

2018 REMSA Paramedic Program Drug List

Acetaminophen (APAP)

Class: Analgesic, antipyretic

Action: Increases pain threshold and reduces fever by acting on the hypothalamus.

Indications: Fever, pain relief

Contraindications: Hypersensitivity and use caution in patients with liver disease.

Onset/Duration: Onset: Rapid and Duration: 3-4 hours

Dose/route:

Adult: 325-650 mg PO every 4-6 hr

Peds: 15 mg/kg PO/PR every 4-6 hr

Side Effects: Nausea/vomiting, hepatotoxicity

Activated Charcoal

Class: Antidote, Adsorbant

Action: Binds to and absorbs ingested toxins thereby inhibiting their GI adsorption. Once the drug binds to the charcoal the combined complex is excreted.

Indications: Acute ingested poisonings that were ingested within the last hour

Contraindications: Cyanide, mineral acids, caustic alkalis, iron, ethanol, methanol, corrosives, petroleum distillates

Onset/Duration: Onset: Immediate and Duration: Continual while in GI tract and reaches equilibrium once saturated

Dose/Route:

Adult: 1 g/kg PO

Peds: 1-2 g/kg PO

Side Effects: Nausea, vomiting, abdominal cramping, constipation

Adenosine (Adenocard)

Class: Misc. Antidysrhythmic, Endogenous Nucleoside

Action: Decreases electrical conduction through the AV node without causing negative inotropic effects

Indications: Supraventricular tachycardia's (SVT/PSVT)

Contraindications: Hypersensitivity, bradycardia, drug induced tachycardia, 2nd or 3rd degree heart blocks, A-Fib, A-Flutter, V-Tach, WPW with A-Fib/flutter

Onset/Duration: Onset immediate and Duration/half-life: 10 seconds

Dose/Route:

Adult: 6mg rapid IV/IO push followed by 20cc saline flush, may repeat at 12mg rapid IV push followed by 20cc saline flush.

Peds: 0.1mg/kg (max 6mg) IV/IO followed by 5-10cc saline flush. May repeat at 0.2mg/kg (max 12mg) IV/IO followed by 5-10cc saline flush

Side Effects: dizziness, headache, shortness of breath, hypotension, flushing, palpitations, chest pain, nausea/vomiting

Note: Methylxanthine classified stimulants (caffeine & theophylline) usage will antagonize adenosine

Albuterol (Proventil)

Class: Sympathomimetic, bronchodilator, beta 2 agonist

Action: Sympathomimetic that is selective for Beta 2 adrenergic receptors and relaxes smooth muscles of the bronchial tree and peripheral vasculature by stimulating adrenergic receptors of sympathetic nervous system

Indications: Asthma, bronchospasms, reactive airway disease

Contraindications: Hypersensitivity, caution with pt's with cardiac dysrhythmias

Onset/Duration: Onset: 5-8 min with peak effect in 1-1.5 hours and Duration: 2 – 6 hours

Dose/Route:

Adult: 2.5mg diluted in 3mL of Normal Saline

Peds: 2.5mg diluted in 3mL of Normal Saline

Side Effects: Tremors, tachycardia, hypertension, anxiety, nausea, headache, palpitations, cough, dizziness

Note: Albuterol may precipitate angina & cardiac dysrhythmias. Use with caution in pt's with cardiovascular disorder, diabetes, seizure disorder, hyperthyroidism.

Amiodarone (Cordarone)

Class: Class III Antidysrhythmic

Action: Prolongs duration of the action potential and prolongs the refractory period, also has beta adrenergic receptor and calcium channel blocking activity. Works on both the ventricles and the atria

Indications: V-Fib, hemodynamically unstable V-Tach, treatment for some stable atrial rhythms

Contraindications: CHF, cardiogenic shock, bradycardia, 2nd or 3rd degree heart blocks with no pacemaker present, hypersensitivity to amiodarone or iodine

Onset/Duration: Onset: within minutes and Duration: Variable but considered 30 – 45 days

Dose/Route:

Adult: Pulseless V-Tach/V-Fib arrest - 300mg IV/IO may repeat once at 150mg IV/IO. V-Tach with a pulse 150mg IV drip over 10 minutes up to max of 2.2g in 24 hours

Peds: Pulseless V-Tach/V-Fib arrest - 5mg/kg IV/IO. V-Tach with a pulse 5mg/kg IV drip over 20-60 minutes with a max of 15mg/kg/day.

Side Effects: Bradycardia, hypotension, headache, CHF, abnormal liver/thyroid functions. In rare cases can cause pulmonary fibrosis

Amyl Nitrite

Class: Coronary vasodilator

Action: Smooth muscle relaxant that converts hemoglobin to methemoglobin which attracts cyanide thus allowing oxygen to bind to hemoglobin

Indications: Cyanide poisoning (should be given in conjunction with sodium nitrate IV)

Contraindications: None when used for cyanide poisoning

Onset/Duration: Onset: 30 sec and Duration: 3 – 20 min

Dose/Route:

Adult: One ampule crushed and inhaled for 30-60 seconds

Peds: Same as adult

Side Effects: Hypotension, tachycardia, palpitations, syncope, headache, nausea

Note: Amyl nitrite is frequently abused as it is known to be an aphrodisiac

Aspirin (Salicylate)

Class: Analgesic, nonsteroidal anti-inflammatory drug (NSAID), antipyretic, and antiplatelet

Action: Inhibits prostaglandins involved in the production of inflammation, pain and fever. Dilates peripheral vessels and also inhibits platelet aggregation by blocking the formation of thromboxane A₂.

Indications: Acute coronary syndrome (ACS) such as myocardial infarction, ischemic chest pain or angina, plus given for mild to moderate fever and pain

Contraindications: GI bleeding, hemorrhagic stroke, active gastric ulcers, bleeding disorders, asthma, hypersensitivity to salicylates, children

Onset/Duration: Onset: 15-30 min and Duration: 4-6 hours

Dose/Route:

Adult: Mild pain/fever – 325-650 mg PO every 4 hours. ACS – 2 to 4 baby chewable aspirin 162-324mg OR 1 adult aspirin 325mg PO.

