

Southern Tier Regional
Emergency Medical Services

FORMULARY



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** May be given endotracheally

SCHEDULE OF MEDICATIONS

Medications authorized to be carried in ALS Ambulances (EMT-CC/P level services). All required to be carried except as indicated.

Intravenous Preparations, unless otherwise indicated:

1. Adenosine
2. Albuterol, **SVN use only**
3. Atropine
4. Bretylium
5. Calcium Chloride
6. Charcoal
7. Chewable Aspirin
8. Dextrose (50%)
9. Diazepam
10. Diphenhydramine
11. Dopamine HCL premix (1600 mcg/cc)
12. Epinephrine 1:1,000
13. Epinephrine 1:10,000
14. Furosemide
15. Glucagon
16. Glucose, **oral use only**
17. Ipratropium
18. Lidocaine bolus
19. Lidocaine drip premix (4 mg/cc)
20. Lorazepam (**optional to carry**)
21. Magnesium Sulfate
22. Morphine Sulfate
23. Naloxone
24. Neosynephrine, **nasal use only**
25. Nitroglycerine
26. Procainimide
27. Promethazine
28. Sodium Bicarbonate
29. Thiamine

30. IV Solutions
 - D5W (Intermediate Services only)
 - Lactated Ringers
 - Sodium Chloride 0.9%

ADENOSINE

Class

Endogenous nucleotide; antiarrhythmic

Description

Adenosine is primarily formed from the breakdown product of adenosine triphosphate (ATP). Both compounds are found in every cell of the human body and have a wide range of metabolic roles. Adenosine slows tachycardias associated with the AV node via modulation of the autonomic nervous system without causing negative inotropic effects. It acts directly on sinus pacemaker cells and vagal nerve terminals to decrease chronotropic and dromotropic activity. Adenosine is the drug of choice for paroxysmal supraventricular tachycardia (PSVT) and can be used diagnostically for stable, wide complex tachycardias of unknown type after two doses of lidocaine.

Onset & Duration

Onset: almost immediate

Duration: 10 sec

Indications

Conversion of PSVT to sinus rhythm

Contraindications

1. Second- or third-degree AV block
2. Sick sinus syndrome
3. Hypersensitivity to adenosine

Adverse Reactions

- | | | |
|--------------------|-----------------|-------------------------|
| 1. Facial flushing | 5. Diaphoresis | 9. Nausea |
| 2. Lightheadedness | 6. Palpitations | 10. Metallic taste |
| 3. Paresthesia | 7. Chest pain | 11. Shortness of breath |
| 4. Headache | 8. Hypotension | |

Drug Interactions

1. Methylxanthines (for example, caffeine and theophylline) antagonize the action of adenosine.
2. Dipyridamole potentiates the effect of adenosine; reduction of adenosine dose may be required.
3. Carbamazepine may potentiate the AV-nodal blocking effect of adenosine,

Special Considerations

1. Pregnancy safety: Category C
2. May produce bronchoconstriction in patients with asthma or bronchopulmonary disease.
3. At the time of conversion asystole or new rhythms may result. These generally last a few seconds without intervention; patient may have transient symptoms
4. Adenosine is not effective in atrial flutter or fibrillation
5. Must administer rapidly (IV slam), due to short duration/half-life. Always follow with NS flush.

ALBUTEROL

SVN use only

Class

Sympathomimetic
Relatively selective beta-2 adrenergic bronchodilator

Description

B-Agonist agents are considered sympathomimetic, that is selective for beta-2 adrenergic receptors. It relaxes smooth muscles of the bronchial tree peripheral vasculature, by stimulating adrenergic receptors of the sympathetic nervous system.

Onset & Duration

Onset: 5-15 min. after inhalation; 30 min PO
Duration: 3-4 hr after inhalation; 4-6 hr PO (variable as per agent)

Indications

1. Relief of bronchospasm due to asthma, anaphylaxis, or allergic reactions
2. Prevention of exercise-induced bronchospasm

Contraindications

1. Prior hypersensitivity reaction to B-Agonist
2. Cardiac dysrhythmias associated with tachycardia
3. Tachycardia caused by digitalis intoxication

Adverse Reactions

- | | |
|-----------------|-------------------------------|
| 1. Tachycardia | 6. Nausea |
| 2. Restlessness | 7. Palpitations |
| 3. Apprehension | 8. Increase in blood pressure |
| 4. Headache | 9. Dysrhythmias |
| 5. Dizziness | 10. Hypokalemia |

Drug Interactions

1. Sympathomimetics may exacerbate adverse cardiovascular effects. Antidepressants may potentiate the effects on the vasculature.
2. Beta blockers may antagonize B-Agonists.
3. B-Agonists may potentiate diuretic-induced hypokalemia.

