Wednesday, June 14, 2006

Dear Lead Instructor or Medical Director:

At the June, 2006 meeting of the Board of Medical Examiners, the Board adopted a Mark I auto-injector training curricula for all EMT personnel. This is REQUIRED at both the refresher and initial training of all EMT personnel. The curricula can be downloaded from our website: www.emt.mt.gov or if you do not have access to a computer or web, you can call us at 406-841-2328 and we'll be happy to mail you one.

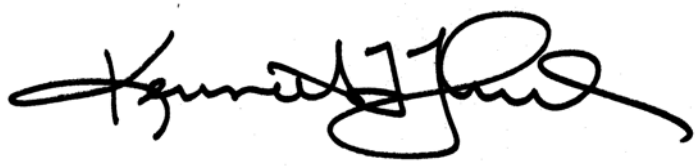
The Mark I Auto-Injector System is an auto-injector approved by the FDA for civilian use in incidents involving nerve agents and organo-phosphorus (OP) insecticides. During the former revision of the EMT Rules, the following language was added to allow EMT's to utilize Mark I auto-injector systems for personnel safety and the general public:

24.156.2771 SCOPE OF PRACTICE (5) In the event of a bio-terrorism attack in which chemical agents are used or suspected as being used, EMTs at all levels who are appropriately trained are authorized by the board to carry auto-injectors and administer them as instructed to themselves and any others.

The developed and required curricula will assure that all Montana EMT's are capable of utilizing the Mark I Auto-Injector System in a safe and efficient manner. Because the Mark I auto-injector system is **not** used **as a prophylactic treatment, but only based on an exposure with** signs and symptoms, it is imperative that the EMT know and understand the utilization of the Mark I Auto-Injector System. Please download and review the curricula, if you have any questions please feel free to contact us.

It is my understanding that plans are in place to distribute Mark I Auto-Injector System's to areas of the state if needed through your local disaster planning. Getting EMT's trained is only one step in getting our resources coordinated.

Thank you.



Kenneth Threet, Training Coordinator
Montana Board of Medical Examiners

MARK-1 Auto Injector Educational Objectives for EMT Personnel

June 2006

Montana Board of Medical Examiners

MARK-1 Auto Injector Educational Objectives for EMT Personnel

Objectives: The EMT shall be able:

to identify the MARK-1 Auto injector;
to identify the medications of the MARK-1 Auto injector;
to demonstrate the steps for administering the MARK-1 Auto injector;
to identify patients with signs and symptoms of nerve agent poisoning; and
be aware of contraindications and personal safety when using the MARK-1 Auto injector.

The above objectives **MUST** be covered in the offering of all EMT training; INITINAL and REFRESHER training. They may be offered in a stand alone CE programs.

Prerequisites for all students attending this program (initial, refresher or stand alone CE) are:

They must be a student in an approved initial course of EMT instruction, or currently licensed as an EMT in Montana, AND;

Must have completed a "WMD Awareness Level"* training program.

***(The awareness program must be a national training program or modeled after one of the training programs developed by the Department of Defense (DOD), Department of Justice (DOJ) or Federal Emergency Management Agency (FEMA). An online WMD awareness course is offered through the Domestic Preparedness Campus of Texas A & M University's web site at: http://www.teexwmdcampus.com)*

There are three provisions required in this curriculum:

1. **The decision to utilize the "Mark I" antidote must be done under the authority of physician medical direction.**
2. **The "Mark I Kit" is not to be used as prophylactic treatment.**
3. **Use of the "Mark I Kit" is to be based on signs and symptoms. The suspicion or identified presence of a nerve agent is not sufficient reason to administer these medications.**

RECOMMENDED CURRICULA (Lesson Plan)

IMPORTANT NOTE:

DO NOT ATTEMPT TO RESCUE ANYONE IN A SUSPECTED OR DOCUMENTED CONTAMINATED AREA UNLESS YOU ARE PROPERLY TRAINIED, QUALIFIED AND EQUIPPED IN THE APPROPRIATE PPE

The US military has established a regimen of atropine and pralidoxime to counteract the effects of exposure to nerve agents such as Sarin, VX and Soman. To achieve maximum effectiveness, these antidotes must be administered as quickly as possible and frequently by EMT's, to the affected subjects.