Peds: Not indicated in pre-hospital setting

Side Effects: Stomach irritation, GI bleeding, Nausea/vomit

Note: Children under 12 should not be given Aspirin as they may develop Reyes syndrome.

Atropine Sulfate

Class: Anticholinergic; Parasympatholytic

Action: Inhibits actions of acetylcholine (mostly at muscarinic receptor sites) causing decreasing salivation and bronchial secretions, increased heart rate, decreased gastric motility.

Indications: Hemodynamically unstable bradycardia, Organophosphate or nerve gas poisoning

Contraindications: Tachycardia, hypersensitivity, avoid use with hypothermic pt's, caution in pt's with an active MI and hypoxia

Onset/Duration: Onset: Rapid and Duration: 2-6 hours

Dose/Route:

Adult: Bradycardia – 0.5 mg IV/IO q 3-5 min up to max total of 3mg or 0.04mg/kg.
Organophosphate poisoning – 1 to 5mg IV/IM/IO repeated 3-5 min until cessation of bronchial secretions

Peds: Bradycardia NOT responding to Epi- 0.02mg/kg IV/IO (min dose of 0.1mg and max single dose 0.5mg) with maximum total of 1 mg for a child and 3 mg for an adolescent.
Organophosphate peds < 12 yrs old - 0.02 - 0.05mg/kg IV/IM/IO may be repeated every 20-30 mins until cessation of bronchial secretions.

Side Effects: Tachycardia, paradoxical bradycardia if given too slow or too small of dose, mydriasis (dilated pupils), dysrhythmias, headache, nausea/vomit, headache, dizziness, flushed, anticholinergic effects (dry mouth/nose/skin, blurred vision, urinary retention, constipation)

Note: Effects of atropine may be potentiated by antihistamines, procainamide, quinidine, antipsychotics, antidepressants, and thiazides

Calcium Chloride

Class: Electrolyte, hypertonic solution

Action: It is an essential element for regulating the excitation threshold of nerves and muscles, normal cardiac contractility, and blood coagulation.

Indications: Hyperkalemia, hypocalcemia, hypermagnesemia, calcium channel blocker overdose

Contraindications: V-Fib during cardiac resuscitation, digitalis toxicity, hypercalcemia

Onset/Duration: Onset: 5-15 min and Duration is dose dependant but may last up to 4 hours

Dose/Route:

Adult: 500-1000 mg slow IV of 10% solution

Peds: 20 mg/kg slow IV of 10% solution

Side Effects: Bradycardia, hypotension, Metallic taste in mouth, local necrosis if given IM or IV infiltration

Dextrose 50% (D50)

Class: Carbohydrate, hypertonic solution

Action: Dextrose increases available blood sugar to be used as energy by the body

Indications: Hypoglycemia. If protocol allows also for altered LOC, coma, and seizure of unknown origin

Contraindications: Intracranial hemorrhage, increased intracranial pressure, known or suspected stroke in the absence of hypoglycemia

Onset/Duration: Onset: 1 min and Duration: variable depending on degree or hypoglycemia

Dose/Route:

Adult: 12.5-25 g IV

Peds: 0.5 – 1 g/kg IV of dextrose 25%

Neonates: 0.5 – 1 g/kg IV of dextrose 10%

Side Effects: Hyperglycemia

Note: If given through infiltrated IV will cause tissue necrosis so use large vein and flush with saline to ensure IV patency. D50 may cause Wernicke's encephalopathy in thiamine deficient patient (alcoholics and malnourished pt's) so if these conditions are suspected administer 100 mg Thiamine IV prior to administering D50.

Diazepam (Valium)

Class: Benzodiazepine

Action: Benzodiazepines increase the activity of GABA, thereby producing a sedative effect, relaxing skeletal muscles, and inducing sleep.

Indications: Seizure activity, acute anxiety, skeletal muscle relaxation, sedation for pacing, acute alcohol withdrawal delirium tremors

Contraindications: Hypersensitivity, respiratory depression, shock, coma, head injury, use with caution in pt's with acute substance abuse

Onset/Duration: Onset: 1-5 min IV and 15-30 min IM with Duration: 15-60 min

Dose/Route:

Adult: Seizures – 5 to 10 mg IV over 2 mins every 10-15 min as needed & a max of 30 mg. Premedication for pacing – 5-15 mg IV

Peds: Ages 30 days to 5 yrs – 0.2 - 0.5-2 mg slow IV push over 2 mins every 2-5 min to a max of 5 mg. Peds 5 yrs or older – 1 mg slow IV push over 2 mins every 2-5 min with a max of 10mg

Side Effects: Respiratory depression, altered LOC, hypotension, amnesia, confusion, nausea, vomiting, blurred vision

Diltiazem (Cardizem)

Class: Calcium Channel Blocker

Action: Inhibits calcium ion influx through slow channels into the cell of myocardial and arterial smooth muscle. Slows SA and AV nodal conduction. Dilates coronary arteries and arterioles thus inhibits coronary artery spasms

Indications: A-Fib and A-Flutter. Multifocal atrial tachycardias. SVT/PSVT refractory to Adenosine.

Contraindications: Hypersensitivity, 2nd and 3rd degree heart block, hypotension, cardiogenic shock, ventricular rhythms, sick sinus syndrome, Wolf-Parkinson-White syndrome.

Onset/Duration: Onset: 2-5 min and Duration: 1-3 hour

Dose/Route:

Adult: 0.25mg/kg IV over 2 min, may be repeated in 15 min at 0.35mg/kg IV over 2 min

Peds: Not recommended in the prehospital setting

Side Effects: Headache, dizziness, hypotension, 1st and 2nd degree heart block, bradycardia, palpitations, CHF, chest pain, ventricular rhythms

Note: Use caution with renal/liver impaired pt's and those taking beta blockers.

