Florida Regional Common

EMS Protocols

Section 5

Drug Section

Revised, October 24, 2013
**Drug Summary Section Table of Contents**

<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.1</td>
<td>Adenosine Triphosphate (Adenocard®)</td>
</tr>
<tr>
<td>5.2</td>
<td>Albuterol (Proventil®, Ventolin®)</td>
</tr>
<tr>
<td>5.3</td>
<td>Amiodarone Hydrochloride (Cordarone®)</td>
</tr>
<tr>
<td>5.4</td>
<td>Amyl Nitrate</td>
</tr>
<tr>
<td>5.5</td>
<td>Aspirin</td>
</tr>
<tr>
<td>5.6</td>
<td>Atropine</td>
</tr>
<tr>
<td>5.6.1</td>
<td>Atropine Sulfate as Cardiac Agent</td>
</tr>
<tr>
<td>5.6.2</td>
<td>Atropine Sulfate as Antidote for Poisonings</td>
</tr>
<tr>
<td>5.7</td>
<td>Calcium Chloride 10%</td>
</tr>
<tr>
<td>5.8</td>
<td>Calcium Gluconate</td>
</tr>
<tr>
<td>5.9</td>
<td>Dextrose 50% and 25% (Glucose)</td>
</tr>
<tr>
<td>5.10</td>
<td>Diastat</td>
</tr>
<tr>
<td>5.11</td>
<td>Diltiazem Hydrochloride (Cardizem®)</td>
</tr>
<tr>
<td>5.12</td>
<td>Diphenhydramine Hydrochloride (Benadryl®)</td>
</tr>
<tr>
<td>5.13</td>
<td>Dopamine Hydrochloride (Intropin®)</td>
</tr>
<tr>
<td>5.14</td>
<td>Epinephrine</td>
</tr>
<tr>
<td>5.14.1</td>
<td>Epinephrine 1:1000</td>
</tr>
<tr>
<td>5.14.2</td>
<td>Epinephrine 1:10,000</td>
</tr>
<tr>
<td>5.15</td>
<td>Etomidate (Amidate)</td>
</tr>
<tr>
<td>5.16</td>
<td>Glucagon</td>
</tr>
<tr>
<td>5.17</td>
<td>Haloperidol (Haldol®)</td>
</tr>
<tr>
<td>5.18</td>
<td>Hurricane Spray</td>
</tr>
<tr>
<td>5.19</td>
<td>Hydroxocobalamin (Cyanokit®)</td>
</tr>
<tr>
<td>5.20</td>
<td>Ipratropium Bromide (Atrovent®)</td>
</tr>
<tr>
<td>5.21</td>
<td>Labetalol Hydrochloride (Normodyne®, Trandate®)</td>
</tr>
<tr>
<td>5.22</td>
<td>Furosemide (Lasix®)</td>
</tr>
<tr>
<td>5.23</td>
<td>Lidocaine Hydrochloride</td>
</tr>
<tr>
<td>5.24</td>
<td>Magnesium Sulfate</td>
</tr>
<tr>
<td>5.25</td>
<td>Methylene Blue</td>
</tr>
<tr>
<td>5.26</td>
<td>Midazolam (Versed®)</td>
</tr>
<tr>
<td>5.27</td>
<td>Morphine Sulfate (MS)</td>
</tr>
<tr>
<td>5.28</td>
<td>Naloxone Hydrochloride (Narcan®)</td>
</tr>
<tr>
<td>5.29</td>
<td>Nitroglycerin</td>
</tr>
<tr>
<td>5.29.1</td>
<td>Nitroglycerin (Nitrostat®, Nitrolingual® Spray)</td>
</tr>
<tr>
<td>5.29.2</td>
<td>Nitroglycerin (Nitro-Bid Ointment®)</td>
</tr>
<tr>
<td>5.30</td>
<td>Nitrous Oxide 50% Blended in Oxygen (Nitronox®)</td>
</tr>
<tr>
<td>5.31</td>
<td>Oral Glucose (Glutose®, Insta-Glucose)</td>
</tr>
<tr>
<td>5.32</td>
<td>Clopidogrel Bisulfate (Plavix®)</td>
</tr>
<tr>
<td>5.33</td>
<td>Pralidoxime (2-PAM®, Protopam Chloride®)</td>
</tr>
<tr>
<td>5.34</td>
<td>Sodium Bicarbonate 8.4% and 4.2%</td>
</tr>
<tr>
<td>5.35</td>
<td>Sodium Nitrite</td>
</tr>
<tr>
<td>5.36</td>
<td>Sodium Thiosulfate</td>
</tr>
<tr>
<td>5.37</td>
<td>Methylprednisolone (Solu-Medrol®)</td>
</tr>
<tr>
<td>5.38</td>
<td>Succinylcholine Chloride (Anectine®)</td>
</tr>
<tr>
<td>5.39</td>
<td>Terbutaline</td>
</tr>
<tr>
<td>5.40</td>
<td>Tetracaine Hydrochloride 0.5% Eye Drops</td>
</tr>
<tr>
<td>5.41</td>
<td>Ketorlac Tromethamine (Toradol®)</td>
</tr>
</tbody>
</table>
5.42 Acetaminophen (Tylenol®)
5.43 Vasopressin
5.44 Vecuronium Bromide (Norcuron®)
5.45 Zofran (Ondansetron Hydrochloride)
5.1 Adenosine Triphosphate (Adenocard®)