Before making a unprotected patient contact, make sure appropriate decontamination has been performed including clothing removal in a liquid exposure, prior to contact. All EMT personnel should act with due caution to any incident that presents with multiple non-traumatic patients or incidents where vapors, clouds, or unknown type of liquids are present.

Although criminal acts and terrorism are one source of nerve gas exposure, the accidental release of similar organophosphate compounds in places such as hardware stores, garden supply facilities and research centers should not be ruled out.

Nerve Agents:

GA (Tabun) Ethyl N, N-dimethyl phosphoramidocyanide

GB (Sarin) Isopropyl-methylphosphonofluoridate

GD (Soman) 1,2,2-Trimethylpropyl methylphosphonofluoridate

GF Cyciohexyl-methylphosphonofluoridate

VX S-[2-(diisopropylamino)ethyl] methylphosphonothiolate

SIGNS & SYMPTOMS:

Nerve agents are toxic materials that produce injury and death within seconds to minutes. The signs and symptoms caused by nerve agents are characteristic and not difficult to recognize with a high index of suspicion. Signs and symptoms of nerve agent poisoning are:

1. Lacrimation (tearing)
2. Unexplained rhinorrhea (runny nose)
3. Salivation (drooling)

4. Diaphoresis (sweating)
5. Pulmonary edema
6. Miosis (constriction of pupils)
7. Blurred vision
8. Faciculations (muscle twitching)
9. Paralysis
10. Weakness
11. Airway constriction
12. Loss of consciousness
13. Altered Mental Status
14. Seizures
15. GI distress (abdominal cramps)
16. Apnea
17. Tightness in chest
18. Shortness of breath
19. Nausea & vomiting
20. Uncontrolled urination
21. Uncontrolled defecation

The acronym 'SLUDGE' is a convenient way to remember the signs and symptoms of nerve gas exposure.

S= Salivation
L= Lacrimation (tearing)
U= Urination
D= Defecation or Diarrhea
G= GI Distress
E= Emesis (vomiting)

MARK-1 Auto injector (description)

The MARK-1 kit contains two separate auto injectors with the following medications:

> **AtroPen - atropine sulfate,** 2 mgs in 0.7mL; and
> **ComboPen - pralidoxime chloride** (**2-PAM),** 600 mgs in 2 mL.

Each auto-injector is a disposable, spring-loaded, pressure activated system prefilled with medication. Its simplicity, concealed needle and speed of injection render it quick, easy and convenient for self or patient administration.

The MARK-1 kit consists of one atropine and one pralidoxime auto-injector linked together with a plastic clip. The atropine is administered first followed by the pralidoxime.

MARK-1 Auto injector Administration Procedure:

When an EMT arrives on a scene of a potentially contaminated site with suspected nerve agents, he or she must wear personal protective equipment. If symptoms of nerve agent exposure manifest, you must **IMMEDIATELY** self-administer the nerve gas antidote.

Site Selection

The injection site for administration is normally in the **outer thigh muscle**. It is important that the injections be given into a large muscle area; or, if the individual is thinly built, then the injections should be administered into the **upper outer quadrant of the buttocks**. DO NOT inject into areas close to the hip, knee, or thighbone;

Administration

1. Remove MARK-1 kit from the protective pouch;

2. Hold unit by plastic clip. (See graphic A);

3. Remove AtroPen from slot number 1 of the plastic clip. The yellow safety cap will remain in the clip and the AtroPen will now be armed. DO NOT hold unit by green tip. The needle ejects from the green tip. (See graphics B & C);

4. Grasp the unit and position the green tip of the AtroPen on victim's outer thigh.

5. Push firmly until auto-injector fires. Hold in place for 10 seconds to ensure atropine has been properly delivered. Using a jabbing motion may result in a improper injection or injury to the thigh or buttocks. Carefully remove the auto injector by pulling straight away from your injection site. The needle will still be exposed.

6. Remove 2-PAM Cl ComboPen from slot number 2 of the plastic clip. The gray safety cap will remain in the clip and the ComboPen will now be armed. DO NOT hold the unit by the black tip. The needle ejects from the black tip.