Diphenhydramine (Benadryl)

Class: Antihistamine

Action: Blocks H1 and H2 receptors which block histamine release

Indications: Allergic reactions, anaphylaxis, acute extrapyramidal reaction (dystonia)

Contraindications: Hypersensitivity, pt's taking MAO inhibitors, newborns/nursing mothers, caution with glaucoma

Onset/Duration: Onset: 5-15min with max effects in 1-3 hr and Duration: 6-12 hr

Dose/Route:

Adult: 25-50mg IV/IM with a max of 400 mg/day

Peds: 1mg/kg IV with a max of 300 mg/day

Side Effects: Drowsiness, palpitations, hypotension, tachycardia or bradycardia, disturbed coordination, dry mouth/throat

Note: Use with caution in CNS depressed pt's and pt's with lower respiratory tract diseases such as asthma

Dopamine (Inotropin)

Class: Sympathomimetic, vasopressor

Action: Acts primarily on alpha 1 and beta 1 adrenergic receptors. At low doses (2-5 mcg/kg/min) may act on dopaminergic receptors causing renal, mesenteric, and cerebral vascular dilation. At moderate doses (5-10 mcg/kg/min) dopamine stimulates mostly beta 1 receptors causing increased cardiac contractility and output. At high doses (10-20 mcg/kg/min) dopamine has mostly alpha 1 stimulation effects causing peripheral arterial and venous constriction.

Indications: Hemodynamically significant hypotension in the absence of hypovolemia such as in cardiogenic shock, neurogenic shock, septic shock. Second line pharmacological treatment for bradycardia after atropine

Contraindications: Hypovolemia, trauma, tachydysrhythmias, VOFib, pt's with pheochromocytoma

Onset/Duration: Onset: 2-4 min and Duration: 10-15 min

Dose/Route:

Adult: 2-20 mcg/kg/min IV Drip and titrate to desired effect

Peds: Same as adult

Side Effects: Tachycardia, hypertension, anxiety, headache, nausea/vomiting, increased myocardial oxygen demand, mydriasis, dose-related tachydysrhythmias

Epinephrine (Adrenalin)

Class: Sympathomimetic

Action: Endogenous catecholamine that directly stimulates both alpha and beta 1 & 2 adrenergic receptors. The effects this will have on the heart include increased contractile force, increased rate, and increased cardiac output. Epinephrine is also a potent vasoconstrictor as well as a bronchodilator. Other effects include slowing of gastric motility, miosis, and pale skin.

Indications: Anaphylaxis, cardiac arrest, asthma, bradycardia (first line in peds, not adults), shock not caused by hypovolemia, severe hypotension accompanied with bradycardia when pacing and atropine fail.

Contraindications: Hypovolemic shock. Caution should be used in patients with known cardiovascular disease or pts >45 yo

Onset/Duration: Onset 1-2 min IV and 5-10 mins SQ with Duration: 5-10 min

Dose/Route:

Adult: Cardiac arrest - 1mg 1:10,000 IV/IO every 3-5 min with NO max.

Anaphylaxis/asthma – 0.3-0.5mg SQ/IM 1:1,000. If no response some protocols give 0.3-0.5mg IV 1:10,000. Post cardiac arrest or for bradycardia with severe hypotension – IV drip infusion 2-10 mcg/min and titrate to effect.

Peds: Cardiac arrest – 0.01 mg/kg 1:10,000 IV/IO max of 1 mg every 3-5 mins.

Anaphylaxis/asthma – 0.01 mg/kg 1:1,000 SQ/IM with a max single dose 0.3 mg.

Side Effects: Tachycardia, hypertension, anxiety, cardiac dysrhythmias, tremors, dyspnea

Note: Always use epinephrine 1:1,000 when given SQ/IM and 1:10,000 when given IV/IO. Due to severe complications associated with Epi IV drip infusion this is not typically done in the prehospital field.

Racemic Epinephrine (Micronefrin)

Class: Sympathomimetic

Action: Racemic Epinephrine is an inhaled version of epinephrine that is used as a bronchodilator and as an anti-inflammatory to treat laryngeal/tracheal swelling and edema. Its actions are the same as epinephrine but since it is inhaled it has both systemic and localized effects.

Indications: Laryngotracheobronchitis (croup), asthma, bronchospasms, laryngeal edema

Contraindications: Hypertension, epiglottitis. Use caution in patients with known cardiovascular disease and/or in pt's > 45 yo.

Onset/Duration: Onset: 5 min and Duration: 1-3 hr

Dose/Route:

Adult: Not usually given to adults. Contact medical control

Peds: All doses given via aerosolized neb. 0.25 ml of 0.1% solution diluted in 2.5 mL saline for pt's < 20 kg. 0.5ml of 0.1% solution diluted in 2.5 ml saline for pt's 20-40 kg. 0.75 ml of 0.1% solution diluted in 2.5 ml saline for pt's >40kg.

Side Effects: Tachycardia, hypertension, anxiety, cardiac dysrhythmias, tremors

Etomidate (Amidate)

Class: Anesthetic, hypnotic

Action: Etomidate is a very potent drug that acts on the central nervous system to produce a short lasting anesthesia with amnesic properties. Etomidate has very little effect on respiratory drive which makes it ideal for certain procedures.

Indications: Premedication prior to procedures such as endotracheal intubation, synchronized cardioversion, conscious sedation for bone dislocation relocation.