Special considerations

1. Pregnancy safety: Category C
2. May precipitate angina pectoris and dysrhythmias
3. Should be used with caution in patients with diabetes mellitus, hyperthyroidism, prostatic hypertrophy, or seizure disorder

ASPIRIN

Class

Platelet Aggregator Inhibitor, Anti-Inflammatory Agent

Description

Aspirin is an anti-inflammatory agent and an inhibitor of platelet function. This makes it a useful agent in the treatment of various thromboembolic diseases such as acute myocardial infarction.

Indications

- New chest pain suggestive of acute myocardial infarction (AMI)
- Signs and symptoms suggestive of recent stroke (CVA) if without cerebral bleeding

Contraindications

Allergy to aspirin: aspirin is contraindicated in patients with know hypersensitivity to the drug. It is relatively contraindicated in patients with active ulcer disease and asthma, bleeding disorders, hemorrhagic CVA, children.

Adverse Reactions

Aspirin can cause heartburn, GI bleeding, nausea, vomiting, wheezing, stomach irritation, indigestion, and prolong bleeding.

Drug Interactions

When administered together, aspirin and other anti-inflammatory agents may cause an increased incidence of side effects and increased blood levels of both drugs. Administration of aspirin with antacids may reduce the blood level of the drug by decreasing absorption.

ATROPINE SULFATE**

Class

Anticholinergic, Vagolytic

Description

Atropine is a parasympatholytic (anticholinergic) that is derived from parts of the *Atropa belladonna* plant.

Blocks vagus nerve, causing increased heart rate, enhanced AV conduction

Indications

- Hemodynamically-significant bradycardia
- Asystole

Contraindications

None in emergency situations

Adverse Reactions

Atropine sulfate can cause blurred vision, dilated pupils, dry mouth, tachycardia, drowsiness, and confusion.

Drug Interactions

Few in the prehospital setting.

Increased effect with patients on dioxin.

Special Considerations

Use with caution with myocardial ischemia

** May be given endotracheally

BRETYLIUM TOSYLATE

Class

Antidysrhythmic (class 111)

Description

Bretylium is an adrenergic neuronal blocking agent that has both adrenergic and direct myocardial effects. Although the antidysrhythmic action of bretylium is poorly understood, like lidocaine it has been found to be effective in treating ventricular fibrillation and ventricular tachycardia. Bretylium produces a prompt increase in ventricular fibrillation threshold, perhaps through postganglionic adrenergic blockade. It causes an initial release of norepinephrine from postganglionic nerve terminals. At present, its use is reserved for patients who fail to respond to lidocaine or other first-line antidysrhythmics.

Onset & Duration

Onset: Antifibrillatory effects are seen in 2-15 min. after IV administration. The suppression of ventricular tachycardia and other ventricular dysrhythmias occurs in 20 min. or longer after IV administration.

Duration: 2-6 hr (ventricular fibrillation). Up to 24 hr (ventricular tachycardia).

Indications

Treatment of VF and VT refractory to lidocaine.

Contraindications

None in the treatment of life-threatening dysrhythmias

Adverse Reactions

1. Vertigo
2. Nausea and vomiting
3. Dizziness
4. Syncope
5. Hypotension
6. Bradycardia
7. increase in PVCs
8. Angina pectoris

Drug Interactions

Digoxin toxicity may be aggravated by the initial release of norepinephrine from bretylium.

Special Considerations

1. Pregnancy safety: Category C
2. Postural hypotension occurs in 50% of patients receiving Bretylium (patients should be kept in supine position).
3. In ventricular fibrillation, bretylium is usually only effective if followed by defibrillation.
4. Ventricular tachycardia does not respond to bretylium as rapidly as ventricular fibrillation.

CALCIUM CHLORIDE 10%

Class

Calcium supplement, electrolyte

Description

Calcium Chloride provides elemental calcium in cases of hypocalcemia. It causes a significant increase in myocardial contractile force, and increases ventricular automaticity. Calcium chloride is an antidote for Magnesium sulfate, and can minimize some of the side effects of calcium channel blocker usage.

Indications

Acute hyperkalemia, acute hypocalcemia, calcium channel blocker toxicity, hypermagnesium

Contraindications

Calcium may precipitate Digitalis toxicity in patients taking Digoxin.
Ventricular fibrillation

Adverse Reactions

Bradycardia, arrhythmias, syncope, nausea, vomiting, cardiac arrest, arteriospasm

Drug Interactions

Flush IV line between administrations of Calcium Chloride and Sodium Bicarbonate to avoid precipitation. Calcium chloride can cause elevated digoxin levels, and Digitalis toxicity in those patients receiving digitalis preparations.

Precautions

Flush IV line between administrations of Calcium Chloride and Sodium Bicarbonate to avoid precipitation.
Extravasation (IV infiltration) causes necrosis.