**CLASS**
Antiarrhythmic agent, Endogenous nucleotide

**ACTIONS**
Adenosine exerts its effects by decreasing conduction through the AV node. The half-life of Adenocard (Adenosine) is less than 15 seconds.

**INDICATIONS**
Adenocard is indicated for supraventricular tachycardia (PSVT), including that associated with accessory bypass tracts (Wolf-Parkinson-White Syndrome). When appropriate vagal maneuvers should be attempted prior and post Adenocard administration if needed.

**CONTRAINDICATIONS**
Adenocard is contraindicated in second- or third degree AV block and sick sinus syndrome (except in patients with a functioning artificial pacemaker), and known hypersensitivity to adenosine.

**PRECAUTIONS**
The effects of adenosine are antagonized by methylxanthines such as caffeine and theophylline. Thus larger doses may be required for adenosine to be effective in patients who have taken methylxanthines. Adenosine effects are potentiated by dipyridamole (Persantine™). Thus, smaller doses of adenosine may be effective in those who have taken this drug. Adenosine may produce bronchoconstriction in patients with asthma.

**ADVERSE REACTIONS AND SIDE EFFECTS**
- Cardiovascular: Facial flushing, headache, and rarely: sweating, palpitations, chest pain, and hypotension.
- Respiratory: Shortness of breath, chest pressure, and rarely: hyperventilating, metallic taste, tightness in throat and head pressure.
- CNS: Light headedness and rarely: dizziness, blurred vision, tingling and numbness in extremities, apprehension.

**WARNINGS**
Adenocard may produce a short-lasting first, second, or third degree heart block. In extreme cases, transient asystole may result. At the time of conversion to normal sinus rhythm, a variety of new rhythms may appear (PVC's, PAC's, sinus bradycardia, sinus tachycardia, skipped beats, and varying degrees of AV block) and generally last only a few seconds without intervention.

The effects of adenosine are antagonized by methylxanthines such as caffeine and theophylline. Thus, larger doses of adenosine may be required for adenosine to be effective. Adenosine effects are potentiated by dipyridamole (Persantine™). Thus, smaller doses of adenosine may be effective. Adenosine may produce bronchoconstriction in patients with asthma.
DOSAGE
Adult: 6 mg rapid IVP immediately followed by 20 ml NS flush. Repeat in 2 minutes at 12 mg IVP followed by 20 ml NS flush PRN. Repeat in 2 minutes at 12 mg IVP followed by 20 ml NS flush PRN.

Pediatric: 0.1 mg/kg (max. 6 mg) rapid IVP immediately followed by 5 ml NS flush. Repeat in 2 minutes, at 0.2 mg/kg (max. 12 mg) rapid IVP followed by 5 ml NS flush PRN. Repeat in 2 minutes, at 0.3 mg/kg (max. 12 mg) rapid IVP followed by 5 ml NS flush PRN.
5.2 Albuterol (Proventil®, Ventolin®)

**CLASS**
Sympathomimetic
Relatively selective beta-2 adrenergic bronchodilator

**ACTIONS**
Albuterol is primarily a beta-2 sympathomimetic and as such produces bronchodilation. Because of its greater specificity for beta-2 adrenergic receptors it produces fewer cardiovascular side effects and more prolonged bronchodilation than isoproterenol. Onset is within 15 minutes peaks in 60-90 minutes. Therapeutic effects may be active up to 5 hours.