Contraindications: Hypersensitivity, labor/delivery

Onset/Duration: Onset: < 1 min and Duration 5-10 min

Dose/Route:

Adult: 0.3mg/kg IV over 30-60 secs limited to one dose

Peds: 0.3mg/kg IV over 30-60 secs with a max dose of 20 mg

Side Effects: Hypotension, hypertension, dysrhythmias, hypoventilation, nausea/vomiting, cortisol suppression

Note: Primarily used for Rapid Sequence Intubation/induction (RSI) in the prehospital setting

Fentanyl (Sublimaze)

Class: Synthetic Opioid analgesic

Action: Combines with the receptor sites in the brain to produce potent analgesic effects.

Indications: Pain and sedation

Contraindications: hypersensitivity to opiates, hypotension, head injury, respiratory depression, cardiac dysrhythmias, myasthenia gravis

Onset/Duration: Onset 1-2 min IV and Duration 30-60 min

Dose/Route:

Adult: 0.5 – 2 mcg/kg IV/IN over 2 mins with a max typically of 100 mcg per dose.
Typically total max dose of 300 mcg.

Peds: 0.5 – 1 mcg/kg IV/IN over 2 mins with a max typically of 100 mcg per dose. Max total dose of 3 mcg/kg.

Side Effects: Respiratory depression, hypotension or hypertension, bradycardia, nausea/vomiting, and rigidity of chest wall muscles

Flumazenil (Romazicon)

Class: Benzodiazepine antagonist, antidote

Action: Flumazenil antagonizes the actions of benzodiazepines in the CNS.

Indications: Reversal of respiratory depression and sedation caused from benzodiazepine overdose

Contraindications: Hypersensitivity, Tricyclic antidepressant overdose, chronic benzodiazepine users or alcoholics, cocaine or other stimulant intoxication, and caution with known seizure disorder

Onset/Duration: Onset: 1-2 min and Duration: Related to amount of benzodiazepine absorbed

Dose/Route:

Adult: 0.2mg IV over 15 sec, may repeat at 0.3mg IV over 30 sec, then 0.5mg IV over 30 secs given at 1 min intervals until adequate response or a max dose of 3 mg given

Peds: Not recommended in the pre-hospital setting

Side Effects: Seizures, nausea/vomiting, dizziness, headache, agitation, abnormal vision

Furosemide (Lasix)

Class: Loop diuretic

Action: Furosemide is a potent diuretic that inhibits the reabsorption of sodium and chloride in the proximal tubule and loop of Henle. IV doses can also reduce cardiac preload by increasing venous capacitance.

Indications: Pulmonary edema (CHF) with SBP>90, hypertensive emergencies, hyperkalemia

Contraindications: Anuria, hypersensitivity, hypovolemia, hypokalemia

Onset/Duration: Onset: 15-20 min IV and Duration: 2 hrs

Dose/Route:

Adult: 0.5 - 1mg/kg IV over 1-2 min. If no response double dose to 2 mg/kg over 1-2 min. Most services allow up to a max of 40-80 mg IV.

Peds: 1mg/kg/dose IV over 1-2 min with a total max of 6 mg/kg

Side Effects: Tinnitus (if given too quickly), hypotension, hypokalemia, hyponatremia, hypocalcemia, hyperglycemia

Note: MUST GIVE SLOWLY OR MAY CAUSE PERMANENT HEARING PROBLEMS

Glucagon

Class: Pancreatic hormone

Action: Glucagon stimulates the breakdown of glycogen to glucose resulting in an increase in an increase in blood glucose.

Glucagon also has a positive inotropic action on the heart even in the presence of beta blockade or calcium channel blockade which makes it useful for beta blocker or calcium channel blocker overdose.

Glucagon also relaxes smooth muscle of the GI tract, primarily the esophagus which makes it useful for esophageal obstruction.

Indications: Hypoglycemia (when IV access is not available), beta blocker overdose, calcium channel blocker overdose, esophageal obstruction

Contraindications: Hypersensitivity (usually to proteins)

Onset/Duration: Onset: 10-20 min IM and 1 min if IV. Duration: 60-90 min

Dose/Route:

Adult: Hypoglycemia – 0.5-1 mg IM may repeat in 10 min if protocol allows. Calcium channel or beta blocker overdose – 3-10 mg IV over 3-5 min followed by an infusion at 3-5 mg/hr

Peds: Used for peds >20 kg at 0.5-1.0 mg IM.

Side Effects: Tachycardia, hypotension, nausea/vomiting, urticaria

Note: Glucagon requires glycogen stores in the liver to increase blood glucose. If patient is malnourished glucagon may not work.

Haloperidol (Haldol)

Class: Antipsychotic/neuroleptic

Action: Blocks dopamine type 2 receptors in the brain altering mood and behavior.

Indications: Acute psychotic episodes, emergency sedation of severely agitated or delirious pt's

Contraindications: Hypersensitivity, CNS depression, pregnancy, Parkinson's disease, seizure disorder, liver or cardiac disease

Onset/Duration: Onset 30-60 min IM and Duration 12-24 hr

Dose/Route:

Adult: 2-5mg IM/IV every 4-8 hr as needed

Peds: Not recommended

Side Effects: Dystonia or EPS reactions, hypotension, pseudoparkinsonism, nausea/vomiting, akathisia, blurred vision

Ipratropium (Atrovent)

Class: Anticholinergic, bronchodilator

Action: Ipratropium blocks interaction of acetylcholine at receptor sites on bronchial smooth muscle resulting in bronchodilation, reduced mucus production, decreased levels of cyclic guanosine monophosphate.

Indications: Persistent bronchospasms, asthma, COPD exacerbation

Contraindications: Hypersensitivity to Ipratropium, atropine, soybean protein, or peanuts

Onset/Duration: Onset: 5-15 min and Duration: 4-6 hr

Dose/Route:

Adult: 500 mcg diluted in 3ml saline via nebulizer. May repeat dose once per most protocols

Peds: Not typically given prehospital. 250-500 mcg diluted in 3ml saline via neb every 20 mins up to 3 doses

Side Effects: Mydriasis, tachycardia, blurred vision, nausea/vomiting, headache, anxiety, blurred vision.