7. Grasp the unit and position the black tip of the ComboPen on victim's outer thigh. (See graphics D & E.)

8. Push firmly until auto-injector fires, hold in place for 10 seconds to ensure Pralidoxime Chloride has been properly delivered. This plunges the needle through the clothing and into the muscle and at the same time injects the antidote into the muscle tissue.

9. Massage the injection sites, if time permits.

If nerve agent symptoms are still present after 15 minutes; repeat injections.

If symptoms still exist after an additional 15 minutes, repeat injections for a third time. If after the third set of injections symptoms remain, seek medical help (transport).

SPECIAL PROTOCOL (MARK I - INJECTOR)

PRE HOSPITAL PROVIDER GOALS:

- **To protect themselves and other pre hospital responders from any significant toxic exposure.**
- **To obtain accurate information on the health effects of the nerve agent and the appropriate pre hospital evaluation and medical care for victims.**
- **To minimize continued exposure of the victim and secondary contamination of health care personnel by ensuring that proper decontamination has been completed prior to transport to a hospital emergency department.**
- **To provide appropriate pre hospital emergency care consistent with their certification; and**
- **To prevent unnecessary contamination of their transport vehicle or equipment.**

GENERAL

This protocol is to be used in the event of a nerve agent release. The nerve agents are GA (Tabun), GB (Sarin), GD (Soman), GF, and VX.

ASSESSMENT (of the hazards):

Physical Characteristics **– Nerve agents under temperate conditions are liquids, not gases as they erroneously called ("nerve gas"). They are clear and colorless, they have no taste, and most are odorless, although GD and GA are said to have slight odors. GB is the most volatile, but it evaporates less quickly than does water. The volatility of the other "G agents" is GD>GA>GF. VX is similar to light motor oil, and although liquid VX produces a slight amount of vapor it generally is not considered to be a vapor hazard unless the ambient temperature is very warm.**

Signs and Symptoms:

After a small vapor exposure: Miosis constricted pupils), runny nose, shortness of breath.

After a large vapor exposure: Loss of consciousness, convulsions, apnea, flaccid paralysis.

After a small to moderate liquid exposure: Localized seating, fasiciculations; nausea, vomiting, diarrhea, feeling of weakness (may start hours later).

<u>After a large liquid exposure:</u> Loss of consciousness, convulsions, apnea, flaccid paralysis.

Patient Treatment (In general, this is the responsibility of the EMT or Paramedic

Assign highest priorities to ABC and decontamination.

Complete primary and secondary surveys as conditions allow. Bear in mind the chemical specific information.

In multiple patient situations, begin proper triage procedures.

Treat presenting signs and symptoms as appropriate and when conditions allow.

Administer orders of the designated hospital when conditions allow.

Perform invasive procedures only in contaminated areas.

Reassess the patient frequently because many chemicals have latent physiological effects.

D. Recommendations for Initial Therapy

Type of Exposure	Symptoms	Treatment	Comments
Mild Vapor Exposure	**Miosis alone**	**No treatment**	**The presence of miosis and rhinorrhea require observation only**
	Rhinorrhea	**Depends on amount of rhinorrhea and amount of discomfort**	**The presence of miosis and rhinorrhea require observation only**
Moderate Vapor Exposure	**Miosis, rhinorrhea, shortness of breath, wheezing, secretions, muscle weakness, GI effects (vomiting and diarrhea**	**HazMat EMT's – One or two MARK I kits (repeat doses every 5 – 10 minutes via MARK I kit; total of 1,800 mg 2-PAMCI**	**Be more aggressive with moderate vapor exposures.**
Severe Vapor Exposure	**Unconscious, seizing, flaccid, apnea**	• **Haz Mat EMT's** **-Three MARK I kits ASAP** **-Airway / Ventilation / O2**	**The antidotes should be administered as early as possible because airway management will not be possible until atropine reduces the bronchoconstriction. After administering the antidote, immediately obtain a definitive airway. Oxygenate the patient and suction secretions.**
Mild Liquid Exposure	**Localized sweating fasciculations**	• **Haz Mat EMT's – One MARK I kit**	
Moderate Liquid Exposure	**Gastronintestinal effects (vomiting, diarrhea)**	• **Hax Mat EMT's – One MARK I kit (repeat atropine in 5 – 10 minutes if effects worsen)**	**Oxygen may be needed in those with cardiac or pulmonary disease who have severe breathing difficulty, but generally is not**