**INDICATIONS**
Albuterol inhaler is indicated for relief of bronchospasm in patients with reversible obstructive airway disease including asthma.

**CONTRAINDICATIONS**
Albuterol is contraindicated in patients with a history of hypersensitivity.

**ADVERSE REACTIONS AND SIDE EFFECTS**
- Cardiovascular: Tachycardia, hypertension, and angina
- CNS: Nervousness, tremor, headache, dizziness, and insomnia.
- GI: Drying of oropharynx, nausea, and vomiting, unusual taste.

**WARNINGS**
Use cautiously in patients with coronary artery disease, hypertension, hyperthyroidism, and diabetes. Epinephrine should not be used subsequent to a failure of the other. Administer cautiously to patients on MAO inhibitors or tricyclic anti-depressants. Beta-Blockers and Albuterol will inhibit each other.

**DOSAGE**
If >1 year or >10 kg: add 2.5 mg of Albuterol mixed in 3 ml of NS (0.083%) to nebulizer and flow oxygen at 6-8 liters/min.

If <1 year or <10 kg: add 1.25 mg of Albuterol mixed in 1.5 ml of NS (0.083%) to nebulizer and flow oxygen at 3 liters/min.

**Treatment will be delivered over approximately 5 to 15 minutes.**
5.3 Amiodarone Hydrochloride (Cordarone®)

**CLASS**
Antiarrhythmic agent

**ACTIONS**
Amiodarone blocks sodium channels at rapid pacing frequencies and exerts a noncompetitive antisympathetic action. One of its main effects, with prolonged administration, is to lengthen the cardiac action potential. In addition, it produces a negative chronotropic effect in nodal tissues. Amiodarone blocks potassium channels, which contributes to slowing of conduction and prolongation of refractoriness. Its vasodilatory action can decrease cardiac workload and consequently myocardial oxygen consumption.

**INDICATIONS**
Indicated for initiation of treatment and prophylaxis of frequently recurring ventricular fibrillation, atrial fibrillation and hemodynamically unstable ventricular tachycardia in patient refractory to other therapy. Amiodarone may also be used to treat supraventricular tachycardia.

**CONTRAINDICATIONS**
Contraindicated in patients with known hypersensitivity to Amiodarone, or in patients with cardiogenic shock, marked sinus bradycardia, and second or third degree AV block. **Contraindicated in patients with iodine hypersensitivity.**

**WARNINGS**
May worsen existing or precipitate new dysrhythmia's, including torsades d pointes, and VF. Use with beta-blocking agents could increase risk of hypotension and bradycardia. Amiodarone inhibits atrioventricular conduction and decreases myocardial contractility, increasing the risk of AV block with verapamil or diltiazem or of hypotension with any calcium channel blocker. Use with caution with pregnancy and with nursing mothers.

**ADVERSE REACTIONS AND SIDE EFFECTS**
Adverse reactions include fever, bradycardia, CHF, cardiac arrest, hypotension, ventricular tachycardia, nausea, and abnormal liver function.

**DOSAGE**
**Adult:**
- Atrial Fib 150 mg IVIO in 50 ml D5W/NS over 10 minutes.
- May repeat 10 minutes after last drip was completed. (3 times)
- VT with pulse (stable) and SVT: 150 mg IV/IO in 50 ml D5W/NS over 10 minutes.
- May repeat every 10 minutes PRN.
- VT with pulse unstable: 1st dose 150mg IVP/IOP under 2 minutes - 2nd dose 150mg IV/IO in 50ml D5W/NS over 10 min.
- VF and pulseless VT: 300 mg IV/IO push.
DOSAGE (Continued)

Pediatric:
VT with a pulse and SVT: 5 mg/kg in 50 ml D5W / IV/IO over 20 minutes.
VF and pulseless VT: 5 mg/kg IV/IO push.
5.4 Amyl Nitrate

ACTIONS
In cyanide toxicity, nitrite ions combine with hemoglobin to form methemoglobin, which binds with cyanide and assists in cyanide elimination. Amyl nitrate converts hemoglobin (Fe^{2+}) into methemoglobin (Fe^{3+}), which binds with the cyanide.

INDICATIONS
Used initially in the management of cyanide toxicity.

