

Hydrocarbon Ingestion

Brent Parris, MD

PGY-1

Internal Medicine-Pediatrics

Question 1

A 16 year old boy is promptly brought to the emergency room by his hysterical mother after she found him in a park with his friends sniffing aerosol propellants from a paper bag (“huffing”). After questioning the child alone, he states that he has been huffing every weekend for the last 6 months. Review of systems is positive for headache, dizziness, and chronic cough. Upon arrival to the ER, his vitals are as follows: T: 37.8, RR: 26, HR: 115, BP: 85/60, and O2 sat: 100% on room air. Physical examination is significant for injected sclera, dry and cracked oral mucosa, a chemical smell on his breath, black stains on his fingernails, a 1/6 holosystolic murmur, and clear lungs. What is the most appropriate next step in management of this patient?

- A. Fluid bolus
- B. Chest x-ray
- C. ECG
- D. Head CT without contrast
- E. Admission for observation

Question 1

A 16 year old boy is promptly brought to the emergency room by his hysterical mother after she found him in a park with his friends sniffing aerosol propellants from a paper bag (“huffing”). After questioning the child alone, he states that he has been huffing every weekend for the last 6 months. Review of systems is positive for headache, dizziness, and chronic cough. Upon arrival to the ER, his vitals are as follows: T: 37.8, RR: 26, HR: 115, BP: 85/60, and O2 sat: 100% on room air. Physical examination is significant for injected sclera, dry and cracked oral mucosa, a chemical smell on his breath, black stains on his fingernails, a 1/6 holosystolic murmur, and clear lungs. What is the most appropriate next step in management of this patient?

- A. Fluid bolus
- B. Chest x-ray
- C. ECG
- D. Head CT without contrast
- E. Admission for observation

Acute management of hydrocarbon ingestion

- Supportive care of symptoms is the mainstay of treatment
- Depending on the amount of ingestion, patients may present with the following:
 - Asymptomatic
 - Coughing, gagging, choking
 - Tachypnea, crackles, hemoptysis, bronchospasm, hypoxia, or respiratory failure
 - Varying levels of tachycardia, ventricular tachydysrhythmias (v-tach and v-fib)
 - CNS depression **or** excitation
 - Seizure
 - Ataxia and dementia (with chronic abuse)
 - Sudden death

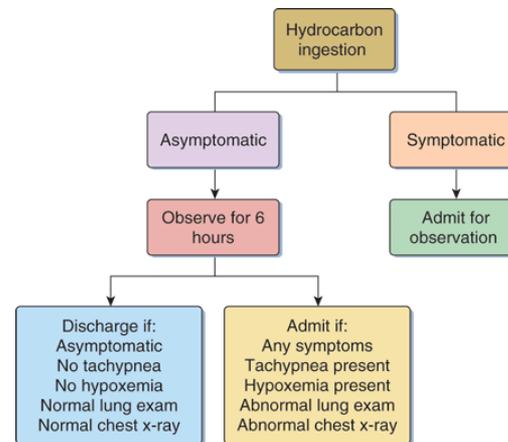
Question 1

- Choice A: The patient is hypotensive, tachycardic, and dry. A bolus is most likely to resolve his symptoms. Supportive care is the mainstay of therapy.
- Choice B: Chest x-ray is typically indicated prior to discharge but is typically not performed early unless the patient has severe or new onset respiratory symptoms. Findings of chemical pneumonitis are often not apparent until hours after the ingestion. This patient has a chronic cough, is not significantly tachypneic, and is saturating well. Supplemental oxygen and bronchodilators may aid patients who have respiratory symptoms.
- Choice C: Patients who ingest hydrocarbons are susceptible to ventricular tachydysrhythmias and should have ECG prior to discharge. This patient has tachycardia, hypotension, and dry mucosa which suggest dehydration over ventricular dysrhythmia.

Question 1

- Choice D: Head CT without contrast is not typically indicated in hydrocarbon ingestion unless there was trauma to the head.
- Choice E: Admission for observation is indicated if a patient is tachypneic, hypoxemic, has an abnormal lung exam or chest x-ray, or has cardiovascular instability upon arrival to the ER or after a 6 hour observation period.

Disposition algorithm



Source: Strange GR, Ahrens WR, Schafermeyer RW, Wiebe RA: *Pediatric Emergency Medicine, 3rd Edition*: <http://www.accessmergencymedicine.com>
Copyright © The McGraw-Hill Companies, Inc. All rights reserved.

Question 2

An 18 year old male arrives via ambulance to the ER unresponsive, hypoxic, tachycardic and hypotensive. He was found in an abandoned warehouse surrounded by multiple unmarked chemical containers. He appears disheveled and his clothes have a strong scent of paint thinner. He is rapidly intubated and then goes into cardiac arrest. His rhythm is ventricular fibrillation. Which of the following sympathomimetics is most appropriate during resuscitation of this patient?

- A. Epinephrine
- B. Norepinephrine
- C. Isoproterenol
- D. Lidocaine
- E. Dopamine

Question 2

An 18 year old male arrives via ambulance to the ER unresponsive, hypoxic, tachycardic and hypotensive. He was found in an abandoned warehouse surrounded by multiple unmarked chemical containers. He appears disheveled and his clothes have a strong scent of paint thinner. He is rapidly intubated and then goes into cardiac arrest. His rhythm is ventricular fibrillation. Which of the following sympathomimetics is most appropriate during resuscitation of this patient?

- A. Epinephrine
- B. Norepinephrine
- C. Isoproterenol
- D. Lidocaine*
- E. Dopamine

Question 2

Choice A, B, C, and E: In severe toxicity, hydrocarbons can cause sensitization of the myocardium to catecholamines which can result in cardiac arrest. Patients have been known to have sudden death after abusing hydrocarbons after being startled or excited because the heart becomes extra sensitive to the catecholamine surge. In an otherwise healthy patient, if you think the arrest is secondary to the hydrocarbon exposure, lidocaine or beta antagonists such as beta blockers have been shown to be efficacious.

References

1. Gummin DD. Chapter 106. Hydrocarbons. In: Nelson LS, Lewin NA, Howland M, Hoffman RS, Goldfrank LR, Flomenbaum NE. eds. *Goldfrank's Toxicologic Emergencies*, 9e . New York, NY: McGraw-Hill; 2011.
<http://accessemergencymedicine.mhmedical.com/content.aspx?bookid=454&Sectionid=40199519>. Accessed June 12, 2014.
2. Thompson TM. Chapter 114. Hydrocarbons: In: Strange GR, Ahrens WR, Schafermeyer RW, Wiebe RA. eds. *Pediatric Emergency Medicine*, 3e. New York, NY: McGraw-Hill; 2009.
<http://accessemergencymedicine.mhmedical.com/content.aspx?bookid=558&Sectionid=42137073>. Accessed June 12, 2014.
3. Anderson CE, Loomis GA. Recognition and prevention of inhalant abuse. *Am Fam Physician*. 2003;68(5):869-74.