SEMP

SOCIETY OF EMERGENCY MEDICINE PHARMACISTS

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From Reactor to Response and Resuscitation: Hydrazine Exposure Management

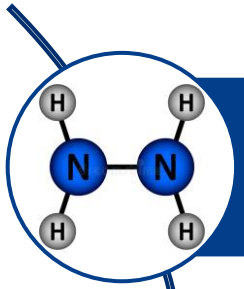
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Disclosures

No one involved in the development of the educational content has a relevant financial relationship to disclose

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Objectives



Recognize the toxicologic profile of hydrazine and apply evidence-based principles to the assessment and management of exposed patients.



Analyze communication challenges encountered during a mass casualty event and identify strategies to improve coordination among healthcare teams and external agencies.



Assess mass casualty incident response procedures and identify opportunities to enhance institutional preparedness, surge capacity, and operational readiness.

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Byron, Illinois
March 10th, 2026



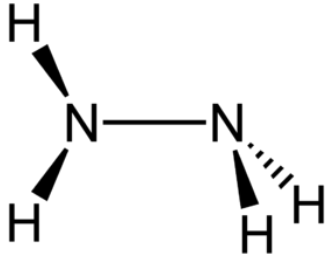
- 5:45 PM - ED notified via police officer of a mass casualty event at the nuclear power plant
- Unsure how many victims as was rapidly evolving
- Unsure if radioactive material involvement
- ED starts to coordinate a tentative response

Information Trickle and Discrepancies

- Emergency Management team was on site at the power plant
- Began to receive reports of anywhere from 5-10+ patients exposed to a chemical spill and unsure what chemical
  - 1st report (Illinois Poison Center): Hydrazine
  - 2nd report (Emergency Management): Sodium Metabisulfite
  - 3rd report (patients who worked with chemical): Hydrazine
- EM Pharmacist reached out to Illinois Poison Center (IPC) to see if they were aware, to prepare resources, and for guidance
  - Surprised as they had been told all patients being transferred to another Rockford area hospital
- Primary Exposure: inhalational ± dermal

Chemical Decision Point

- Given the information that you have what chemical do you go with as information changes so rapidly?
- The EM team and IPC made the decision to go with the initial report and what the patients flowing in who worked with the chemicals everyday reported an ammonia smell
- Hydrazine
  - Toxicology
    - Hydrazine (N_2H_4) industrial reducing agent
    - Rapid absorption via lungs and skin
    - Inhibits pyridoxine kinase and glutamic acid decarboxylase
    - CNS, liver, and respiratory toxicity
  - Key Symptoms
    - Airway irritation, cough, dyspnea, pulmonary edema
    - Headache, dizziness, nausea, CNS depression
    - Seizures and potential delayed hepatotoxicity







Hydrazine Monitoring, Management, Disposition

Monitoring

- Vitals and mental status
- CMP, CBC, pH, lactate
- Chest x-ray for pulmonary symptoms
- Methemoglobin levels

Management

- Decontamination (ensure staff safety)
- 100% oxygen with assisted ventilation as needed
- β_2-agonists and corticosteroid for bronchospasm
- Pyridoxine 25 mg/kg IM or IV (up to 5 grams) and a benzodiazepine for seizures, CNS depression, or lactic acidosis