CONTRAINDICATIONS
- Hypersensitivity to nitrates
- Intracranial pressure/closed head injury
- Cerebral hemorrhage

ADVERSE REACTIONS AND SIDE EFFECTS
- CNS: Headache, dizziness, weakness.
- CV: Orthostatic hypotension, tachycardia.
- GI: Nausea and vomiting.
- Blood: Methemoglobin.
- Other: Flammable, looks similar to ammonia inhalants.

DOSE
Adult: 0.2-0.3 mL inhaled for 15-30 seconds every 3-5 minutes, until sodium nitrite IV solution is available
CLASS
Platelet Aggregator Inhibitor, Anti-Inflammatory Agent
Salicylates

ACTIONS
Aspirin is an analgesic, anti-inflammatory and anti-pyretic, which also appears to cause an inhibition of synthesis and release of prostaglandins. Aspirin also blocks formation of thromboxane A 2. (Thromboxane A 2 causes platelets to aggregate and arteries to constrict). Reduces overall mortality from acute myocardial infarction.

INDICATIONS
Aspirin is indicated in the acute M.I. setting to prevent further clotting.

CONTRAINDICATIONS
Known allergy to Aspirin (e.g. asthma), active GI ulceration or bleeding, hemophilia or other bleeding disorders, during pregnancy, children under 2 years of age.

ADVERSE REACTIONS AND SIDE EFFECTS
• GI: Nausea, vomiting, heartburn, and stomach pain.
• OTIC: Tinnitus.
• Hypersensitivity: Bronchospasm, tightness in chest, angioedema, urticaria, and anaphylaxis.

WARNINGS
Contact physician for patients having a history of:
- asthma or seasonal allergies
- stomach ulcers
- liver disease
- kidney disease
- a bleeding or blood clotting disorder
- heart disease, high blood pressure, or congestive heart failure
- gout
- nasal polyps

DOSAGE
Adult: 324 mg chewable (4 tablets) for A.M.I.
(High doses may interfere with the benefits of aspirin)
5.6.1 Atropine Sulfate as a Cardiac Agent

**CLASS**
Anticholinergic, Vagolytic
Belladonna alkaloid, Cycloplegic mydriatic

**ACTIONS**
Atropine is a potent anti-cholinergic (parasympathetic blocker, parasympatholytic) that reduces vagal tone and thus increases automatically the SA node and increases A-V conduction.

**INDICATIONS**
Sinus Bradycardia accompanied by hemodynamic compromise, (e.g. hypotension; confusion; frequent PVC's; pales, cold, clammy skin). In infants (<6 months) bradycardia of less than 60 beats/minute should be treated even if BP is normal.

Pretreatment in pediatric intubations to prevent bradycardia

**CONTRAINDICATIONS**
None in emergency situations.

**ADVERSE REACTIONS AND SIDE EFFECTS**
- CNS: Restlessness, agitation, confusion, psychotic reaction, pupil dilation, blurred vision, and headache.
- Cardio: Increased heart rate, may worsen ischemia or increase area of infarction, ventricular fibrillation, ventricular tachycardia, angina, flushing of skin.
- GI: Dry mouth, difficulty swallowing.
- Other: Urinary retention. Worsened pre-existing glaucoma.

**WARNINGS**
Too small of a dose (< 0.5 mg) or if pushed too slowly, may initially cause the heart rate to decrease. Antihistamines and antidepressants potentiate atropine. A maximum dose of 0.04 mg/kg should not be exceeded. For 2nd degree AV block type II and 3rd degree AV block, omit Atropine and go to external pacer.

**DOSAGE**
Bradycardias: 0.5-1 mg IV, or 1-2 mg ET, may repeat every 3-5 minutes until improved or total of 0.04 mg/kg or 3 mg is reached.
Pediatric: 0.02 mg/kg IV or ET (minimum dose is 0.1 mg and maximum single dose is 0.5 mg child, 1 mg adolescent).
5.6.2  Atropine Sulfate as Antidote for Poisonings

**CLASS**
Anticholinergic, Vagolytic
Belladonna alkaloid, Cycloplegic mydriatic

**ACTIONS**
Atropine is a potent parasympatholytic that binds to acetylcholine receptors thus diminishing the actions of acetylcholine.

