

Name of Medicine

Atropine Injection BP

as atropine sulfate 0.5mg/5mL and 1.0mg/10mL MIN-I-JET

Presentation

Atropine is (1R,3r,5S,8r)-tropan-3-yl-(±)-tropate sulfate monohydrate; $(C_{17}H_{23}NO_3)_2H_2SO_4 \cdot H_2O$. It is an odourless, bitter tasting, crystalline powder and is an alkaloid which is widely distributed in nature, especially in the deadly nightshade plant, *Atropa belladonna*.

Atropine Injection BP, is a sterile solution of atropine sulfate in water. Each mL of injection contains 0.1 mg of atropine sulfate. The injection also contains sodium chloride, sodium citrate and citric acid monohydrate.

Uses

Actions

Atropine is an antimuscarinic agent which competitively antagonizes acetylcholine at postganglionic nerve endings, thus affecting receptors of the exocrine glands, smooth muscle, cardiac muscle and the central nervous system.

Peripheral effects include tachycardia, decreased production of saliva, sweat, bronchial, nasal, lachrymal and gastric secretions, decreased intestinal motility and inhibition of micturition.

Atropine increases sinus rate and sinoatrial and AV conduction by blocking vagal tone. The heart rate is usually increased but it sometimes preceded by an initial bradycardia.

Atropine inhibits secretions throughout the respiratory tract and relaxes bronchial smooth muscle, producing bronchodilatation.

Pharmacokinetics

Peak plasma concentrations of atropine after intramuscular administration are reached within 30 minutes. The elimination half-life varies between 2 and 5 hours. Plasma levels after intramuscular and intravenous injection are comparable after one hour. Atropine is distributed widely throughout the body and crosses the blood brain barrier and placenta. Up to 50% of the dose is protein bound.

Peak effects on the heart occur within 4 minutes of intravenous and about 1 hour after intramuscular administration. Atropine is metabolised in the liver by oxidation and conjugation to give inactive metabolites. About 50% of the dose is excreted within 4 hours and 90% in 24 hours in the urine, about 30 to 50% as unchanged drug.

Indications

Cardiac

In the management of patients with severe bradycardia and bradyarrhythmias to increase the heart rate.

Patients with Type I atrioventricular conduction deficits to lessen the degree of atrioventricular heart block.

Anaesthesia

Atropine is indicated as an antisialagogue in anaesthetic premedication to reduce or prevent secretions in the respiratory tract.

During anaesthesia, atropine may be used to prevent reflex bradycardia and restore cardiac rate and arterial pressure resulting from the increased vagal activity associated with laryngoscopy, tracheal intubation and intra-abdominal manipulation, and for the prevention of the oculo-cardiac reflex during ophthalmic surgery. It may also be used to block muscarinic effects when neostigmine is used to counter the action of muscle relaxants.

Anticholinesterase poisoning

Atropine is indicated in the treatment of cardiovascular collapse following poisoning from cholinesterase inhibitors such as the organophosphorus insecticides parathion and malathion, the nerve gases and from mushroom poisoning.

Dosage and Administration

Adults

The usual adult dose is 0.4 to 0.6 mg given intravenously, intramuscularly or subcutaneously to a total of 2 mg.

Anaesthetic premedication: 0.2 – 0.6 mg intramuscularly or subcutaneously half to one hour before surgery or the same dose intravenously immediately before surgery.

To control muscarinic side effects of neostigmine: 0.6 – 1.2 mg intravenously for each 0.5 – 2.5 mg of neostigmine.

Anticholinesterase poisoning: 1 – 2 mg intramuscularly or intravenously, repeated every 5 to 60 minutes until signs and symptoms disappear. Up to 50 mg may be needed in the first 24 hours.

Children

The usual paediatric dose is 0.01 mg/kg or 0.3 mg/m² body surface given intravenously, intramuscularly or subcutaneously. The dose should not exceed 0.4 mg. If necessary, it can be repeated every 4 to 6 hours.

Cardiac: for advanced cardiac life support the dose is 0.02 mg/kg with a minimum of 0.1 mg and a maximum of 1 mg in children and 2 mg in adolescents.

Anaesthetic premedication: subcutaneous doses as follows:

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| up to 3 kg | 0.1 mg |
| 7 to 9 kg | 0.2 mg |
| 12 to 16 kg | 0.3 mg |
| Over 20 kg | adult dose |

Anticholinesterase poisoning: intramuscular or intravenous, 0.05 mg/kg every 10 to 30 minutes until signs and symptoms disappear.

Contraindications

Atropine is contraindicated in patients with known hypersensitivity to the drug, those with prostatic hypertrophy, bladder neck obstruction, pyloric obstruction, reflux oesophagitis, unstable cardiac rhythm, narrow angle glaucoma and myasthenia gravis (unless used to treat the adverse effects of an anticholinesterase agent).

Severe ulcerative colitis or toxic megacolon complicating ulcerative colitis, obstructive disease of the GI tract (eg. pyloroduodenal stenosis, achalasia) cardiospasm, paralytic ileus or intestinal atony (especially in geriatric or debilitated patients) should be included.

