GENERIC NAME: ATROPINE SULFATE

Brand Name:

CLASS: Anticholinergic agent, antidote, antispasmodic agent, antiarrhythmic, antimuscarinic

Mechanism of Action:

Pharmacological: Blocks the action of acetylcholine as a competitive antagonist at muscarinic receptor sites in smooth muscle, secretory glands, and the CNS. It works by blocking parasympathetic response and allowing sympathetic response to take over, resulting in an increase in cardiac output and the drying of secretions. Atropine reverses the muscarinic effects of cholinergic poisoning by primarily reversing bronchorrhea and bronchoconstriction. At high enough doses, atropine may have an effect on nicotinic receptors responsible for restlessness, hallucinations, disorientation, and/or delirium.

Clinical: CV: Increased heart rate (positive chronotropic effect); increased

conduction velocity; increased force of contraction (slight),

increase cardiac output. **Resp:** Decreased mucus production; increased bronchial smooth muscle

relaxation (bronchodilation). **GI:** Decreased GI secretion and motility. **GU:** Decreased urinary bladder tone. **Misc:** Mydriasis (pupillary dilation); decreased sweat production.

Indications and Field Use:

§ Symptomatic bradycardia (sinus, junctional, and AV blocks causing significant hypotension, ventricular ectopy, chest pain, altered level of consciousness, etc.), monitored patient only.

§ Asystole (after epinephrine) monitored patient only.

§ PEA with actual or relative bradycardia (after epinephrine) monitored patient only.

§ Acetylcholinesterase inhibitor poisoning (organophosphate, carbamate cholinergic poisoning).
Contraindications: § Hypersensitivity to atropine or any component of the formulation – Belladonna alkaloid allergy

§ Glaucoma, acute narrow angle (relative contraindication for patient with symptomatic bradycardia), adhesions between the iris and lens

§ Tachycardia

§ Obstructive GI disease, paralytic ileus, intestinal atony of the elderly or debilitated patient, severe ulcerative colitis, or toxic megacolon complicating ulcerative colitis

§ Hepatic disease

§ Renal disease, obstructive uropathy

§ Myasthenia gravis (unless used to treat side effects of acetylcholinesterase inhibitor

§ Asthma

§ Thyrotoxicosis

§ Mobitz type II block

§ 3rd degree heart block **Pregnancy Risk Factors/Considerations** Risk category: C. Animal reproduction studies have not been conducted. Atropine has been found to cross the human placenta. Trace amounts of atropine can enter breast milk; use caution. Anticholinergic agents may suppress lactation. **Adverse Reactions:**

Major: Tachydysrhythmias; flushing; ventricular irritability; exacerbation/initiation of angina; acute narrow angle glaucoma; blurred vision; mydriasis; agitation to delirium; bloating; constipation; decreased gastric emptying

Minor: Dry mouth/mucous membranes; loss of taste; nausea; vomiting; urinary retention; neuromuscular weakness; decreased

sweating/increased body temperature.

NOTES ON ADMINISTRATION

Incompatibilities/Drug Interactions:

Incompatibilities –

§ Y-site incompatible with thiopental

§ Syringe incompatible with cimetidine, pentobarbital (variable)

§ Admixture incompatible with floxacillin, metaraminol, methohexital, norepinephrine

§ Sodium bicarbonate (relative) Drug Interactions –
§ Atropine may increase the levels/effects of: anticholinergics, cannabinoids, and potassium chloride

§ Atropine may decrease the levels/effects of: phenothiazines, acetylcholinesterase inhibitors (central), and secretin

§ Concurrent use of atropine with psychotropics may result in additive anticholiergic side effects (dry mouth, blurred vision, constipation)

§ Pramlintide may increase the levels/effects of atropine

§ Acetylcholinesterase inhibitors (central) may decrease the levels/effects of atropine

Adult Dosage:

Special instructions

IV – administer undiluted by rapid IV injection; slow injection may result in paradoxical bradycardia. Doses < 0.5 mg may increase vagal tone resulting in paradoxical bradycardia. **IO –** intraosseous administration is an alternative to IV access only for asystole.

IM – AtroPen should be administered to outer thigh. May be given through clothing as long as pockets at injection site are clear. Hold autoinjector in place for 10 seconds following injection; massage injection site.

Symptomatic Bradycardia: **IV** – 0.5 mg every 5 minutes. Do NOT exceed a total dose of 3 mg or 0.04mg/kg if

symptoms profound.

