

**REGION I EMERGENCY MEDICAL SERVICES
STANDING MEDICAL ORDERS
BLS**

**SMO: Nerve Agents
(Sarin, Soman, Tabun, VX)**

Revised Date:

Overview: Nerve agents inhibit acetylcholinesterase. When inhibition of acetylcholinesterase occurs, there is a build up of acetylcholine, a neurotransmitter found at the neuromuscular junction and pre-ganglionic synapses in the sympathetic and parasympathetic nervous system. This leads to classic muscarinic, nicotinic and central effects. Muscarinic effects (DUMBELLS) include diarrhea, urination, constricted pupils, bradycardia, bronchorrhea, emesis, lacrimation and salivation. Nicotinic effects (M T W H F) include dilation of the pupils of the eyes, tachycardia, weakness, hypertension and a localized uncoordinated, uncontrollable twitching of a single muscle group. Central effects may include anxiety, agitation, confusion, seizures and coma. Nerve agent poisoning can occur from ingestion, inhalational or dermal exposure. All suspected or confirmed cases of nerve agent poisoning must be reported to the local department of public health and the Illinois Department of Public Health.

INFORMATION NEEDED

- History of current illness
- Rapid or slow onset of signs/symptoms
- Number of patients
- Decontamination/treatment procedures already provided
- Type of exposure, vapor/gas or liquid

OBJECTIVE FINDINGS

- **Onset of action:**
 - Vapor or gas exposure within seconds to minutes
 - dermal liquid exposure within minutes to hours
- **Motor:** Ranges from diffuse muscle cramping and early uncoordinated and uncontrollable twitching of a single muscle group (early sign) to flaccid paralysis (late sign)
- **Pulmonary:** Rales, wheezing, poor inspiration from muscle weakness
- **Cardiac:** Bradycardia or tachycardia and hypotension or hypertension may be seen
- **GI:** Nausea, vomiting, diarrhea, abdominal cramping
- **GU:** Urinary incontinence
- **Skin:** Diaphoresis
- **HEENT:** Constriction of pupils or, rarely seen, dilation of the pupils, tearing of the eyes, excessive salivation
- **CNS:** Confusion, agitation, seizures, coma

BLS

- ___ Generally, gas/vapor exposures only need removal of clothes and jewelry. Seal all articles in impervious plastic bags and save for the authorities
- ___ Patients exposed to gas/vapor do not always need dermal decontamination as secondary decontamination is negligible once the clothing is removed
- ___ Liquid or unknown exposures MUST have universal, thorough decontamination
 - Dermal exposure: Remove all clothes and jewelry. Wash patient with copious amounts of mild soap or bleach and water as per local/area guidelines. Soap and water may be preferable for infants and small children. Use chemical resistant gloves (e.g., neoprene) if possible
- ___ Mark Kits, if available to EMS personnel, should be used as soon after exposure as possible. Mark kits each contain 600 mg of 2-PAM and 2 mg Atropine
 - Initial bolus
 - ▶ One Mark 1 kit for mild symptoms such as ambulating, constricted pupils, eye pain, blurred vision, rhinorrhea, mild dyspnea, sweating at exposure site, if dermal exposure
 - ▶ Two Mark 1 kits for moderate symptoms such as unable to ambulate, nausea, vomiting, wheezing, dyspnea or large scale uncoordinated and uncontrolled twitching of muscle groups
 - ▶ Three Mark 1 kits for severe symptoms such as extremis, loss of consciousness, flaccid paralysis, seizures, cardiac or respiratory arrest
- ___ Protection of patient during seizure activity
- ___ Support the patient's airway with manual or mechanical means that are necessary
- ___ Treat for shock
- ___ Provide supplemental oxygenation by nasal cannula at 2-6 LPM or by non-rebreather mask at 10-15 LPM
- ___ Vital signs
- ___ Call for BLS, ILS or ALS support for any exposures to a nerve agent, particularly when respiratory distress, shock and/or cardiac signs and symptoms are present

Documentation of adherence to protocol:

- ___ Decontamination procedures provided prior to EMS personnel arrival or by EMS personnel
- ___ Treatment provided by non-EMS personnel prior to EMS arrival
- ___ Airway maintenance
- ___ Medications provided
- ___ Oxygen provided

Medical Control Contact Criteria

- ___ • Contact Medical Control as soon as possible
- ___ • Call for ILS or ALS support as soon as possible

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ALS

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 - ▶ Three Mark 1 kits for severe symptoms such as extremis, loss of consciousness, flaccid paralysis, seizures, cardiac or respiratory arrest
- ___ IV of N.S.
- ___ If Mark Kit not available or has not already been administered:
 - Adults: Atropine, 1-2 mg IV or IM if no IV access. Repeat every 5 minutes until tracheobronchial secretions have cleared
 - Pediatrics: Atropine initial dose of 0.05 mg/kg IV or IM if no IV access. Repeat every 5 minutes until there is clearing of the tracheobronchial secretions
- ___ Protection of patient during seizure activity
- ___ Cardiac monitor
- ___ Support the patient's airway with manual or mechanical means that are necessary
- ___ Treat for shock
- ___ Provide supplemental oxygenation by nasal cannula at 2-6 LPM or by non-rebreather mask at 10-15 LPM
- ___ Vital signs
- ___ Call for ALS support for any exposures to a nerve agent, particularly when respiratory distress, shock and/or cardiac signs and symptoms are present
- ___ Diazepam
 - Adults: 5 to 10 mg IV, repeat every 5 to 10 minutes as needed not to exceed 30 mg
 - Pediatrics: 0.2 to 0.5 mg/kg IV, repeat every 5 to 10 minutes as needed, not to exceed 10 mg for children over 5 years old and not to exceed 5 mg for children under 5 years of age

Documentation of adherence to protocol:

- ___ Decontamination procedures provided prior to EMS personnel arrival or by EMS personnel
- ___ Treatment provided by non-EMS personnel prior to EMS arrival
- ___ Airway maintenance
- ___ Medications provided
- ___ Oxygen provided
- ___ Cardiac rhythm strip

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