

Atropine sulfate & 2-pralidoxime chloride auto-injector - CHEMPACK

Required when distributed (EMR, EMT, AEMT)



Objectives

- At the completion of this education module, the provider will have:
 - An understanding of scene safety and assuring responder safety
 - An understanding of the physiological effects of nerve agents
 - Will demonstrate with 100% accuracy the procedure for auto-injection administration.

Identifying Organophosphorous Nerve Agent and Insecticide Poisonings

A series of horizontal lines in teal and light blue colors, with varying lengths and slight offsets, creating a modern, layered effect across the width of the slide.

Nerve Agents

- Many countries still have large stockpiles of organophosphorous nerve agents
- 4 widely known nerve agents
 - Tabun (GA)
 - Clear, colorless, tasteless liquid with a faint fruity odor; highly volatile
 - Sarin (GB)
 - Clear, colorless, tasteless liquid with no odor
 - Soman (GD)
 - Clear, colorless, tasteless liquid with a slight rotting fruit odor
 - VX
 - Oily, odorless, tasteless liquid that is amber colored; most toxic and least volatile
- Victims can be poisoned by being exposed to nerve agent vapor or through dermal exposure to the liquid form

Routes of Exposure

- Pathways of entry:
 - Eyes
 - Nose
 - Mouth
 - Or combination of all 3
 - The eyes and nose being the most sensitive
 - Skin
 - Exposure to organophosphorous nerve agents as a liquid may delay certain effects:
 - Sweating, localized muscle twitching, nausea, nose and mouth secretions, diarrhea, or a combination of symptoms
 - May be a period of many hours between exposure and the onset of signs and symptoms
 - After large exposure, delay may be shorter than for smaller exposures

Exposure Risk

- Exposures may occur during mixing, loading or transporting of the chemicals.
- First responder may not know what they're facing when accidental spills occur during transport of the chemicals.
 - Even if identity of chemical is known, these accidents pose a large hazard to emergency responders
 - Bystanders and nearby residents will also be at risk
- Exposure in chemical plants may affect both the employees and nearby residents
- Unexplained casualties with multiple victims experiencing the same type of symptoms:
 - Notify dispatch and request Hazmat team
- **Your first priority is the safety of you and your crew.**

Recognizing Organophosphorous Nerve Agent Poisoning

- Mild Signs & Symptoms
 - Blurred vision, miosis
 - Excessive, unexplained teary eyes
 - Excessive, unexplained rhinitis
 - Increased salivation / sudden drooling
 - Chest tightness or dyspnea
 - Tremors / muscular twitching throughout the body
 - Nausea / vomiting
 - Unexplained wheezing, coughing, or increased airway secretions
 - Acute onset of stomach cramps
 - Tachycardia or bradycardia

Recognizing Organophosphorous Nerve Agent Poisoning

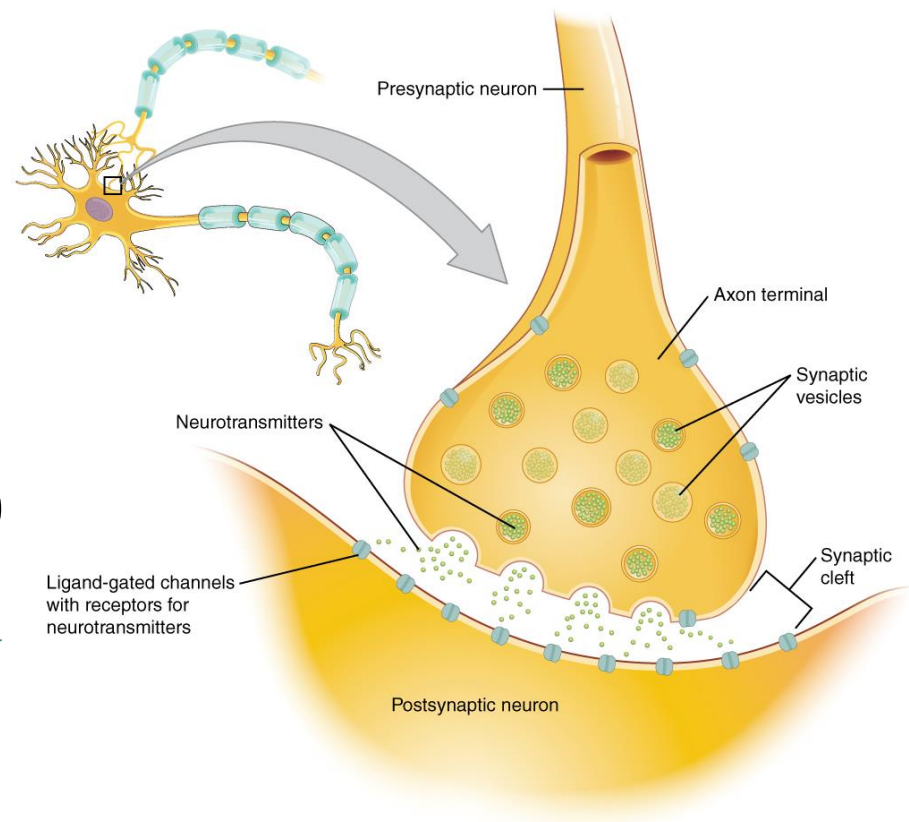
- Severe Signs & Symptoms
 - Strange or confused behavior
 - Severe difficulty breathing or copious amount of secretions from lungs / airway
 - Severe muscular twitching and general weakness
 - Involuntary urination / defecation
 - Convulsions
 - Unexplained unconsciousness

How Organophosphates Affect the Body

A series of horizontal lines in teal and light blue colors, with varying lengths and thicknesses, extending from the left edge of the slide towards the right.

