

Poison Facts:

High Chemicals: Ammonia

Properties of the Chemical

Ammonia is a corrosive alkaline gas, which is colorless with a pungent odor. Although ammonia is generally regarded as nonflammable, mixtures of ammonia and air will explode when ignited under favorable conditions. Ammonia is highly water-soluble.

Uses of the Chemical

Ammonia is used as a refrigerant, a fertilizer, a cleaning and bleaching agent, and is widely used as a household cleaner. It is also used in explosives. Approximately 80 percent of ammonia is used in agriculture.

Absorption, Distribution, Metabolism and Excretion (ADME)

Ammonia may be absorbed by inhalation, ingestion and most likely through dermal exposures at concentrations high enough to cause skin injury.

Clinical Effects of Acute Exposure

- **Ocular exposures:** Exposure to ammonia is very irritating to the eyes. Possible injuries to the eye include conjunctivitis, lacrimation, palpebral edema, blepharospasm, photophobia, corneal irritation and temporary blindness. These are all common after severe exposure. Ammonia has a greater tendency than other alkalis to penetrate and damage the iris, due to the fact that it is both water- and lipid-soluble.
- **Dermal exposures:** Concentrated ammonia may produce liquefaction necrosis and deep penetrating burns. Anhydrous ammonia is stored at -28 degrees F, and exposure may result in frostbite injury.
- **Inhalation exposures:** Inhalation of even diluted household ammonia is irritating to the upper respiratory tract. Ammonia can cause bronchospasm, laryngitis, tracheitis, wheezing, dyspnea and chest pain. Mucosal burns to the tracheobronchial tree and pulmonary edema have occurred following inhalation exposures to concentrated ammonia.
- **Ingestion exposures:** Nausea and vomiting occur frequently following ingestion of ammonia solutions. Swelling of the lips, mouth and larynx have occurred. Oral and esophageal burns may occur if the ingestion is of the concentrated form. Gastric perforation within 24 to 72 hours leading to mediastinitis has been reported.

Additional information: Altered mental status and coma may occur secondary to hypoxemia. Seizures may occur if there is extensive absorption.

In-Field Treatment Prior to Arrival at a Health Care Facility

- **Ocular exposures:** Immediate irrigation of the eye is essential. Irrigation should continue for 20 to 30 minutes.
- **Dermal exposures:** Remove contaminated clothing, and wash exposed skin thoroughly with soap and water. Pressurized liquid ammonia can produce frostbite injury. Do not institute rewarming unless complete rewarming can be assured.
- **Inhalation exposures:** Move the patient from the toxic environment to fresh air, and monitor for respiratory distress.
- **Ingestion exposures:** Dilute with any available nontoxic, cool liquid. The maximum amount of dilutions should be no more than 8 ounces (240 ml) in adults and 4 ounces (120 ml) in children. DO NOT attempt dilution in patients with respiratory distress, altered mental status, severe abdominal pain, nausea or vomiting, or patients who are unable to swallow or protect their airway.

Special note to first responders:

- Wear a positive-pressure Self-Contained Breathing Apparatus (SCBA).
- Wear chemical protective clothing that is specifically recommended by the manufacturer. It may provide little or no thermal protection.

Treatment of Exposures in a Health Care Facility

- **Ocular exposures:** Exposed eyes should be immediately irrigated with tepid water or room-temperature 0.9% normal saline for 20 to 30 minutes or until the pH of the conjunctival sac is less than 8.5. Corneal fluorescein staining and slit lamp examination is highly recommended, even with the household ammonia splash contacts.
- **Dermal exposures:** Remove clothing, and irrigate exposed dermis with soap and water. Pressurized liquid ammonia can cause frostbite injury. Institute rewarming by total immersion of exposed area in a water bath of 40 to 42 degrees C for 15 to 30 minutes. Debride nonviable tissue.
- **Inhalation exposures:** Administer 100 percent humidified oxygen. Intubation or tracheotomy may be lifesaving following severe exposure if stridor, indicating laryngeal edema, is present. Onset of acute lung injury after exposure to high concentrations may be delayed up to 72 hours. If bronchospasm and wheezing occur, use inhaled sympathomimetic agents. Monitor arterial blood gases.
- **Ingestion exposures:** If no respiratory compromise is present, dilute patient with milk or water – no more than 8 ounces (240 ml) for adults or 4 ounces (120 ml) for children. Obtain consultation for endoscopy as soon as possible, and perform endoscopy within 24 hours, when indicated by patient symptoms.

For more poison prevention and first aid information, call the

Poison Control Center

Serving the Residents of Kansas

Toll-free Hotline

1-800-222-1222

THE UNIVERSITY OF KANSAS HOSPITAL

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