Section: ALS Hazardous Materials
Subject: ADULT CHEMICAL TREATMENT GUIDE 1A: YELLOW
Section #: 346.04
Issue Date: March 21, 2011
Revision Date:
Approved By:  Michael Lozano, Jr., M.D., HCFR Medical Director

1. Covered Substances:
    a. Acits and Acid Mists
    b. Alkaline Compounds
    c. Methylene Biphenyl Isocyanate, Ethyl Isocyanate, and Methylene Dilsocyanate (MDI)
    d. Ammonia (liquid and gas)
    e. Chlorine Gas (CI) and Phosgene
    f. Nitrogen Mustard (HN-1, HN-2, HN-3); Lewisite (L, HI); and Blister Agents (H, HD, HS)

2. Signs and Symptoms:
    a. Low concentrations of airborne acids and alkalis can produce rapid onset of eye, nose, and throat irritation.
    b. Higher concentrations of acids and alkalis, or low concentrations of ammonia, can produce cough, stridor, wheezing, or chemical pneumonitis also known as non-cardiogenic pulmonary edema (NCPE).
    c. Ingestion of acids and alkalis can result in severe injury to the upper airway, esophagus, and stomach.
    d. There may be circulatory collapse as well as partial or full thickness burns to any internal or external skin surfaces that come in contact with the acid or alkali.
    e. Some of the gases are stored in a liquid state and pose a significant risk of frostbite.

3. General Supportive Care:
    a. Ensure that members are using appropriate PPE.
        i. Obtain HIT-9 assistance, if needed.
    b. Decontamination:
        i. Remove the patient from the hazardous area.
            1. If victims can walk, lead them out of the Hot Zone to the Decon Zone.
            2. Victims who are unable to walk may be removed on backboards or gurneys; if these are not available carefully drag victims to safety.
            3. Consider appropriate management of chemically contaminated children, such as measures to reduce separation anxiety.
        ii. Victims who are able may assist with their own decontamination.
            1. Remove contaminated clothing while flushing exposed areas.
            2. Double-bag contaminated clothing and personal belongings.
            3. If indicated, irrigate exposed or irritated eyes with plain water or saline for at least 15 minutes.
                a. Remove contact lenses if easily removable.
                b. Continue irrigation while transferring the victim to the Support Zone.
                c. Do not cover the eyes with bandages.
        iii. Handle frostbitten skin and eyes with caution.
            1. Do not irrigate eyes that have sustained frostbite injury.
            2. Place frostbitten skin in warm water, about 108°F (42°C).
                a. If warm water is not available, wrap the affected part gently in blankets.
            3. Let the circulation reestablish itself naturally.
            4. Encourage the victim to exercise the affected part while it is being warmed.
            5. Continue passive warming while initiating transport.

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iv. Do not attempt to neutralize the agent with another solution.
v. If the patient has external burns, irrigate copiously and cover with a dry dressing.

c. Initiate medical and / or trauma supportive care as indicated.
   i. NG tube placement is contraindicated.
   ii. Avoid the use of oral airways.
   iii. In case of ingestion, do not induce emesis.
d. *Contact Poison Information Center (1-800-222-1222)*.
e. If the patient has signs and symptoms of pulmonary edema, maintain adequate ventilation and oxygenation.
   i. Non-cardiogenic pulmonary edema should not be treated with furosemide.
   ii. If intubated, use positive end expiratory pressure (PEEP) per protocol.
   iii. If spontaneously breathing, apply CPAP at the lowest level needed to alleviate dyspnea.

4. Paramedic Level Care:
   a. If the patient has bronchospasm, administer **albuterol** 5.0 mg via nebulizer q 20 minutes PRN.
   b. For seizures, follow appropriate HCFR protocol.
   c. Phosgene will sensitize the myocardium to catecholamines, so place the patient in a calm reassuring environment if possible.
      i. If dysrhythmias develop, treat with the indicated HCFR protocol.
   d. Treat hypotension with vasopressors rather than with fluids unless there are signs and symptoms of hypovolemic shock.
      i. **Dopamine** starting at 5.0 mcg/kg/min IV and titrating to SBP > 100 mmHg in adults or the lower end of the normal range adjusted for age in pediatric patients (max dose 20 mcg/kg/min).

5. MSOT – HazMat Medic Level Care:
   a. Treat hypotension with vasopressors rather than with fluids unless there are signs and symptoms of hypovolemic shock.
      i. **Phenylephrine** (Neo-synephrine™)
         1. *Adults*: 100 – 180 mcg/min IV as a brief initial infusion until the blood pressure stabilizes, with dosage titrated to a mean arterial pressure (MAP) of 75 – 100 mmHg.
            a. The usual maintenance infusion rate ranges between 40 and 60 mcg/min IV.
         2. *Pediatrics*: 20 mcg/kg IV bolus, followed by an initial IV infusion of 0.1 – 0.5 mcg/kg/min, with dosage titrated to a mean arterial pressure (MAP) of 75 – 100 mmHg.
   b. Consider **racemic epinephrine** aerosol for children who develop stridor:
      i. 0.5 ml of 2.25% **racemic epinephrine** (Vaponephrine™) solution in water q 20 min PRN – hold for tachycardia.

6. Quality Assurance Points:
   a. End-stage symptoms may resemble organophosphate poisoning. However, patients will have normal or dilated pupils – the patient will not have pinpoint pupils.
      i. These patients should not be given either atropine or 2-PAM.

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b. Do not attempt to neutralize the agent with another solution.
c. Chemical burns to the upper airway or pharynx preclude the use of a supraglottic airway.
    i. Your only alternative as a rescue airway may well be a device assisted cricothyrotomy.
d. Children may be more vulnerable to corrosive agents than adults because of the smaller diameter of their airways.
    i. Children may also be more vulnerable because of failure to evacuate an area promptly when exposed.
e. The following exposed persons must be evaluated at a medical facility:
    i. Those who have ingested ammonia.
    ii. Those who have persistent upper respiratory irritation or other acute symptoms of severe inhalation exposure.
    iii. Those who have eye or skin burns that cover a large surface area.
f. Persons who have been exposed only to ammonia gas and are currently asymptomatic are not likely to develop complications.
g. Patients exposed to blister agents may not experience symptoms at first. Since there is no known antidote, early decontamination is the only effective treatment.