**INDICATIONS**
Anticholinesterase syndrome poisoning such as; Organophosphate (e.g. parathion, Malathion, rid-a-bug) and carbamate (Baygon, Sevin and many common roach & ant sprays). Signs of organophosphate poisoning are: Salivation, Lacrimation, Urination, Defecation, GI distress, Emesis, pinpoint pupils, bradycardia, and excessive sweating.

**CONTRAINDICATIONS**
None when used in the management of severe organophosphate poisoning.

**ADVERSE REACTIONS AND SIDE EFFECTS**
Victims of organophosphate poisoning can tolerate large doses (1000 mg) of Atropine. Signs of atropinization are the end point of treatment: flushing, pupil dilation, dry mouth, and tachycardia.

**WARNINGS**
It is important that the patient be adequately oxygenated and ventilated prior to using atropine as Atropine may precipitate ventricular fibrillation in a poorly oxygenated patient. Even after Atropine is administered, the patient may require intubation and aggressive ventilatory support.

**DOSAGE**
Adult: 0.03 mg/kg (2 mg) IV / IM, repeat q 5-10 minutes until atropinization occurs.
Pediatric: 0.05 mg/kg (max. 3 mg) IV, repeat q 5-10 minutes until atropinization occurs.
5.7 Calcium Chloride 10%

CLASS
Mineral, Calcium supplement, Electrolyte

ACTIONS
Calcium chloride increases the force of myocardial contraction; calcium may either increase or decrease systemic vascular resistance. In normal hearts, calcium's positive inotropic and vasoconstricting effects produce a predictable rise in systemic arterial pressure.

INDICATIONS
Calcium chloride is indicated during resuscitation for the treatment of hypocalcemia and calcium channel blocker toxicity (e.g. Verapamil or Cardizem overdose) and magnesium sulfate overdose. It also protects the heart from hyperkalemia as may occur in patients with end-stage renal disease.

CONTRAINDICATIONS
Cardiopulmonary arrest not associated with calcium channel blocker toxicity, hypocalcemia, or hyperkalemia.

ADVERSE REACTIONS AND SIDE EFFECTS
If the heart is beating, rapid administration of calcium can produce slowing of cardiac rate.

WARNINGS
Calcium chloride should not be administered in the same infusion with sodium bicarbonate, since calcium will combine with sodium bicarbonate to form an insoluble precipitate (calcium carbonate). Calcium chloride should be given with extreme caution, and in reduced dosage, to persons taking digitalis because it increases ventricular irritability and may precipitate digitalis toxicity.

DOSAGE
Adult: For hypotension following administration of calcium channel blockers (e.g. Cardizem, Verapamil): 4 mg/kg IV, slowly. If patient is taking digitalis, 2 mg/kg IV, slowly. Repeat every 10 min. PRN.
For calcium channel blocker overdose and hyperkalemia: 8-16 mg/kg IV, slowly.

Pediatric: 20 mg/kg slowly, over 10 min. PRN.
For calcium channel blocker overdose and hyperkalemia: 20 mg/kg IV, slowly.
5.8 Calcium Gluconate

**ACTIONS**
Calcium is a basic element that is essential for growth and maintenance of nerve, muscle, and bone tissue. It is necessary for transmission of nerve impulses; contraction of cardiac, smooth, and skeletal muscles; renal function; respirations; and blood clotting. Calcium also plays an important role in the regulation of neurotransmitters, hormones, and amino acid metabolism. Its IV administration improves vascular tone and myocardial contractility in patients in hypocalcemic states. Cardiac output and blood pressure usually increase. In cases of hydrofluoric acid toxicity, calcium binds with fluoride ions, producing calcium fluoride.

**INDICATIONS**
Used in the treatment of hydrofluoric acid burns and magnesium sulfate overdose. Also indicated in the management of black widow spider bites to relieve muscle spasms.

**CONTRAINDICATIONS**
- Absence of hydrofluoric acid burns or magnesium sulfate overdose
- Digitalis toxicity

**ADVERSE REACTIONS AND SIDE EFFECTS**
SQ or IM administration can cause severe tissue necrosis and tissue sloughing. Calcium gluconate can also induce serious cardiac dysrhythmias.

**DOSAGE**
Adult: Burns to eyes: Mix calcium gluconate (10%) 50 mL in normal saline 500 mL and wash the eyes with the solution using a Morgan lens.

Burns to skin: Mix calcium gluconate (10%) 10 mL into a 2-oz tube of sterile water-based gel lubricant (KY Jelly). Apply the gel to the burned skin area.