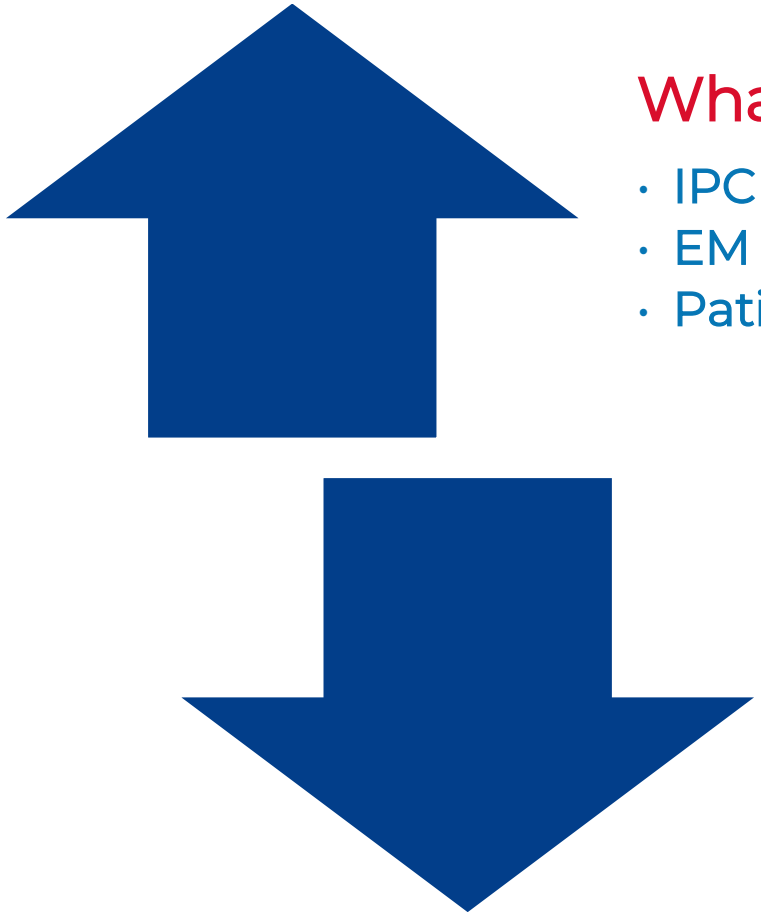
Disposition

- Observe until asymptomatic
- Any sign of CNS symptoms or persistent pulmonary symptoms beyond 6-12 hours should be admitted

Back to the Cases

Patient Number	Patient Presentation
1	Numbness and tingling hands and feet, dizzy, shortness of breath, cough, vitals stable, EKG normal
2	Potential chemical burn to anterior face and neck, mild breathing difficulty
3	Security supervisor who ran and was coughing, unsure what was causing coughing, right eye irritation, no blurred vision
4	Walk in, was floor above spill came for severe hypertension
5	Walk in, drove with husband, Patient 4, 30 minutes from scene where she is also an employee that was intubated 6 months prior due to hydrazine exposure at plant
6	Discovered the spill which was a leak from a fitting on a 50-gallon hydrazine tank and threw oil dry on the few ounces spilled per protocol. Initial throat irritation.
7	Worked for over 20 years at the plant knew from smell it was hydrazine, floor above spill, headaches only
8	Numbness and tingling in hands and toes, dizzy

Art of Communication



What Went Well

- IPC involved early
- EM pharmacist engaged
- Patients successfully managed

Opportunities for Improvement

- Incident command activation
- Chemical identification
- Antidote inventory awareness
- Inter-hospital communication
- Decontamination process

Patient Dispositions

- All patients were successfully managed with supplemental oxygen, corticosteroids, and albuterol
- Final Outcome
  - 8 patients evaluated
  - No severe toxicity
  - No pyridoxine required
  - No admissions
  - No delayed complications identified

Mass Casualty and Disaster Considerations

- Need to keep the rest of the department moving while dealing with mass casualty events
- Review your current protocols on what happens during a mass casualty or disaster event internal and external
- Identify critical medications and antidote shortages early
- Depending on specific event, try and anticipate needs early
  - Anesthetics, RSI kits, sedation, pain medications
- Keep communication open and information shared amongst team

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Other Events

Our Hospital

- March 2024, Mass stabbing in a neighborhood: 4 killed, 7 others injured
- March 2023, Tornado collapsed concert venue: 1 killed, 48 injured
- December 2020, Mass shooting at a bowling alley: 3 killed, 6 injured

Around the Country the Past Few Weeks

- Paper mill chemical explosion in Washington killed 11 after “white liquor” (sodium hydroxide and sodium sulfide) tank explosion
- 400,000 Californians evacuated after chemical leak at an aerospace facility
- Fire and major explosion in New York City at a shipyard 16 injured and 3 critical condition
- Chemical leak in April at a refining facility in West Virginia with 2 dead and injured 30 people

Resources

- ASHP Emergency Preparedness Resources
- Centers for Disease Control and Prevention CHEMPACK
- Administration for Strategic Preparedness and Response
- American College of Emergency Physicians
- State Poison Centers
- MSDS

Summary

- In chemical MCIs, treatment decisions frequently must be made before complete information is available
- Early coordination with poison centers, toxicology resources, pharmacy, and incident command is critical to avoid delays in care and antidote procurement
- Familiarity with hospital/local protocols can promote efficiency during a mass casualty situation while also maintaining workflows for other patients

Assessment Question #1

A nuclear power plant employee presents after a suspected hydrazine exposure. Which toxicity is most directly related to hydrazine-induced depletion of pyridoxine?

A. Methemoglobinemia

B. Seizures

C. Bradycardia

D. Renal failure

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Assessment Question #2

During a developing chemical mass casualty incident, multiple sources provide conflicting information regarding the involved chemical. What is the most appropriate initial action?

A. Wait until the chemical is definitively identified before preparing treatment resources

B. Prepare for the most severe plausible exposure while continuing information gathering

C. Assume the most recent report is correct

D. Delay patient evaluation until incident command confirms details

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Q&A and Discussion



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