CHARCOAL (ACTIVATED)

Class

Adsorbant

Description

A fine, black powder (premixed as a slurry), that adsorbs many drugs and chemicals; acts by binding toxic substances thereby inhibiting GI absorption, enterohepatic circulation and therefore bioavailability.

Indications

Acute ingested poisons.

Contraindications

Altered mental status, inability to swallow, poisonings by cyanide, mineral acids, caustic alkalies, organic solvents, iron, ethanol, methanol.

Adverse Reactions

Vomiting, abdominal cramping, abdominal bloating, constipation, (diarrhea if mixed with sorbitol).

Drug Interactions

May decrease effects of all oral medications.

Special Considerations

To be administered only per medical control or poison control request.

May improve palatability by adding a small amount of concentrated fruit juice or chocolate powder to slurry.

DO NOT give before or after ipecac syrup.

DEXTROSE 50%, 25%

Class

Carbohydrate, hypertonic solution

Description

The term dextrose is used to describe the six-carbon sugar d-glucose, the principal form of carbohydrate used by the body. D50 is used in emergency care to treat hypoglycemia and to manage coma of unknown origin.

Onset & Duration

Onset: ≤ 1 min.

Duration: Depends on the degree of hypoglycemia.

Indications

1. Hypoglycemia
2. Altered level of consciousness
3. Coma of unknown etiology
4. Seizure of unknown etiology
5. Refractory cardiac arrest (controversial)

Contraindications

There are no significant contraindications for IV administration of dextrose in emergency care, except in the setting of intracerebral bleeding or hemorrhagic CVA.

Adverse Reactions

1. Warmth, pain, burning from medication infusion
2. Thrombophlebitis
3. Rhabdomyolysis

Drug Interactions

There are no significant drug interactions with other emergency medications.

Special Considerations

1. Pregnancy safety: NA
2. Draw blood sample before administration if possible.
3. Extravasation may cause tissue necrosis; use a large vein and aspirate occasionally to ensure route patency.
4. D50 sometimes precipitates severe neurological symptoms (Wernicke's encephalopathy) in thiamine-deficient patients such as alcoholics. This can be prevented by administering 100 mg. IV of thiamine.
5. Use D25% with pediatric or D50% and dilute 1:1 with NS.

DIAZEPAM

Class

Benzodiazepine, sedative-hypnotic, anticonvulsant

Description

Diazepam is frequently prescribed to treat anxiety and stress. In emergency care, it is used to treat alcohol withdrawal and grand mal seizure activity. Diazepam acts on the limbic, thalamic, and hypothalamic regions of the CNS to potentiate the effects of inhibitory neurotransmitters, raising the seizure threshold in the motor cortex. It may also be used in conscious patients during cardioversion to induce amnesia and sedation. Though the drug is still widely used as an anticonvulsant, it is relatively weak and of short duration. Rapid IV administration may be followed by respiratory depression and excessive sedation.

Onset & Duration

Onset: (IV) 1-5 min. (IM) 15-30 min.

Duration: (IV) 15 min-1 hr (IM) 15 min-1 hr

Indications

1. Status epilepticus
2. Acute anxiety states
3. Acute alcohol withdrawal
4. Muscle relaxant
5. Preoperative sedation

Contraindications

1. Hypersensitivity to the drug
2. Acute narrow angle glaucoma
3. Open angle glaucoma
4. Hypotension
5. Head injury
6. CNS depression
7. Respiratory depression

Adverse Reactions

1. Hypotension
2. Reflex tachycardia
3. Respiratory depression
4. Ataxia
5. Psychomotor impairment
6. Confusion
7. Nausea

Drug Interactions

1. Diazepam may precipitate CNS depression and psychomotor impairment when the patient is taking CNS depressant medications.
2. Should not be administered with other drugs because of possible precipitation (incompatible with most fluids; should be administered into an IV of normal saline solution).

Special Considerations

1. Pregnancy safety: Category D
2. May cause local venous irritation
3. Has short duration of anticonvulsant effect
4. Reduce dose by 50% in elderly patients
5. Resuscitation equipment should be readily available
6. Antidote: Flumazenil (Ramazicon)

DIPHENHYDRAMINE

Class

Antihistamine

Description

Diphenhydramine is a potent antihistamine that blocks H1 and H2 histamine receptors.

Mechanism of Action

Diphenhydramine blocks the effects of H1 receptor stimulation (bronchoconstriction, visceral contractions) and that of H2 receptor stimulation (peripheral vasodilation and secretion of gastric acids). Diphenhydramine is also useful in the treatment of dystonic reactions accompanying phenothiazine use.

Indications

Anaphylaxis, allergic reactions, dystonic (extrapyramidal) reactions due to phenothiazines.

Contraindications

Asthma, nursing mothers
Hypersensitivity

Adverse Reactions

Sedation, dries bronchial secretions, blurred vision, headache, palpitations, tachycardia

Drug Interactions

Potential can occur by the administration of CNS depressants, other antihistamines, narcotics, and alcohol.