Inhalation: Administer calcium gluconate (10%) 1 mL mixed with normal saline 3 mL via nebulizer. For severe exposure, administer calcium gluconate (10%) 1-2 g via slow IV over 5 minutes.
5.9  Dextrose 50% and 25% (Glucose)

CLASS
Carbohydrate, Hypertonic solution

ACTIONS
A monosaccharide, which provides calories for metabolic needs, spares body proteins and loss of electrolytes. Readily excreted by kidneys producing diuresis. Hypertonic solution.

INDICATIONS
Hypoglycemia; coma of unknown origin.

CONTRAINDICATIONS
- Intracranial or intraspinal hemorrhage
- DTs with dehydration
- Blood glucose level > 60 mg/dL

ADVERSE REACTIONS AND SIDE EFFECTS
- Cardiovascular: Thrombosis, sclerosing if given in a peripheral vein.
- Local: Tissue irritation if infiltrates. Extravasation may cause tissue necrosis; use a large vein and aspirate occasionally to ensure route patency.
- Other: Acidosis, alkalosis, hyperglycemia, and hypokalemia.

WARNINGS
May cause Wernicke-Korsakoff syndrome in acute alcohol intoxication usually this is prevented by administration of Thiamine 100 mg IM or IV. Perform a glucose test (if possible) and draw a blood sample (red top tube) prior to administering Dextrose.

DOSAGE
Adult: (>8 years of age) 50 cc of a 50% solution; (25 gm) IV.
If conscious, Glucose may be given orally (25 gm).

Pediatric: (If <8 years of age) 2-4 ml/kg slow IV of a 25% solution.

Newborn: 4 ml/kg IV of d12.5% solution (dilute D50 4:1 with NS).
5.10  Diastat

CLASS
Carbohydrate, Hypertonic solution

DESCRIPTION
Diazepam rectal gel rectal delivery system is a non-sterile diazepam gel provided in a prefilled, unit-dose, rectal delivery system. Diazepam rectal gel contains 5 mg/mL diazepam, propylene glycol, ethyl alcohol (10%), hydroxypropyl methylcellulose, sodium benzoate, benzyl alcohol (1.5%), benzoic acid and water. Diazepam rectal gel is clear to slightly yellow.

ACTIONS
Although the precise mechanism by which diazepam exerts its antiseizure effects is unknown, animal and in vitro studies suggest that diazepam acts to suppress seizures through an interaction with γ-aminobutyric acid (GABA) receptors of the A-type (GABAA). GABA, the major inhibitory neurotransmitter in the central nervous system, acts at this receptor to open the membrane channel allowing chloride ions to flow into neurons. Entry of chloride ions causes an inhibitory potential that reduces the ability of neurons to depolarize to the threshold potential necessary to produce action potentials. Excessive depolarization of neurons is implicated in the generation and spread of seizures. It is believed that diazepam enhances the actions of GABA by causing GABA to bind more tightly to the GABAA receptor.

Diazepam rectal gel is well absorbed following rectal administration, reaching peak plasma concentrations in 1.5 hours. The absolute bioavailability of Diazepam rectal gel relative to Valium® injectable is 90%.

INDICATIONS
Diazepam rectal gel is a gel formulation of diazepam intended for rectal administration in the management of selected, refractory, patients with epilepsy, on stable regimens of AEDs, who require intermittent use of diazepam to control bouts of increased seizure activity.

CONTRAINDICATIONS
•  Know drug hypersensitivity
•  Acute narrow angle glaucoma

ADVERSE REACTIONS AND SIDE EFFECTS
The most frequent side effect was somnolence, CNS depressant

Less frequent adverse events reported were dizziness, headache, pain, vasodilatation, diarrhea, ataxia, euphoria, incoordination, asthma, rash, abdominal pain, nervousness and rhinitis.

BODY AS A WHOLE: Asthenia
CARDIOVASCULAR: Hypotension, vasodilatation
NERVOUS: Agitation, confusion, convulsion, dysarthria, emotional lability, speech disorder, thinking abnormal, vertigo
RESPIRATORY: Hiccups
WARNINGS
Consult physician in cases where the patient has kidney disease, liver disease, lung problems such as asthma, or pneumonia or history of substance abuse.

Not recommended for patients that are pregnant or that are breast feeding.