			necessary.
Severe Liquid Exposure	**Unconscious, seizing, flaccid, apnea**	**Haz Mat EMT's** **- Three MARK I kits ASAP** **- Airway/Ventilation/ 02**	**The antidotes should be administered as early as possible because airway management will not be possible until atropine reduces the bronchoconstriction. After administering the antidote, immediately obtain a definitive airway. Oxygenate the patient and suction secretions.**

MARK-1 Auto Injector Trainers

Each trainer is the same size as the auto-injector it simulates, works in the same manner and can be re-cocked after activation and used again. These devices contain no drugs or needles. Contact Meridian Medical Technologies, Inc. for information and pricing.

Manager, Sales and Marketing
Meridian Medical Technologies, Inc.
10240 Old Columbia Rd
Columbia, MD 21046-2371
Phone: 443.259.7800 or 800.638.8093
Fax: 443.259.7801
government@meridianmt.com

Practicing with MARK-1 Auto-Injector Trainers

Description of Action Required	Correct
Remove kit from protective pouch	
Hold MARK-1 trainer by plastic clip	
Remove AtroPen trainer from slot number 1 of the plastic clip. The yellow safety cap will remain in the clip	
Grasp the trainer and position the green tip of the AtroPen trainer on self / victim's outer thigh	
Push firmly until red prod ejects from unit	
Remove ComboPen trainer from slot number 2 of the plastic clip. The gray safety cap will remain in the clip	
Grasp the trainer and position the black tip of the ComboPen trainer on self / victim's outer thigh	
Push firmly until white prod ejects from unit	
Dispose of the sharps correctly (secure safely to individual)	

Resetting MARK-1 Auto-Injector Trainers

AtroPen - Trainer

1. Gently pull the green tip out about 1/4 inch to expose the neck of the unit.
2. Clamp open end of recocking tool on the neck of the AtroPen trainer below the green tip.
3. Place red prod down on a hard surface and apply pressure until you hear a click.
4. Remove recocking tool.
5. Slide AtroPen trainer back into the plastic clip slot number 1 and press end of the unit into the yellow safety cap.

ComboPen - Trainer

1. Place the black recocking cap over the safety end of the ComboPen trainer.
2. Rotate the black recocking cap until the two internal projections are aligned with the matching holes in the safety end of the training device.
3. Firmly press the black recocking cap down as far as it will go.
4. While holding the black recocking cap down, push the white prod against a hard surface, forcing the prod back into the trainer.
5. A click will be heard when the device is recocked.
6. Remove the black recocking cap.
7. Slide the ComboPen trainer back into the plastic clip slot number 2 and press end of unit into gray safety cap.

PRALIDOXIME (2-PAM) FACT SHEET

CLASS: Antidote, to cholinesterase inhibitors, organophosphate chemicals, organophosphate pesticides

MECHANISM OF ACTION: Pralidoxime (pra-li-DOX-eem) is used together with another medicine called atropine to treat poisoning caused by organic phosphorus pesticides (e.g., diazinon, malathion, mevinphos, parathion, and sarin) and by organophosphate chemicals ("nerve gases") used in chemical warfare. Pralidoxime is also used to treat overdose of medicines, such as ambenonium, neostigmine, and pyridostigmine, that are used to treat myasthenia gravis. Poisoning with these chemicals or medicines causes your muscles, including the muscles that help you breathe, to become weak. Pralidoxime is used to help you get back strength in your muscles. Pralidoxime is to be given only by or under the direct supervision of a doctor or trained military personnel. It is available in the following dosage form: Parenteral Injection (U.S. and Canada)

EFFECTS: Along with its needed effects, a medicine may cause some unwanted effects. Although not all of these side effects may occur, if they do occur they may need medical attention.