Warnings and Precautions

Antimuscarinic agents should be used with caution in the elderly and children since these patients may be more susceptible to adverse events. Atropine should also be used with caution in patients with hyperthyroidism, hepatic or renal disease or hypertension. Use with caution in febrile patients or when ambient temperature is high since antimuscarinics may cause an increase in temperature. Antimuscarinics block vagal inhibition of the SA nodal pacemaker and should thus be used with caution in patients with tachyarrhythmias, congestive cardiac failure or coronary heart disease.

Atropine should be used with extreme caution in patients with mild to moderate ulcerative colitis.

Parenterally administered atropine should be used cautiously in patients with chronic pulmonary disease, since a reduction in bronchial secretions may lead to the formation of bronchial plugs. Antimuscarinics should be used with extreme caution in patients with autonomic neuropathy.

Antimuscarinics decrease gastric motility, relax the lower oesophageal sphincter and may delay gastric emptying; they should therefore be used with caution in patients with gastric ulcer, oesophageal reflux, pyloric stenosis, diarrhoea or gastrointestinal infection.

Systemic administration of conventional doses of atropine may precipitate acute glaucoma in susceptible individuals. Tachycardia may result from vagal inhibition and induce angina pectoris in patients with coronary heart disease.

Infants, patients with Down's Syndrome and children with spastic paralysis or brain damage may be hypersensitive to atropine's effects.

As atropine may affect eyesight and cause drowsiness, patients should not be allowed to drive cars or operate machinery.

The atropine is in a single use MIN-I-JET prefilled syringe. Once the unit is assembled and used, any remaining portion of the solution must be discarded with the entire unit.

Use in pregnancy (Category A)

Atropine has been given to a large number of pregnant women and women of childbearing age without any proven increase in the frequency of malformations or other direct or indirect harmful effects on the foetus having been observed.

Atropine crosses the placenta and may cause tachycardia in the foetus.

Use in lactation

Trace amounts of atropine appear in the breast milk and may cause antimuscarinic effects in the infant; lactation may be inhibited.

Adverse Effects

Adverse events are dose related and usually reversible when therapy is discontinued. In relatively small doses, atropine reduces salivary, bronchial and sweat secretions; dry mouth and anhidrosis may develop, these effects being intensified as the dosage is increased. Reduced bronchial secretion may cause dehydration of residual secretion and consequent formation of thick bronchial plugs that are difficult to eject from the respiratory tract.

Larger doses dilate the pupil and inhibit accommodation of the eye; they also block vagal impulses with consequent increase in heart rate with possible atrial arrhythmias, a trioventricular dissociation, multiple ventricular ectopics and angina; parasympathetic control of the urinary bladder and gastrointestinal tract is inhibited, causing urinary retention and constipation. Further increase in dosage inhibits gastric secretion. Anaphylaxis, urticaria and rash, occasionally progressing to exfoliation, may develop in some patients. Other effects include increased ocular tension, loss of taste, headache, nervousness, drowsiness, weakness, dizziness, flushing, insomnia, nausea, vomiting and bloated feeling. Mental confusion and/or excitement may occur, especially in the elderly.

Interactions

The effects of atropine may be enhanced by the concomitant administration of other drugs with anticholinergic activity such as tricyclic antidepressants, antispasmodics, antiparkinsonian drugs, some antihistamines, phenothiazines, disopyramide and quinidine. By delaying gastric emptying, atropine may alter the absorption of other drugs.

Overdosage

Symptoms and signs: marked dryness of the mouth accompanied by a burning sensation, difficulty in swallowing, pronounced photophobia, flushing and dryness of the skin, raised body temperature (very high in infants), rash, leucocytosis, nausea, vomiting, tachycardia and hypertension. Restlessness, tremor, confusion, excitement, hallucinations and delirium may result from CNS stimulation; this may be followed by increasing drowsiness, stupor and general central depression, terminating in death from circulatory and respiratory failure.

Treatment: in severe cases, physostigmine 1 to 4 mg should be administered intravenously, intramuscularly or subcutaneously; the dose may be repeated as necessary since it is rapidly eliminated from the body. Diazepam may be administered for sedation of the delirious patient but the risk of central depression occurring late in the course of atropine poisoning contraindicates large doses of sedative. An adequate airway should be maintained and respiratory failure may be treated with oxygen and carbon dioxide inhalation. Fever is reduced by the application of cold packs or sponging with tepid water. Adequate fluid intake is essential. Urethral catheterisation may be necessary. A darkened room is essential because of photophobia.

Pharmaceutical Precautions

Store below 25°C. Protect from light.

Medicine Classification

Prescription Medicine.

Package Quantities

Atropine Injection BP is available in single use prefilled MIN-I-JET syringes of 0.5 mg atropine sulfate in 5 mL and 1.0 mg atropine sulfate in 10 mL.

Further Information

Nil

Names and Addresses

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