Ketamine (Ketalar)

Class: Nonbarbituate anesthetic

Action: Acts on the limbic system and cortex to block afferent transmission of impulses associated with pain perception. It produces short-acting amnesia without muscular relaxation. A derivative of phencyclidine (PCP).

Indications: Pain control and sometimes used as an adjunct to nitrous oxide

Contraindications: Stroke, increased intracranial pressure, severe hypertension, cardiac instability

Onset/Duration: Onset: 30 sec and Duration: 5-10 min

Dose/Route:

Adult: 1-2 mg/kg IV over 1 min or 4-5 mg/kg IM

Peds >2yo: 1-2 mg/kg IV over 1 min or 3-5 mg/kg IM

Side Effects: Hypertension, increased heart rate, hallucinations, delusions, explicit dreams, respiratory depression

Note: Common street use these days in conjunction with narcotics because they potentiate each other for a longer/higher euphoria. Giving Narcan will only affect the narcotic NOT the Ketamine therefore only a minimal short-lasting effect.

Lidocaine (Xylocaine)

Class: Class 1B Antidysrhythmic

Action: Lidocaine is a sodium channel blocker that acts primarily on the ventricles of the heart during phase 4 diastolic depolarization which decreases automaticity, suppresses premature ventricular complexes, and raises the V-Fib threshold.

Indications: Significant ventricular ectopy with ischemia/MI, pulseless V-tach or V-Fib cardiac arrest, stable V-Tach with a pulse

Contraindications: Hypersensitivity, prophylactic use in an acute MI, 2nd or 3rd degree heart block in the absence of a pacemaker, Stokes-Adams syndrome

Onset/Duration: Onset: 30-90 secs and Duration: 10-20 min

Dose/Route:

Adult: Cardiac arrest - 1-1.5mg/kg IV/IO bolus may be repeated in 5-10 mins with a total max of 3mg/kg. Bolus is followed by a maintenance infusion drip of 1-4mg/min post-cardiac arrest. For PVC's or V-Tach with a pulse – 0.5-0.75 mg/kg IV/IO up to 1-1.5 mg/kg IV/IO and may be repeated with a total max dose of 3 mg/kg

Peds: 1mg/kg IV/IO bolus followed by maintenance infusion drip of 20-50 mcg/kg/min IV/IO post-cardiac arrest. For PVC's or V-tach with a pulse 1 mg/kg IV/IO.

Side Effects: Blurred vision, dizziness, hypotension, bradycardia, seizures, altered LOC

Note: Use caution in patients with impaired liver/renal function and the elderly. May half dose initial dose for pts >70 yo

Magnesium Sulfate

Class: Electrolyte, anticonvulsant

Action: Reduces striated muscle contractions and blocks peripheral neuromuscular transmission by reducing acetylcholine release at the myoneural junction.

Indications: Seizures due to eclampsia after seizure activity is stopped, torsades de pointes, unstable V-Tach attributed to digitalis toxicity, hypomagnesemia, status asthmaticus not responsive to beta-adrenergic drugs

Contraindications: Any heart block or myocardial damage, hypotension

Onset/Duration: Onset: Immediate IV and Duration: 30 min IV

Dose/Route:

Adult: Pulseless arrest (hypomagnesemia and torsades de pointes) and status asthmaticus – 1-2 g IV/IO diluted in 10 ml D5W. Torsades de pointes or hypomagnesemia WITH A PULSE – 1-2 g in 100ml D5W over 5-60 min IV. Eclampsia – 1-4 g IV with a max dose of 30-40 g/day

Peds: Pulseless arrest or hypomagnesemia/torsades with a pulse – 25-50 mg/kg IV/IO (max 2 g) over 10-20 mins. Status asthmaticus - 25-50 mg/kg IV/IO (max 2 g) over 15-30 mins

Side Effects: Hypotension, facial flushing, hyporeflexia (decreased reflexes), bradycardia, respiratory depression, diaphoresis

Note: If overdose is suspected (usually by decreased deep tendon reflexes) may give calcium chloride or calcium gluconate to reverse effects.

Methylprednisolone (Solu-Medrol)

Class: Corticosteroid, Glucocorticoid

Action: Synthetic steroid that suppresses acute and chronic inflammation. Additionally is also potentiates vascular smooth muscle relaxation by beta-adrenergic agonists and may alter airway hyperactivity.

Indications: Anaphylaxis, asthma unresponsive to bronchodilators, acute spinal cord injury, adrenal insufficiency

Contraindications: Caution in pt's with GI bleeding, diabetes, severe infection

Onset/Duration: Onset: 1-2 hrs and Duration: 8-24 hours

Dose/Route:

Adult: 40-125mg IV (higher doses in spinal injury per medical control)

Peds: 1-2mg/kg IV

Side Effects: hypertension, hypokalemia, headache, alkalosis, sodium and water retention

Note: Use in spinal injury is controversial

Metoprolol (Lopressor)

Class: Beta blocker

Action: Blocks beta-adrenergic receptor sites in the heart, lungs and blood vessels. The beta 1 blocking action on the heart decreases heart rate, conduction velocity, myocardial contractility, and cardiac output. The beta 2 effects may cause bronchoconstriction.

Indications: Supraventricular tachycardia (SVT/PSVT), Atrial Fibrillation, Atrial Flutter, to reduce myocardial ischemia and damage in acute myocardial infarction/Unstable angina

Contraindications: Hemodynamically unstable pt's, CHF, decreased cardiac output, cardiogenic shock. Relative contraindications with 2nd or 3rd degree heart blocks, asthma, RAD, severe bradycardia, and SBP<100

Onset/Duration: Onset: 1-2 min and Duration: 3-4 hours

Dose/Route:

Adult: 5 mg slow IV at 5 min intervals and may repeat up to 15mg max.