Check with your doctor as soon as possible if any of the following side effects occur: Blurred or double vision; difficulty in focusing your eyes; difficulty in speaking; difficult or rapid breathing; dizziness; fast heartbeat; muscle stiffness or weakness; pain at the place of injection (after injection into a muscle).

Other side effects may occur that usually do not need medical attention. These side-effects may go away during treatment as your body adjusts to the medicine. However, check with your doctor if any of the following side effects continue or are bothersome: Drowsiness; headache; nausea.

Other side effects not listed above may also occur in some patients. If you notice any other effects, check with your doctor.

Once a medicine has been approved for marketing for a certain use, experience may show that it is also useful for other medical problems. Although this use is not included in product labeling, pralidoxime has been used in some patients to treat poisoning caused by certain carbamate pesticides.

Some commonly used brand names are:
In the U.S. - Protopam Chloride
In Canada. - Protopam Chloride

Generic name product may be available in the U.S.

Other commonly used names are 2-PAM and 2-PAM chloride.

In deciding to use a medicine, the risks of taking the medicine must be weighed against the good it will do. This is a decision you and your doctor will make. For pralidoxime, the following should be considered:

Allergies
Tell your doctor if you have ever had any unusual or allergic reaction to pralidoxime. Also tell your health care professional if you are allergic to any other substances, such as foods, preservatives, or dyes.

Pregnancy
Studies on effects in pregnancy have not been done in either humans or animals.

Breast-feeding
It is not known whether pralidoxime passes into breast milk. Although most medicines pass into breast milk in small amounts, many of them may be used safely while breastfeeding.

Mothers who are taking this medicine and who wish to breast-feed should discuss this with their doctor.

Children
Although there is no specific information comparing use of pralidoxime in children with use in other age groups, this medicine is not expected to cause different side effects or problems in children than it does in adults.

Older adults
Many medicines have not been studied specifically in older people. Therefore it may not be known whether they work exactly the same way they do in younger adults or if they cause different side effects or problems in older people. There is no information comparing use of pralidoxime in the elderly with use in other age groups.

Other medicines
Although certain medicines should not be used together at all, in other cases two different medicines may be used together even if an interaction might occur. In these cases, your doctor may want to change the dose, or other precautions may be necessary. When you are using pralidoxime, it is especially important that your health care professional know if you are taking any of the following: Aminophylline (e.g., Somophyllin) or Theophylline (e.g., Theo-Dur, Somophyllin-T). These medicines may make the effects of the poisoning worse Caffeine (e.g., NoDoz).

Other medical problems.The presence of other medical problems may affect the use of pralidoxime. Make sure you tell your doctor if you have any other medical problems, especially Kidney disease. The effects of this medicine may be increased Myasthenia gravis (impaired transmission of motor nerve impulses). This medicine may make the condition worse.

COMMON EMERGENCY INDICATIONS:
For patients using the pralidoxime auto-injector (automatic injection device):
You will be trained to use the pralidoxime auto-injector by a medic or other trained military personnel. You will also be told the conditions under which it should be used. The auto-injector also comes with patient directions. Read them carefully before you actually need to use this medicine. Then, when an emergency arises, you will know how to inject the pralidoxime. It is important that you do not remove the safety cap on the auto-injector until you are ready to use it. This prevents spillage of the medicine from the device during storage and handling.

To use the pralidoxime auto-injector:

1. Remove the gray safety cap.
2. Place the black tip of the device on the thigh, with the injector pointed straight at the thigh.
3. Press hard into the thigh until the auto-injector functions. Hold in place for several seconds.
4. Remove the auto-injector and dispose of it as directed.
5. Massage the injected area for 10 seconds.

Use this medicine only as directed. Do not use more of it and do not use it more often than your doctor or medic ordered. Do not use more than recommended on the label unless otherwise directed by your doctor or medic.

Dosing
The dose of pralidoxime will be different for different patients. Follow your doctor's or medic's orders or the directions on the label. The following information includes only the average doses of pralidoxime.

For injection dosage form: For treatment of organic phosphorus pesticide poisoning:
Adults and teenagers.The usual dose is 1 to 2 grams injected into a vein. The dose may be repeated after one hour, and then every eight to twelve hours if muscle weakness continues.

