11.03 SPECIAL CIRCUMSTANCES: CHEMICAL & RADIOLOGICAL AGENTS

RADIATION INJURY

- Burns and/or blast injury.
- Multiple health issues with lower dose exposures.

**BLS Treatment**

- Position of comfort.
- NPO
- Assess circulation, airway, breathing, and responsiveness.
- Oxygen as indicated.
- Provide **Spinal Motion Restriction** as indicated or position of comfort as indicated.
- Splint suspected fractures/instability as indicated.
- Bandage wounds/control bleeding as indicated.

**ALS Treatment**

- For pain, see **Policy 2.09 Pain Control** or **Policy 8.12 Pediatric Pain Control**.

**Comments**

- Follow facility radiation exposure plan for patient decontamination and disposal of all contaminated waste.
- In the nuclear bomb scenario casualty load will be excessive. Utilize austere care protocol and strict triaging to maximize available resources. Access all available disaster resources.
CHEMICAL AGENT INJURY: NERVE AGENTS (e.g. VX, Sarin, Soman, Tabun)

- Causes “SLUDGE” (Salivation, Lacrimation, Urination, Diaphoresis/Diarrhea, Gastric hypermotility, Emesis/Eye (small pupils, blurry vision).
- Severe exposures may result in decreased level of consciousness, fasciculation/muscle weakness, paralysis, seizures.

**BLS Treatment**

- Position of comfort.
- NPO
- Assess circulation, airway, breathing, and responsiveness.
- **Oxygen** as indicated.
- Provide **Spinal Motion Restriction** as indicated or position of comfort as indicated.
- Appropriate splint suspected fractures/instability as indicated.
- Bandage wounds/control bleeding as indicated.

**ALS Treatment**

- Administer **Atropine** 2-5 mg IVP/IO. Repeat every 2 – 5 minutes until SLUDGE symptoms subside.
- For seizures: administer **Midazolam**.

**Comments**

Nerve agent poisoning can be very toxic. Large amounts of **Atropine/2-PAM** may be needed to treat symptoms. If the patient is initially symptomatic and no response is seen to the initial doses of medication, continue giving until a response is achieved. May need to access pharmaceutical disaster cached called, “CHEMPACK” to have sufficient supply of antidote to treat multiple patients. If available, administer **DuoDote** [Atropine/Pralidoxime (2-PAM)] Autoinjector IM in using dosing table below:

**DuoDote (2-PAM) Dosing Estimator**

*Duodote = Atropine 2.1mg / Pralidoxime 600mg*

<table>
<thead>
<tr>
<th>Do NOT Use Atropine/2-PAM Injector</th>
<th>Use Between 1 – 3 Atropine/2-PAM Injectors IM</th>
<th>Use 3 Atropine/2-PAM Injectors IM</th>
</tr>
</thead>
<tbody>
<tr>
<td>• No signs of life</td>
<td>Titrated dose based on 1 or more SLUDGE signs and:</td>
<td>• Exhibiting 2 or more SLUDGE signs OR</td>
</tr>
<tr>
<td>Fits non-resuscitation group (expectant) due to other concomitant injury</td>
<td>• Elderly</td>
<td>• Non-ambulatory</td>
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<td></td>
<td>• Children appearing under age 14</td>
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<td></td>
<td>• Prolonged extrication (may require more than 3 autoinjectors)</td>
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SAN FRANCISCO EMS AGENCY
Effective: 10/29/18
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Bronchospasm and respiratory secretions are the best acute symptoms to monitor response to Atropine/2-PAM therapy:
- Decreased bronchospasm and respiratory secretions = getting better.
- No change or increased bronchospasm and respiratory secretions = needs more 2-PAM.

MUSTARD (SULFUR MUSTARD)

Blistering agent affecting skin and mucous membranes.

BLS Treatment

- Position of comfort.
- NPO
- Assess circulation, airway, breathing, and responsiveness.
- Oxygen as indicated.
- Provide Spinal Motion Restriction as indicated or position of comfort as indicated.
- Appropriately splint suspected fractures/instability as indicated.
- Bandage wounds/control bleeding as indicated.
- Preserve body temperature if blistered area is large.