- Consider atropine before pacing in mildly symptomatic patients, but do not delay pacing in unstable patients, particularly those with high-degree AV block

- Do not rely on atropine in Mobitz type II second or third-degree AV block or in patients with third-degree AV block with a new wide QRS complex. Hemodynamically unstable and clinically deteriorating patients require immediate pacing. **Asystole**: **IV/IO** – 1 mg. Repeat every 3 to 5 minutes (generally up to 3 doses) if asystole persists. Total dose should not exceed 0.04 mg/kg. **Organophosphate or carbamate poisoning**: **IV** – Initially: 1-5 mg. Doses should be doubled every 5 minutes until signs of muscarinic excess abate (clearing of bronchial secretions, bronchospasm, and adequate oxygenation) **IV infusion** – 0.5-1 mg/hour or 10-20% of loading dose/hour **IM** – (AtroPen) mild symptoms: Administer 2 mg as soon as exposure is known or suspected. If severe symptoms develop after first dose, 2 additional doses should be repeated in 10 minutes, not to exceed more than 3 doses. Severe symptoms: Immediately administer three 2 mg doses. **Pediatric Dosage: Symptomatic Bradycardia: IV** – 0.02 mg/kg (minimum of 0.1 mg), may repeat at 5 minute intervals to a maximum total dose of 1 mg in children and 2 mg in adolescents **Maximum single doses**: Child 0.5 mg; Adolescent 1 mg. For bradycardia in neonates, reserve use for those unresponsive to improved oxygenation and epinephrine.

Organophosphate or carbamate cholinergic poisoning: **IV** – 0.03-0.05 mg/kg every 10 to 20 minutes until cholinergic symptoms minimize, then every 1 to 4 hours

for at least 24 hours **IM** – Administer dose as listed below as soon as exposure is known or suspected. If sever symptoms develop after first dose, 2 additional doses should be repeated in 10 minutes. Do not administer more than 3 doses. For severe symptoms, immediately administer 3 doses as follows:

§ < 6.8 kg (15 lbs): not recommended, administer atropine 0.05 mg/kg

§ 6.8-18 kg (15-40 lbs): 0.5 mg/dose § 18-41 kg (40-90 lbs): 1mg/dose § > 41 kg (> 90 lbs): 2mg/dose

Routes of Administration:

Intravenous, intraosseous, intrathecal, or intramuscular (using AtroPen); okay for endotracheal use if necessary.

Onset of Action:

Rapid, 1 minute

Peak Effects:

IV – 2-5 minutes IM – 30 minutes

Duration of Action:

Half life – 2 to 3 hours Terminal half life – 12.5 hours

Dosage Forms/Packaging:

Injection solution, as sulfate:

§ 0.05 mg/mL (5mL) § 0.1 mg/mL (5mL, 10mL) § 0.4mg/0.5mL (0.5mL) § 0.4mg/mL (0.5mL, 1mL, 20mL) § 1 mg/mL (1mL)

AtroPen, prefilled autoinjector:

§ 0.25 mg/0.3mL (0.3mL) § 0.5mg/0.7mL (0.7mL)

§ 1mg/0.7mL (0.7mL) § 2mg/0.7mL (0.7mL)

Arizona Drug Box Minimum Supply:

EMT- P and EMT-I (99): 4 (1 mg/10 ml) prefilled syringes, 1 (8 mg/20 ml, 0.4 mg/ml) multidose vial

Special Notes:

§ Administering too small doses or administering too slowly may result in paradoxical bradycardia.

§ May accumulate with multiple inhalation administration, particularly in the elderly

§ Heat prostration may occur in hot weather

§ Signs and symptoms of cholinergic/organophosphate poisoning: excess salivation, lacrimation, urination, defecation (SLUD), bardycardia; coma.

§ Signs and symptoms of poisoning/overdose of atropine-like drugs: dry mouth; thirst; hot, dry, flushed skin; fever; palpitations, restlessness; excitement; delirium.

§ Hint: patient that describes their glaucoma as painful, probably has acute narrow angle glaucoma.

§ Atropine should only be utilized when pacer is not immediately available for Second Degree Type II and Third Degree Heart Blocks.

§ Do not rely on atropine in Mobitz type II second-degree or third-degree AV block or in patients with third-degree AV block with a new wide QRS complex. Hemodynamically unstable and clinically deteriorating

patients require immediate pacing. Awake patients should have sedation before pacing.

§ Atropine will affect pupil response and patient will appear to have fixed pupils – do not utilize pupils as clinical marker (ie pupils fixed dilated post resuscitation)