Peds: Not recommended in prehospital setting

Side Effects: Bradycardia, hypotension, AV conduction delays, palpitations

Note: If given concurrently with calcium channel blockers, such as verapamil and cardizem, may cause severe hypotension. Caution in pt's with liver/renal dysfunction.

Midazolam (Versed)

Class: Benzodiazepine

Action: A water soluble benzodiazepine that increases the activity of GABA, thereby producing a sedative effect, relaxing skeletal muscles, and inducing sleep plus has amnesic properties.

Indications: Seizures, anxiety. Premedication for intubation, cardioversion or conscious sedation procedures

Contraindications: Hypersensitivity, hypotension, respiratory depression, alcohol intoxication, depressed VS, use of any CNS depressants to include, but not limited to, barbiturates, alcohol, and narcotics.

Onset/Duration: Onset: 1-3 min IV and Duration: 2-6 hours IV

Dose/Route:

Adult: 2-5mg IV over 1-2 mins or 0.07mg/kg IM with a max of 7 mg

Peds: 0.1-0.2mg/kg IV over 1-2 mins or IM if needed with a max of 5 mg

Side Effects: Hypotension, respiratory depression or arrest, CNS depression, hiccups, oversedation, blurred vision

Note: May be given IM since Midazolam is water based; should be given with analgesic for painful procedures

Morphine Sulfate

Class: Opioid analgesic

Action: Morphine is a natural opioid analgesic. Morphine also causes venous dilation and decreased venous return to the heart thus reducing myocardial oxygen demand. Morphine also causes euphoria, central nervous system depression and sedation.

Indications: Acute pain, chest pain associated with ACS, pulmonary edema

Contraindications: Hypersensitivity to narcotics, CNS depression, respiratory depression, hypotension, hypovolemia, altered mental status, head injury, respiratory depression, pt's that took MAO inhibitors in last 14 days, and caution with pt's with RV infraction/MI

Onset/Duration: Onset: 1-2 min and Duration: 2-7 hr

Dose/Route:

Adult: 2-5mg IV repeat every 5-10min as needed

Peds: 0.1-0.2 mg/kg IV max total dose of 15 mg

Side Effects: Hypotension, CNS depression, tachycardia, respiratory depression

Note: Phenothiazines may potentiate morphine. Narcan for Morphine overdoses.

Naloxone (Narcan)

Class: Opioid antagonist

Action: Narcan is a competitive opiate antagonist used in known or suspected opiate overdose.

Indications: Suspected or known opioid overdose with respiratory depression.

Contraindications: Hypersensitivity. Caution with narcotic dependent pt's who may experience withdrawal syndrome to include neonates of narcotic-dependent mothers. Avoid use with Meperidine induced seizures

Onset/Duration: Onset: 2 min and Duration: 30-60 min

Dose/Route:

Adult: 0.4 – 2mg IV/IO/IM/ET may repeat up to 10 mg max

Peds: 0.1mg/kg IV/IO/ET with a max of 2mg per dose

Side Effects: Nausea/vomiting, hypertension, tachycardia, seizures, blurred vision,

Note: Titrate to control airway and breathing, should NOT be used to completely reverse narcotic effects due to complications with withdrawal syndrome, combativeness, etc.

Nitroglycerin (Nitro-Stat)

Class: Nitrate, Vasodilator

Action: Nitroglycerin is an organic nitrate and potent vasodilator. It relaxes vascular smooth muscle resulting in coronary artery dilation while also reducing blood pressure, preload, afterload, and myocardial oxygen demand.

Indications: Chest pain, acute coronary syndromes (ACS), pulmonary edema associated with CHF, hypertensive emergencies

Contraindications: Hypersensitivity, pt's that have taken erectile dysfunction drugs (Cialis, Levitra, Viagra, etc.) within the last 24-72 hours, head injury, systolic bp <100, cerebral stroke or hemorrhage, extreme bradycardia or tachycardia, Rt ventricular infarction, volume depletion

Onset/Duration: Onset 1-3 min and Duration 30-60 min

Dose/Route:

Adult: 0.4 mg SL or spray may administer up to three total doses for 1.2 mg

Peds: Not recommended in prehospital setting

Side Effects: Headache, hypotension, palpitations, dizziness, reflex tachycardia, nausea/vomiting, postural syncope, diaphoresis, sublingual burning sensation

Note: Ntg must be kept in an airtight container and, if exposed to light, air or heat, it decomposes which is why most pt's own prescription doesn't relieve their symptoms since pt's need to refill every 30 days if opened/used.

Nitro-Paste (Nitro-Bid Ointment)

Class: Vasodilator, Nitrate

Action: Nitroglycerin is an organic nitrate and potent vasodilator. It relaxes vascular smooth muscle resulting in coronary artery dilation while also reducing blood pressure, preload, afterload, and myocardial oxygen demand.

Indications: Typically given for ACS and chest pain with an associated acute myocardial infarction

Contraindications: Hypersensitivity, pt's that have taken erectile dysfunction drugs (Cialis, Levitra, Viagra, etc.) within the last 24-72 hours, head injury, systolic bp <100, cerebral stroke or hemorrhage, extreme bradycardia or tachycardia, Rt ventricular infarction, volume depletion

Onset/Duration: Onset 15-60 min and Duration 2-12 hr

Dose/Route:

Adult: 1-2 inches applied to skin (usually the chest) that is free of hair. Applied with Nitro-Paste paper or other transdermal application paper/tape

Peds: Not recommended in the prehospital setting

Side Effects: Headache, hypotension, palpitations, dizziness, reflex tachycardia, nausea/vomiting, postural syncope, diaphoresis, sublingual burning sensation

Note: Nitro-Paste contains 2% nitroglycerin in an absorbent paste and is applied to the pt's skin to be absorbed through the skin (transdermal). Typically paste is administered in the pre-hospital setting during longer ground transport times.