Normal Function of the Cholinergic Nervous System

- Cholinergic nerve activity is mediated by neurotransmitters – one is acetylcholine.
- Acetylcholine relays information between cholinergic receptors (muscarinic and nicotinic)
- Acetylcholinesterase (AChE) breaks down acetylcholine
 - This helps avoid buildup and overstimulation on the cholinergic nervous system



Effect of poisoning

- Organophosphates disturb normal function within the cholinergic synapses and neuromuscular junctions
- The organophosphates enter the synaptic cleft and bind with acetylcholinesterase, which prevents the breakdown of acetylcholine.
 - This inhibition causes acetylcholine to build up, producing overstimulation of the nerves, resulting in:
 - Changes in heart rate
 - Excessive salivation
 - Sweating
 - Tearing
 - Runny nose
 - Breathing difficulties
 - Loss of bladder and bowel control

How Atropine sulfate & 2-pralidoxime chloride work

A series of horizontal lines in teal and light blue colors, with varying lengths and offsets, creating a modern, layered effect across the width of the slide.

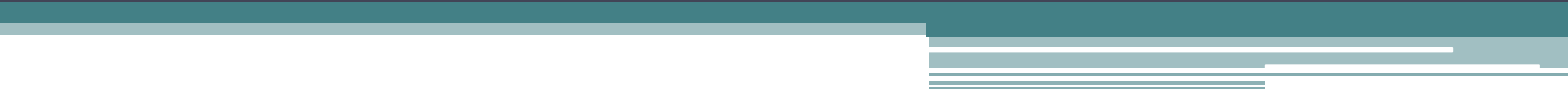
Pralidoxime

- 2-pralidoxime reactivates acetylcholinesterase
- When acetylcholinesterase is reactivated it is able to break down excess acetylcholine.
- Relieves symptoms caused by excessive activity of nicotinic receptors:
 - Difficulty breathing
 - Muscular twitching
 - General weakness
- Has a minor role in relieving symptoms caused by excessive activity of muscarinic receptors:
 - Excessive salivation
 - Bronchospasm

Atropine

- Relieves airway constriction
- Reduces secretions in mouth and respiratory passages
- Reverses the contraction of smooth muscles
- Decreases bronchoconstriction
- Reduces hyperactivity in the GI musculature
- Blocks some of the muscarinic cholinergic receptors from being bound and activated by acetylcholine
- Only blocks the muscarinic cholinergic receptors

Dosing for Atropine & Pralidoxime

A series of horizontal lines in teal and light blue colors, with varying lengths and offsets, creating a modern, layered effect across the middle of the slide.

Mild Symptoms

- ALWAYS consider PPE and Scene Safety
- Atropine & Pralidoxime:
 - 0-2 years: none
 - 2-10 years: none
 - > 10 years: 1 dose

Severe Symptoms

- ALWAYS consider PPE and Scene Safety
- Atropine & Pralidoxime:
 - 0-2 years: 1 dose
 - 2-10 years: 2 doses
 - >10 years: 3 doses
- Consider administering an anticonvulsant if within your scope
- **Never administer more than 3 doses to 1 patient**

Atropine & Pralidoxime Administration

A series of horizontal lines in teal and light blue colors, with varying lengths and offsets, creating a modern, layered effect across the middle of the slide.

Before injecting

- Tear open pouch at the notches – remove the auto-injector from the pouch
- Place the auto-injector in your dominant hand with the green tip pointing down.
- With your other hand, pull off the gray safety release.

Site

- The injection site is the mid-outer thigh area.

Self Aid



Emergency Personnel Aid



Injection

- Swing and firmly push the green tip straight down (90° angle) against the mid-outer thigh.
- Hold against the site for 10 seconds.
- After injection remove the auto-injector from the thigh and look at the green tip.
 - If the needle is visible, the drug has been administered
 - If the needle is not visible, check that the gray safety release was removed, then repeat the administration steps.

After Injection

- Leave the auto-injector with the patient to allow other medical personnel to see the number of auto-injectors administered.
- Immediately move yourself and the patient away from the contaminated area and seek definitive medical care for the patient.
- Notify the receiving facility.

References

- Meridian Medical Technologies
 - <http://www.meridianmeds.com/products/duodote>
- Idaho EMS CHEMPACK presentation (2010)