

Atropine Sulfate

Atropine is an anticholinergic drug that blocks the action of acetylcholine at parasympathetic sites in smooth muscle, secretory glands, and the central nervous system (CNS). It increases cardiac output and dries secretions. It is a competitive, reversible antagonist of muscarinic receptors and can be used to reverse the muscarinic effects of cholinergic poisoning (Lexicomp, n.d.). Atropine may be administered subcutaneously, intramuscularly (IM), intravenously (IV), intraosseous, or by endotracheal tube (ET). Intravenous is the preferred route. For ET administration, dilute 1 mg to 2 mg in 10 mL of sterile water or normal saline (McLendon & Preuss, 2023).

Atropine Sulfate (UpToDate Lexidrug, 2024)	
Approved Indications	Clinical Considerations
Bradycardia during neuromuscular blockade reversal	<ul style="list-style-type: none">• When administered with edrophonium or neostigmine, dosage recommendations vary.
Bradycardia, symptomatic	<ul style="list-style-type: none">• Ineffective in heart transplant recipients because these patients lack vagal innervation.• Ineffective in treating type II second-degree or third-degree AV block.• It is no longer recommended to treat asystole or bradycardic pulseless electrical activity (PEA).
Preoperative/preanesthesia to inhibit salivation and secretion	<ul style="list-style-type: none">• Administer dose 30 to 60 minutes before the procedure; repeat every 4 to 6 hours as needed.
Treatment of symptoms from muscarine-containing mushroom poisoning	<ul style="list-style-type: none">• Titrate dose and repeat as needed to reverse symptoms (i.e., titrate to achieve decreased bronchial secretions).
Antidote for anticholinesterase poisoning (carbamate insecticides, nerve agents, organophosphate insecticides)	<ul style="list-style-type: none">• Dose varies considerably with the severity of poisoning.• Consider starting IV continuous infusion for improved clinical outcomes.• Severely poisoned patients may exhibit significant tolerance to atropine.

Note: The safety and efficacy of atropine in pediatric patients has not been fully studied. Consult the complete product insert for pediatric dosing.

Administration and Monitoring (UpToDate Lexidrug, 2024)

- Inspect product visually for particulate matter or discoloration prior to administration. Do not use unless the solution is clear and container or seal is intact.
- IM (Atropen): administer to the outer thigh. Follow package insert for full instructions.
- IV: administer undiluted by rapid IV injection
 - IV administration requires a cardiac monitor.
 - Slow injection or low IV doses (less than 0.5 mg) have been associated with paradoxical bradycardia.
- Monitor heart rate, PR interval, blood pressure, and mental status closely.

Adverse Reactions

Common adverse reactions of atropine include dry mouth, blurred vision, photophobia, tachycardia, flushed skin, constipation, difficulty with urination, inability to perspire appropriately, delirium or coma (McLendon & Preuss, 2023).

Precautions (Pfizer, 2022)

Atropine may cause adverse effects in patients with the following conditions:

- Known hypersensitivity
- Tachycardia
- Hyperthermia: atropine may inhibit sweating that can lead to heat-related injury
- Suspected glaucoma: atropine may precipitate acute glaucoma
- Pyloric stenosis: atropine may cause complete obstruction
- Prostatic hypertrophy: atropine may cause urinary retention

Atropine should be used with caution in patients with the following conditions:

- Cardiovascular disease: Use atropine with caution in patients with myocardial infarction, heart failure, tachyarrhythmias, and/or hypertension.
- Chronic lung disease: atropine may cause thickening of bronchial secretions.
- Liver or renal impairment may prolong the effects of atropine.

Atropine should also be used with caution in patients with hiatal hernia associated with reflux esophagitis, hyperthyroidism, myasthenia gravis, neuropathy, and urinary retention.

Drug-Drug Interactions (Pfizer, 2022)

The action of atropine may be enhanced by tricyclic antidepressants, monoamine oxidase inhibitors (MAOIs), phenothiazine, amantadine, some antihistamines, butyrophenones, and disopyramide.

Overdose (Pfizer, 2022)

The following symptoms could signal overdose: palpitations, dilated pupils, difficulty swallowing, hot dry skin, thirst, dizziness, restlessness, tremor, fatigue, and ataxia. Toxic doses

can cause palpitations, restlessness, hallucinations, delirium, and coma. Severe overdose may result in circulatory collapse, respiratory failure, paralysis, and coma. Treatment of toxic overdose includes a short-acting barbiturate or diazepam as needed for excitement or convulsions. Physostigmine (1 to 4 mg) is an atropine antidote administered by slow IV injection to treat delirium and coma. Repeat doses may be required.

References

McLendon, K. & Preuss, C.V. (2023, June 23). Atropine. *StatPearls*. <https://www.ncbi.nlm.nih.gov/books/NBK470551/>

Pfizer. (2022, October 26). Product Monograph: Atropine Sulfate Injection USP. <https://webfiles.pfizer.com/file/3eb33b68-40ac-43a2-a045-8bdc66e93798>

UpToDate Lexidrug. (2024). Atropine (systemic): Drug information. *UpToDate Lexidrug*. <https://www.uptodate.com/contents/atropine-systemic-drug-information>