID: PMC6597673.

McCoy CE, Honda R. Anticholinergic Toxicity in the Emergency Department. J Educ Teach Emerg Med. 2023 Jan 31;8(1):S25-S47. doi: 10.21980/J8D07Z. PMID: 37465041; PMCID: PMC10332772.