Nitrous Oxide (Nitronox)

Class: Gaseous analgesic, anesthetic

Action: Nitrous Oxide is a blended mixture of 50% nitrous oxide and 50% oxygen. When inhaled it depresses the CNS causing anesthesia. Due to be administered with high oxygen concentrations it also increases oxygen tension in the blood thereby reducing hypoxia.

Indications: Traumatic musculoskeletal injury, burns, moderate to severe pain

Contraindications: Altered LOC, hypotension, chest trauma (pneumothorax), COPD, Abdominal pain or injury, head injury, bowel obstruction

Onset/Duration: Onset: 2-5 min and Duration: 2-5 min

Dose/Route:

Adult: Self administered by pt via held mask or mouthpiece until effects are felt

Peds: Same as adult

Side Effects: Altered LOC, dizziness, nausea/vomiting, malignant hypertension (rare but serious)

Note: Must be mixed 50% Nitrous Oxide and 50% Oxygen, If 100% Nitrous Oxide is administered the patient will become hypoxic and die. Pt MUST be able to hold mask/mouthpiece on their own to administer!

Ondansetron (Zofran)

Class: Antiemetic

Action: First selective serotonin blocking agent to be marketed. Blocks the serotonin 5-HT₃ receptors that are found centrally in the chemoreceptor trigger zone and peripherally at the vagal nerve terminals in the intestines which in turn minimizes nausea and vomiting.

Indications: Nausea and vomiting

Contraindications: Hypersensitivity, GI obstruction, and use caution with liver disease pt's

Onset/Duration: Onset: 15-30 min and Duration: 3-6 hr

Dose/Route:

Adult: 4mg IV/IO/IM

Peds: 0.15mg/kg IV/IO/IM – use in children still controversial

Side Effects: Generally well tolerated but can cause ECG irregularities (rare), dizziness, headache, hiccups, pruritus, chills, drowsiness

Oxygen (O₂)

Class: Gas

Action: Odorless, tasteless, colorless gas that is present in room air at 21% concentration. Oxygen enters the body through the respiratory system and is transported to the body tissues for energy. Emergency use to reverse hypoxemia and, in doing so, helps oxidize glucose to produce adenosine triphosphate (aerobic metabolism).

Indications: Hypoxia, hypoperfusion, ischemic chest pain, respiratory insufficiency, suspected stroke, confirmed/suspected carbon monoxide poisoning, cardiac insufficiency or arrest

Contraindications: None in the prehospital emergency setting

Onset/Duration: Onset: Immediate and Duration: Less than 2 min

Dose/Route:

Adult: 1-4 lpm via nasal cannula and 10-15 lpm via nonrebreather mask

Peds: Same as adult but using age appropriate sized devices

Side Effects: nausea/vomit, irritation to respiratory tract

Note: Administer and titrate to maintain a minimum SpO₂ of 94%

Oxytocin (Pitocin)

Class: Hormone

Action: Oxytocin is a natural hormone secreted by the posterior pituitary gland. Oxytocin promotes contraction of the uterus and promotes milk ejection.

Indications: Post-partum hemorrhage

Contraindications: Hypersensitivity, baby hasn't delivered

Onset/Duration: Onset immediate; Duration 1 hour

Dose/Route: Adult: 40 units diluted in 1000 mL Normal Saline titrated to control bleeding

Peds: Not recommended

Side Effects: Hypotension, tachycardia, chest pain/coronary artery spasm, cardiac dysrhythmias, hypertension

Pralidoxime (2-Pam)

Class: Cholinesterase reactivator and antidote

Action: Pralidoxime reactivates the enzyme acetylcholinesterase which allows acetylcholinesterase to be degraded, thus relieving the parasympathetic overstimulation caused by excess acetylcholine as seen in organophosphate poisoning.

Indications: Organophosphate poisoning

Contraindications: Hypersensitivity

Onset/Duration: Onset: within minutes and Duration: Variable depending on amount poison exposed to

Dose/Route:

Adult: 600mg IM or 1-2 g IV over 15-30 min

Peds: 20-50mg/kg IV over 15-30 min

Side Effects: Tachycardia, hypertension, laryngospasm, hyperventilation, nausea, weakness

Note: Should be given concurrently with Atropine. Commonly seen in the prehospital setting packaged with atropine in DuoDote or Mark 1 autoinjector kits.

Procainamide

Class: Antidysrhythmic (Class 1A)

Action: Suppresses phase 4 depolarization in normal ventricular muscle and Purkinje fibers, reducing the automaticity of ectopic pacemakers. Suppress reentry dysrhythmias by slowing intraventricular conduction.

Indications: Stable V-Tach, reentry SVT not controlled by adenosine/vagal maneuvers, A-Fib with a rapid rate with WPW syndrome

Contraindications: 2nd & 3rd degree heart blocks without a functioning artificial pacemaker in place, digitalis toxicity, torsades de pointes, tricyclic antidepressant overdose

Onset/Duration: Onset: 10-30 min and Duration: 3-6 hr

Dose/Route:

Adult: 20 mg/min slow IV infusion drip with a total dose of 17 mg/kg. Maintenance drip post cardiac arrest of 1 gm in 250 ml D5W or NS and infuse at 1-4 mg/min

Peds: loading dose 15 mg/kg IV/IO and infuse over 30-60 min

Side Effects: Hypotension, bradycardia, reflex tachycardia, AV block, widening QRS complex, prolonged P-R or QT interval, PVC's, V-Tach/V-Fib/Asystole, seizures, CNS depression

Note: Stop use IMMEDIATELY for the following: reached max of 17 mg/kg, QRS widens >50%, dysrhythmia resolves, and pt becomes hypotensive

Promethazine (Phenergan)

Class: Phenothiazine, antihistamine, antiemetic

Action: Promethazine is an H1 receptor antagonist that blocks the actions of histamine by competitive antagonism at the H1 receptor. Promethazine also acts as an antiemetic and sedative agent with some anticholinergic properties.