Children
The dose is based on body weight and must be determined by your doctor. It is usually 5 to 50 milligrams (mg) per kilogram (kg) (11.35 to 22.7 mg per pound) of body weight injected into a vein. The dose may be repeated after one hour, and then every eight to twelve hours if muscle weakness continues.

TREATMENT OF ORGANIC PHOSPHORUS CHEMICAL POISONING:

Adults
The usual dose is 600 mg injected into a muscle. The dose may be repeated fifteen minutes after the first dose and again fifteen minutes after the second dose, if needed.

Children
Dose must be determined by your doctor. For treatment of overdose of medicines used to treat myasthenia gravis:

Adults and teenagers
At first, the dose is 1 to 2 grams injected into a vein. Then, the dose is 250 mg injected into a vein every five minutes.

Children
Dose must be determined by your doctor.

Storage
To store this medicine:
Keep out of the reach of children.
Store away from heat and direct light.
Keep the medicine from freezing. Do not refrigerate.
Do not keep outdated medicine or medicine no longer needed. Be sure that any discarded medicine is out of the reach of children.

Precautions While Using This Medicine
This medicine will add to the effects of CNS depressants (medicines that may make you drowsy or less alert). Some examples of CNS depressants are antihistamines or medicine for hay fever, other allergies, or colds; sedatives, tranquilizers, or sleeping medicine; prescription pain medicine or narcotics; barbiturates; medicine for seizures; muscle or anesthetics, including some dental anesthetics.
Check with your doctor before taking any of the above while you are using this medicine.

Other than the above information, there is no additional information relating to proper use, precautions, or side effects for this use.

ATROPINE FACT SHEET

CLASS: Antimuscarinic, Parasympathetic blocker, Anticholinergic. It is better to refer to atropine as an antimuscarinic rather than anticholinergic. The word cholinergic refers to the neurotransmitter acetylcholine (ACh) and therefore anticholinergic implies antagonism of ACh everywhere. Atropine does not block ACh everywhere. For example, voluntary muscle contraction occurs when ACh (liberated from motor nerves) stimulates nicotinic receptors located in the membranes of skeletal muscle, If atrophic was truly anticholinergic, then it would paralyze people which, of course, it does not. Atropine is antimuscarinic, meaning that it blocks ACh primarily at muscarinic receptor sites. Muscarinic receptors are found predominantly in the heart, lungs, gastrointestinal tract, genitourinary tract and glands.

MECHANISM OF ACTION: Competitively blocks acetvlcholine (ACh) at muscarinic receptor sites by competing for the muscarinic receptors. It is important to understand that atropine has no effect of its own... that is, atropine exerts its action by negating the effects of ACh. For example, ACh, which is constantly being secreted from parasympathetic nerve endings, stimulates muscarinic receptors in the heart and slows heart rate (FIR). Were it not for this parasympathetic influence, virtually everybody's resting HR would be higher. Atropine raises the heart rate by combining with muscarinic receptors, making them unable to accept ACh. Therefore, the influence of ACh is removed and the heart rate rises.

EFFECTS: An easy way to learn the effects of atropine is to remember that its effects are opposite that of parasympathetic nervous system stimulation. As mentioned, this is because it blocks the action of the ACh liberated from the parasympathetic nerve endings.

HEART

Accelerates HR. conduction velocity and force of contraction (slightly). The major parasympathetic nerve to the head is the vagus nerve (10th Cranial). When the vagus nerve is stimulated, ACh is liberated and upon combining with the muscarinic receptors of the brain, decreases the HR. conduction velocity and force of contraction (slightly). Thus, atropine causes the opposite to occur.

LUNGS

Inhibits glandular secretion in the respiratory tract
Relaxes smooth muscle in the bronchial tree resulting in bronchodilation
Liberation of ACh from parasympathetic nerves adjacent to respiratory tract structures (nose, mouth, pharynx, and bronchi) results in increased respiratory tract secretions and bronchial smooth muscle contraction. Atropine causes the opposite.
The drying of respiratory secretions and the prevention of anesthesia-induced bradycardia are the basis of using atropine preoperatively.