ALS Treatment

- Advanced airway if indicated.

Comments

- Liquid or vapor mustard penetrates the skin and mucous membranes and damages cells within minutes of exposure, so decontamination must be done immediately after exposure.
- Mustard agent can be very persistent; all surfaces with potential contamination must be carefully cleaned before considered decontaminated.
**METHYLENE DIPHENYL ISOCYANATE (MDI), METHYLENE DIISOCYANATE, AND METHYL ISOCYANATE (MIC)**

- Strong eye, skin and respiratory tract irritant.
- High concentrations may result in severe respiratory distress and pulmonary edema.

### BLS Treatment

- Eyes or skin irritation: flush with copious amounts of water as feasible.
- Position of comfort.
- NPO
- Assess circulation, airway, breathing, and responsiveness.
- **Oxygen** as indicated.
- Provide **Spinal Motion Restriction** as indicated or position of comfort as indicated.
- Appropriately splint suspected fractures/instability as indicated.
- Bandage wounds/control bleeding as indicated.

### ALS Treatment

- Advanced airway as indicated.
- Consider needle cricothyroidotomy for laryngospasm if unable to maintain airway with BLS maneuvers or advanced airway procedures.
- IV/IO of **Normal Saline TKO**.
- **Albuterol**
  - For patients with severe refractory bronchospasm who are less than 50 years old and NO history of coronary artery disease or hypertension: administer IM **Epinephrine** (1:1,000)
  - If no response to IM **Epinephrine** or patient is in extremis: administer IV **Epinephrine** (1:10,000)

### Comments

- All patients who have had a moderate or high level of exposure (respiratory, GI or Cardiovascular signs or symptoms upon exam by EMS personnel) should be referred to a medical facility for examination and treatment.
- If utilized, the ETT’s placement and patency must be maintained at all times.
### CHLORINE

- Strong eye, skin and respiratory tract irritant.
- High concentrations may result in severe respiratory distress and pulmonary edema.
- **Symptoms:**
  - **Low dose**—cough, eye irritation & lacrimation, choking sensation
  - **High dose**—hoarseness, wheezing, severe cough, sudden collapse due to laryngospasm

### BLS Treatment

- **Eyes:** Flush with copious amounts of water.
- **Skin:** Flush with copious amounts of water.
- **Position of comfort.**
- **NPO**
- Assess circulation, airway, breathing, and responsiveness.
- **Oxygen** as indicated.
- Provide **Spinal Motion Restriction** as indicated or position of comfort as indicated.
- Appropriately splint suspected fractures/instability as indicated.
- Bandage wounds/control bleeding as indicated.

### ALS Treatment

- **Establish IV/IO of Normal Saline TKO.**
- **Albuterol**
  - For patients with severe refractory bronchospasm who are less than 50 years old and NO history of coronary artery disease or hypertension: administer IM **Epinephrine** (1:1,000)
  - If no response to IM **Epinephrine** or patient is in extremis: administer IV **Epinephrine** (1:10,000)
- Advanced airway as indicated.
- Consider needle cricothyroidotomy for laryngospasm if unable to maintain airway with BLS maneuvers or intubation.

### Comments

- All patients who have had a moderate or high level of exposure (respiratory distress or airway symptoms upon exam by EMS personnel) should be referred to a medical facility for examination and treatment.

### Key Assessment Findings

- History: Exposure to a greenish-yellow gas with a pungent, acrid odor.
**Cyanide**

Blocks O2 use in cell causing cellular asphyxia and death.

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<td>• Advanced airway as indicated.</td>
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<td>• If SBP &lt; 90 mmH, administer IV/IO of <strong>Normal Saline</strong> fluid bolus.</td>
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<tr>
<td>• <strong>Hydroxocobalamin</strong> if available.</td>
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<td>• Patients from enclosed space fires are at risk of cyanide poisoning.</td>
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<tr>
<td>• Notify hospital about possible cyanide poisoning and need for Cyanokit antidote.</td>
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</table>