Precautions

The primary drug for treatment of severe allergic reactions is epinephrine, as it reverses the effects of histamines. Diphenhydramine will block histamine receptors, preventing subsequent stimulation.

DOPAMINE

Class

Sympathomimetic, Inotrop

Description

Dopamine is chemically related to epinephrine and norepinephrine. It acts primarily on alpha-1 and beta-1 adrenergic receptors, increasing systemic vascular resistance and exerting a positive inotropic effect on the heart. In addition, the actions of this drug on dopaminergic receptors dilate renal and splanchnic vasculature, maintaining blood flow. Dopamine is commonly used to treat hypotension associated with cardiogenic shock.

Onset & Duration

Onset: 2-4 min.

Duration: 10-15 min.

Indications

1. Hypotension without hypovolemia
2. Shock without hypovolemia
3. Low cardiac output states

Contraindications

Patients with pheochromocytoma

Adverse Reactions

1. Dose-related tachydysrhythmias, ventricular fibrillation, ventricular tachycardia
2. Hypertension
3. Increased myocardial oxygen demand
4. Nausea, vomiting
5. Headache
6. Ischemia

Drug Interactions

1. May be deactivated by alkaline solutions (sodium bicarbonate and furosemide)
2. MAO inhibitors and bretylium may potentiate the effect of dopamine.
3. Sympathomimetics and phosphodiesterase inhibitors exacerbate dysrhythmia response.
4. Beta-adrenergic antagonists may blunt inotropic response.
5. When administered with phenytoin, hypotension, bradycardia, and seizures may develop.

Special Considerations

1. Pregnancy safety: Category C
2. Infuse through a large, stable vein to avoid the possibility of extravasation injury
3. Monitor patient for signs of compromised circulation

EPINEPHRINE**

Class

Sympathomimetic

Description

Epinephrine stimulates alpha, beta-1, and beta-2 adrenergic receptors in dose-related fashion. It is the initial drug of choice for treating broncho constriction and hypotension resulting from anaphylaxis as well as all forms of cardiac arrest. It is useful in managing reactive airway disease, but beta-adrenergic agents are often used initially because of their bronchial specificity and oral inhalation route. Rapid injection produces a rapid increase in systolic pressure, ventricular contractility, and heart rate. In addition, epinephrine causes vasoconstriction in the arterioles of the skin, mucosa, and splanchnic areas and antagonizes the effects of histamine.

Onset & Duration

Onset: (SQ) 5-10 min.; (IV) 1-2 min.

Duration: 5-10 min.

Indications

1. Bronchial asthma
2. Acute allergic reaction
3. Cardiac arrest
4. Asystole
5. Pulseless electrical activity
6. Ventricular fibrillation unresponsive to initial defibrillatory attempts

Contraindications

1. Hypersensitivity
2. Hypovolemic shock
3. Narrow angle glaucoma

Adverse Reactions

1. Headache
2. Nausea
3. Restlessness
4. Weakness
5. Dysrhythmias
6. Hypertension
7. Precipitation of angina pectoris

Drug Interactions

1. MAO inhibitors and bretylium may potentiate the effect of epinephrine.
2. Beta-adrenergic antagonists may blunt inotropic response.
3. Sympathomimetics and phosphodiesterase inhibitors may exacerbate dysrhythmia response,
4. May be deactivated by alkaline solutions (sodium bicarbonate, furosemide).

Special Considerations

1. Pregnancy safety: Category C
2. Syncope has occurred after epinephrine administration to asthmatic children.
3. May increase myocardial oxygen demand.

**Maybe given endotracheally

FUROSEMIDE

Class

Diuretic

Description

Furosemide is a potent diuretic that inhibits the reabsorption of sodium and chloride in the proximal tubule, distal tubule, and the loop of Henle.

Onset & Duration

Onset: (PO) 30-60 min.; (IV) 5 min.

Duration: 2 hrs

Indications

1. Edema
2. Congestive heart failure

Contraindications

1. Anuria
2. Hypersensitivity
3. Sulfa allergy

Adverse Reactions

1. Hypotension
2. Dehydration
3. Dry mouth
4. Ototoxicity (hearing loss with too rapid IV administration)
5. Tinnitus
6. Hypochloremia
7. Hypokalemia
8. Hyponatremia
9. Hyperglycemia

Drug Interactions

1. Digitalis toxicity may be potentiated by the potassium depletion that can result from furosemide administration.
2. Increases the ototoxic potential of aminoglycoside antibiotics
3. Lithium toxicity may be potentiated by sodium depletion.

Special Considerations

1. Pregnancy safety: Category C
2. Furosemide has been known to cause fetal abnormalities
3. Should be protected from light.

Remainder of Formulary is in Part II...