GASTROINTESTINAL TRACT

Inhibits gastrointestinal secretions

Decreases gastrointestinal motility
Parasympathetic stimulation of the gastrointestinal tract via ACh combining with muscarinic receptors results in increased gastrointestinal secretions and an increase in gastrointestinal motility. By blocking muscarinic receptors, atropine decreases gastrointestinal secretions and decreases motility. Atropine all but stops the secretion of saliva, which is why it causes a dry mouth with difficulty swallowing.

PUPILS
Pupillary dilation
ACh liberated upon stimulation of parasympathetic nerves adjacent to the sphincter muscle of the iris combines with muscarinic receptors and constricts the pupil. Atropine does the opposite. Atropine is a far more effective mydriatic when instilled directly into the eye rather than when given intravenously. Actually, 0.5 mg of atropine given intravenously has little ocular effects, and atropine administration during cardiac arrest does not cause fixed and dilated pupils.

GENITOURINARY TRACT
Decreases normal bladder tone and Intensity of bladder contractions
The effect of ACh on muscarinic receptors of the bladder is to increase bladder tone and the intensity of bladder contractions. In other words, it facilitates urination. Atropine blocks the effects of ACh on muscarinic receptors and thus inhibits bladder motility. This is why atropine-containing drugs can cause urinary retention . . . especially in elderly males with prostate problems.

COMMON EMERGENCY INDICATIONS:

Symptomatic bradyarrhythmias
Symptomatic meaning bradyarrhythmias accompanied by hypotension resulting in organ ischemia (angina, confusion or ventricular ectopy). Atropine is usually the first drug given for all types of heart block, although it may not work if the block is below the A-V node.

Cholinergic poisonings
Organophosphate poisoning and certain types of mushroom poisonings. The symptoms of cholinergic poisoning result from excessive muscarinic stimulation by acetylcholine or by acetylcholine-like drugs. Atropine is the drug of choice for cholinergic poisoning because it blocks the muscarinic receptor sites and therefore protects the individual from the effects of muscarinic over-stimulation. The symptoms of cholinergic poisonings are salivation, lacrimation, urination, abdominal cramps, diarrhea, vomiting, bradycardia, dyspnea (secondary to bronchoconstriction and excessive bronchial secretions), seizures and death. Atropine may be life saving in this situation.

Asystole
Atropine is a second line drug in the treatment of aystole the drug of choice being epinephrine. Some believe that in certain situations, asystole may result (or become refractory) from extremely high parasympathetic tone. In these cases, atropine may be

effective; the evidence for the efficacy of atropine in asystole is weak. 1 mg IV – may repeat every 3 - 5 minutes to a total dose of 3 mg. May administered intratracheally at a dose of 2.5 mg. as above,

Refractory Bronchospasm
Inhaled atropine accomplishes bronchodilation by blocking ACh-induced bronchoconstriction. The theoretical concern that atropine may dry bronchial secretions has not been proven to be the case.

Symptomatic bradyarrhythmias
0.5 mg to 1.0 mg IV, may repeat every 3 - 5 minutes up to a total dose
0.04 mg/kg (2.5 - 3.0 mg in adults)Note: Never use less than 0.5 mg in adults or may get paradoxical bradycardia3 May be given intratracheally endotracheal tube - 1.5 - 2.5 mg diluted to 10 cc sterile water.

TREATMENT OF ORGANIC PHOSPHORUS CHEMICAL POISIONING:
For significant organophosphate poisonings, start with 1-2 mg IV, may repeat as necessary. Severe organophosphate poisonings may require very little amounts of atropine. Best guide for atropinization is cessation of secretions. Refractory Bronchospasm: 1 mg atropine combined with 0.5 cc Bronkosol (or 0.3 cc metaproteronol or 0.5 cc albuterol) diluted to 3 cc.s NS via small volume nebulizer.

Children
0.02 mg/kg IV - may repeat every 3 -5 minutes to a total dose of mg/kg. Maximum single IV dose in child is 0.5 mg, minimum single IV in child is 0.1 mg. May be administered intratracheally at dose of 0.05 mg (for technique, see page 105).

