Drug Name: **Atropine Sulfate**
Trade Name: **Atropine**
Class:
- Parasympatholytic
- Anticholinergic Agent

**Mechanism of Action:**
- Atropine is a competitive inhibitor of acetylcholine at muscarinic receptor sites.
- The increase of sympathetic activity seen with atropine administration is due to the drug’s parasympatholytic effects.
- In the setting of **symptomatic bradycardias**, atropine decreases vagal effects on the heart resulting in increased chronotropy & dromotropy (with little or no inotropic effects).
- It is used in **cholinergic exposures** as a direct antidote for the poison.

**Indications:**
- Symptomatic Bradycardias
- Pre-intubation in children < one month of age
- Poisoning with:
  - Organophosphates
  - Carbamates
  - Mushrooms
  - Nerve gas
  - Other cholinergic agents

**Contraindications:**
- In the arrest setting, there are no contraindications

**Non-arrest contraindications:**
- Myasthenia gravis
- Closed-angle glaucoma
- Atrial fibrillation & flutter
- Known hypersensitivity
- Thyrotoxicosis
- Urinary tract obstruction

**Precautions:**
- Atropine may actually worsen 2nd degree Type II & 3rd degree AV blocks. Many experts go as far as to indicate atropine is relatively contraindicated in this setting & transcutaneous pacing is preferred.
- Cardiovascular disease including: CAD & CHF
- COPD
- HTN
- Renal/hepatic disease
- Geriatrics
- Pregnancy I
- Minimum Doses
  - <0.5 mg in adults
  - <0.1 mg in children

**Smaller doses can cause a paradoxical bradycardia.**
Dosage:

Adults:
- Symptomatic Bradycardia: **IV**: 0.5 mg to 1 mg every 3-5 minutes.
  *Max dose*: 0.04 mg/kg (full vagal blockade).
- Poisonings: **IV/IM/ET/IO**: 1-2 mg as needed to decrease cholinergic symptoms.

  **AUTOINJECTOR (MARK 1 KIT)**: 2 mg

Pediatrics:
- Symptomatic Bradycardias: **IV/IO**: 0.02 mg/kg repeated every 3-5 minutes as needed.
  - Child: Minimum—0.1 mg Maximum—0.5 mg
  - Adolescent: Minimum—0.1 mg Maximum—1 mg
- Poisonings: **IV/IM**: 0.05 mg/kg IV every 3-5 minutes as needed to decrease cholinergic symptoms.

Onset:
- Rapid

Duration:
- 2-6 hours

Side Effects:
- Anticholinergic Effects: Remember the mnemonic:
  - **DRY AS A BONE**—Dry mucous membranes, urinary retention, constipation
  - **MAD AS A HATTER**—Restlessness, tachycardia, palpitations, HA, dizziness
  - **RED AS A BEET**—Flushed, hot, & dry skin
  - **BLIND AS A BAT**—Pupillary dilation (mydriasis), blurred vision (cycloplegia), photophobia
- Tachydysrhythmias, Ventricular Tachycardia/Fibrillation
- Of course…N/V

Interactions:
- Anticholinergics increase vagal blockade.
- Potential adverse effects when administered with digitalis, cholinergics, neostigmine.
- Enhanced effects are possible with antihistamines, procainamide, quinidine, antipsychotics, antidepressants, benzodiazepines, phenothiazines.
- When administered too soon after NaHCO3 (i.e. Without allowing sufficient fluid to flush the line), a precipitate will form.
PEARLS:

- To recognize cholinergic poisonings remember the SLUDGE, DUMBELS, and Days of the week mnemonics.
- Pushing a less than the minimum dose or pushing atropine too slowly may elicit a paradoxical bradycardia.
- Remember most bradycardias in pediatrics are a result of hypoxia/hypoxemia rather than a primary cardiac problem. Ventilation is always preferred over pharmacological intervention.
- Avoid being splashed in the eyes with atropine.
- Be prepared, on physician order, to deliver massive amounts (10-40mg) in the setting of cholinergic poisoning.

**Mnemonics for nerve agent/organophosphate/Carbamate exposure**

<table>
<thead>
<tr>
<th>“S.L.U.D.G.E”</th>
<th>“D.U.M.B.E.L.S.” (Muscarinic)</th>
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</thead>
<tbody>
<tr>
<td>Salivation (excessive production of saliva)</td>
<td>Diarrhea</td>
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<tr>
<td>Lacrimation (excessive tearing)</td>
<td>Urination</td>
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<tr>
<td>Urination (uncontrolled urine production)</td>
<td>Miosis</td>
</tr>
<tr>
<td>Defecation (uncontrolled bowel movement)</td>
<td>Bradycardia/Bronchospasm/Bronchorrhea</td>
</tr>
<tr>
<td>Gastrointestinal distress (cramps)</td>
<td>Emesis</td>
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<tr>
<td>Emesis (excessive vomiting)</td>
<td>Lacrimation</td>
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</tbody>
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<thead>
<tr>
<th>“B.A.M.”</th>
<th>Days of the Week (Nicotenic)</th>
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<tbody>
<tr>
<td>Breathing Difficulty (wheezing)</td>
<td>Mydriasis</td>
</tr>
<tr>
<td>Arrhythmias (Bradycardia, ventr. Arrhythmias, AV Blocks.)</td>
<td>Tachycardia</td>
</tr>
<tr>
<td>Miosis (pinpoint pupils)</td>
<td>Weakness</td>
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<thead>
<tr>
<th>“Three C’s” of CNS effects</th>
<th>Weakness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Confusion</td>
<td>Hypertension, Hyperglycemia</td>
</tr>
<tr>
<td>Convulsions</td>
<td>Fasciculations</td>
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<td>Coma</td>
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**DRUG: ATROPINE SULFATE**