Indications: Nausea and vomiting, motion sickness, to potentiate the effects of analgesics, pre/post Op obstetrical sedative, allergic reactions

Contraindications: Hypersensitivity, CNS depression or coma, CNS depression from alcohol, barbiturates, or narcotics, signs associated with Reyes syndrome. Use with caution in pt's with asthma, peptic ulcer disease, and bone marrow depression.

Onset/Duration: Onset: Rapid by IV and Duration 4-6 hr

Dose/Route:

Adult: 12.5 – 25mg IV diluted in 10cc Normal Saline with doses of 25 mg or less given over 10-15 min. IM doses can be given undiluted

Peds: Not recommended in prehospital setting since can cause hallucinations, seizures, and death in children

Side Effects: Sedation, dizziness, hypotension, dystonias/EPS reaction, hallucinations, dysrhythmias, phlebitis, hyperexcitability

Note: If dystonias/EPS reaction occurs administer Diphenhydramine.

Sodium Bicarbonate

Class: PH buffer, alkalizing agent, electrolyte supplement

Action: Sodium bicarbonate is a short acting, potent acid buffer. The bicarbonate (HCO_3) binds to hydrogen ions (H^+) to make carbonic acid (H_2CO_3). This is broken down in the lungs and exhaled as water (H_2O) and carbon dioxide (CO_2). As a plasma hydrogen ion concentration decreases causing blood pH to rise.

Indications: Tricyclic antidepressant (TCA) overdose, management of metabolic acidosis, prolonged cardiac arrest down time, known preexisting hyperkalemia, DKA, alkalinization treatment for specific intoxications/rhabdomyolysis

Contraindications: Hypokalemia, suspected metabolic and respiratory alkalosis, hypokalemia, hypernatremia, pt's with chloride loss due to vomiting and GI suction, severe pulmonary edema

Onset/Duration: Onset: 2-10 min and Duration 30-60 min

Dose/Route:

Adult: 1mEq/kg IV

Peds: Same as adult but infuse slowly and only if ventilations are adequate

Side Effects: Metabolic alkalosis, seizures

Note: Should not be given at the same time as other electrolytes, be sure to flush IV thoroughly or use separate IV sites. Not recommended for and ineffective in hypercarbic acidosis such as seen in cardiac arrest and CPR without intubation

Succinylcholine (Anectine)

Class: Depolarizing neuromuscular blocker

Action: Succinylcholine is a short acting, depolarizing neuromuscular blocking agent that binds to acetylcholine receptor sites. This produces complete muscle paralysis but since it is a depolarizing agent it causes fasciculations and muscular contractions making it the drug of choice for rapid sequence induction aka chemically assisted endotracheal intubation.

Indications: To facilitate endotracheal intubation, terminate laryngospasm, muscle relaxation

Contraindications: Hypersensitivity, burns or trauma in the first 12 hr, skeletal muscle myopathies, inability to control the airway or support ventilations with O2 and positive pressure (BVM), family or personal history of malignant hyperthermia, allergic reaction, rhabdomyolysis, narrow-angle glaucoma or intraocular (global rupture) injuries. Use with caution in pt's that may have hyperkalemia (renal failure, trauma/burns, crush injury etc.) since use of Succs can exacerbate potassium levels.

Onset/Duration: Onset: less than 1min and Duration: 5-10 min

Dose/Route:

Adult: 1-1.5 mg/kg IV/IO for RSI

Peds: 1-1.5mg/kg IV/IO for RSI

Infants: 2 mg/kg IV/IO for RSI

Side Effects: Fasciculations, bradycardia, hypotension, tachycardia, hypertension, dysrhythmias, malignant hyperthermia, hyperkalemia, respiratory depression, excessive salivation, hyperkalemia

Note: Although after administering Succinylcholine it may appear that the patient is not conscious, Succs has NO effect on the central nervous system, so the patient will be completely aware of procedures unless appropriate sedation is also given.

Thiamine (Betaxin)

Class: Vitamin (B1)

Action: Thiamine is also known as vitamin B1. Thiamine combines with adenosine triphosphate to form thiamine pyrophosphate, a coenzyme necessary for carbohydrate metabolism. The brain is especially sensitive to thiamine deficiency.

Indications: Hypoglycemia with malnourishment or suspected alcoholism, delirium tremors, Wernicke's encephalopathy

Contraindications: None in the emergency prehospital setting

Onset/Duration: Onset: Rapid by IV, 5-15 min if given IM and Duration: variable depending on degree of deficiency

Dose/Route:

Adult: 100mg slow IV or IM

Peds: Not recommended in the prehospital setting

Side Effects: Hypotension (if given rapidly or too large a dose), nausea/vomiting, anxiety, diaphoresis

Vasopressin (Pitressin)

Class: Naturally occurring antidiuretic hormone, vasopressor

Action: Directly stimulates smooth muscle of V1 receptors. When given in high doses it acts as a nonadrenergic peripheral vasoconstrictor.

Indications: Cardiac arrest as an alternative to either the 1st or 2nd dose of Epinephrine, vasodilatory shock

Contraindications: None for cardiac arrest. Coronary artery disease in responsive pt's

Onset/Duration: Onset: immediate and Duration: variable depending on cause of cardiac arrest

Dose/Route:

Adult: 40 units IV/IO in Cardiac arrest replacing with the 1st or 2nd dose of Epinephrine

Peds: Not recommended typically but can be given at 0.4-1.0 unit/kg IV/IO

Side Effects: Hypertension, tachycardia, ischemic chest pain, abdominal distress, diaphoresis, nausea and vomiting, bronchial contraction, uterine contractions, tremors

Note: May increase peripheral vascular resistance and provoke cardiac ischemia and angina so NOT recommended for pt's with coronary artery disease (CAD).