Tachyarrythmias
Exacerbation of Glaucoma
Precipitation of Myocardial Ischemia
When used in the emergency setting, atropine is a very safe, very effective drug with few major side effects. The side effects of atropine can be predicted and understood from exaggerating its actions. Atropine blocks the effects of. Parasympathetic nervous system and, therefore, increases the heart rate. A total dose of 0.04 mg/kg results in full vagal blockade in humans. Atropine in small doses can stimulate the CNS, which can result in vagal stimulation with a subsequent decrease in HR. Slowing is rarely marked usually 4 to 8 beats per minute and actually is quite uncommon after IV injection. At present, optimal endotracheal doses are not known. Current reviews recommend 2.5 times the IV dose Atropine should be used to treat bradycardia only after adequate oxygenation and ventilation have been ensured since hypoxia is a common cause of bradycardia ... especially in children. Occasionally this can result in sinus tachycardia. Since HR is a major determinant of myocardial oxygen demand, increasing HR will increase the heart.s need for oxygen. Increasing the heart.s need for oxygen in patients with coronary artery disease (narrowed coronary arteries) may cause myocardial ischemia resulting in angina, serious arrhythmias, or myocardial infarction. On rare occasions, atropine has even been known to cause ventricular fibrillation. In patients with narrow angle glaucoma, dilating the pupil (which atropine may do) can precipitate an acute exacerbation of their disease.

COMMENTS:
When used in the emergency situation, atropine is a very safe, effective drug with a paucity of significant side effects. It may be life-saving for organophosphate or other types of cholinergic poisoning. While very effective in heart block and bradycardia which are supraventricular in origin, it usually does not work for heart block which is below the AV junction, because of its safety index, it can still be tried first. Antimuscarinic drugs are effective in reversing bronchospasm in certain patients. Ipratropium bromide (Atrovent) is the first antimuscarinic agent approved for this indication. The exact role of these agents in the management of asthma and COPD is presently the subject of study.

THE BARE FACTS OF ATROPINE

CLASS: Antimuscarinic, Parasympathetic blocker, Anticholinergic

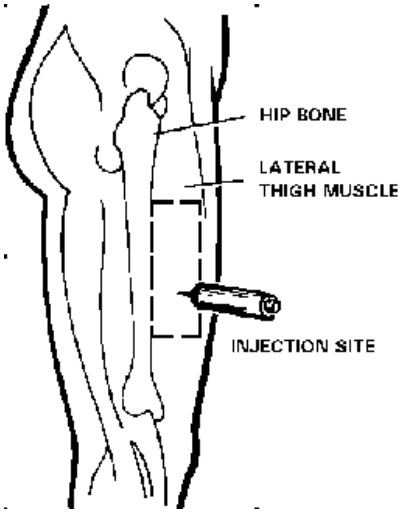
MECHANISM OF ACTION: Competitively blocks acetylcholine (ACh) at muscarinic sites

EFFECTS:
Heart: Accelerates HR, conduction velocity and force of contraction (slightly)
Lungs: Inhibits glandular secretion in the respiratory tract, relaxes smooth muscle in the bronchial tree resulting in bronchodilation
Gastrointestinal tract (GIT): Inhibits gastrointestinal secretions, decreases gastrointestinal motility
Pupils: Pupillary dilation Genitourinary tract: Decreases normal bladder tone and intensity of bladder contractions

COMMON EMERGENCY INDICATIONS: Symptomatic bradyarrhythmias, cholinergic poisonings, Asystole, Refractory Bronchospasms. Symptomatic bradyarrhythmias 0.5 to 1 mg IV, may repeat every 3-5 minutes, .0.4 mg/kg total dose
Asystole- 1 mg IV; may repeat in 3-5 minutes to a total dose of 3 mg
Organophosphate poisonings- 1 to2 mg IV prn (best guide is cessation of secretions).
Refractory Bronchospasm- 1 mg combined with a Beta2 agonist via nebulizer. PEDS: 0.02mg/kg IV may repeat every 5 minutes to a total dose of 0.04 mg/kg. Max single dose in child 0.5mg, minimum 0.1mg

SIDE EFFECTS: Tachyarrhythmias, Exacerbation of Glaucoma, Precipitation of myocardial ischemia

Ideal Location for Administration



How they are packaged

Removal from the "safety" packaging