DOSAGE
Recommended for patients age 2 or greater.
0.5 mg/kg Rectal

Diazepam rectal gel rectal delivery system is a non-sterile, prefilled, unit dose, rectal delivery system. The rectal delivery system includes a plastic applicator with a flexible, molded tip.
5.11 Diltiazem Hydrochloride (Cardizem®)

**CLASS**
Calcium Channel Blocker or calcium antagonist

**ACTIONS**
Diltiazem inhibits the influx of calcium ions during membrane depolarization of cardiac and vascular smooth muscle. The therapeutic benefits of Diltiazem is supraventricular tachycardias are related to its ability to slow AV nodal conduction time and prolong AV nodal refractoriness. Diltiazem slows ventricular rates, interrupts the reentry circuit in AV nodal re-entrant tachycardias and reciprocating tachycardias (e.g. Wolff-Parkinson-White Syndrome - WPW). Diltiazem also prolongs the sinus cycle length and decreases peripheral vascular resistance.

**INDICATIONS**
- Atrial Fibrillation or Atrial Flutter with rapid ventricular response.
- Paroxysmal Supraventricular Tachycardia. Unless contraindicated, vagal maneuvers should be attempted prior to administration of Diltiazem.

**CONTRAINDICATIONS**
- Sick sinus syndrome except in the presence of a functioning ventricular pacemaker.
- Second- or third-degree AV block except in the presence of a functioning ventricular pacemaker.
- Severe hypotension or cardiogenic shock.
- Demonstrated hypersensitivity to Diltiazem.
- Intravenous Diltiazem and intravenous beta-blockers should not be administered together or in close proximity (within a few hours).
- Wolff-Parkinson-White syndrome or short PR syndrome.
- Ventricular tachycardia.

**WARNINGS**
Diltiazem should be used with caution in patients with impaired liver or renal function. Intravenous Diltiazem administered to a patient who is taking oral beta-blockers may cause bradycardia, AV block, and/or depression of contractility. Caution should be used when administering Diltiazem and anesthetics. Caution should also be used in pregnant females and mothers that are nursing. Caution if administered in the presence of CHF.

**ADVERSE REACTIONS AND SIDE EFFECTS**
Hypotension, itching or burning at injection site, flushing of skin, or junctional rhythm. Other side effects are less frequent (e.g. AV blocks, atrial flutter, chest pain, etc.).

**DOSAGE**
Adult: 0.25 mg/kg IV (over 2 minutes).
May repeat at 0.35 mg/kg IV (over 2 minutes), if needed.
Diphenhydramine Hydrochloride (Benadryl®)

CLASS
Antihistamine

ACTIONS
Diphenhydramine is an antihistamine with anticholinergic (drying) and sedative side effects. Antihistamines appear to compete with histamine for cell receptor sites on effector cells. Diphenhydramine prevents, but does not reverse histamine mediated responses, particularly histamine effects on the smooth muscle of the bronchial airways, gastrointestinal tract, uterus, and blood vessels.

INDICATIONS
- Allergy symptoms, anaphylaxis (as an adjunct to epinephrine).
- Sedation of violent patient after giving Haldol IM.
- Dystonic reactions from phenothiazine overdose (e.g. Haldol, Compazine, Thorazine, and Stelazine).
- Rhinitis.
- Anti-parkinsonism.
- Nighttime sedation.
- Motion sickness.

CONTRAINdications
Diphenhydramine is not to be used in newborn or premature infants or in nursing mothers. Diphenhydramine is also not to be used in patients with lower respiratory tract symptoms including asthma.

ADVERSE REACTIONS AND SIDE EFFECTS
- CNS: Drowsiness, confusion, insomnia, headache, vertigo (all especially in the elderly).
- Cardiovascular: Palpitations, tachycardia, PVC’s and hypotension.
- Respiratory: Thickening of bronchial secretions, tightness of the chest, wheezing, nasal stuffiness.
- GI: Nausea, vomiting, diarrhea, dry mouth, and constipation.
- GU: Dysuria, urinary retention.

WARNINGS
In infants and children especially, antihistamines in overdose may cause hallucinations, convulsions, or death. As in adults, antihistamines may diminish mental alertness in children. In young children, they may produce excitation. Diphenhydramine has additive effects with alcohol and other CNS depressants (hyptonics, sedatives, tranquilizers, etc.) Antihistamines are more likely to cause dizziness, sedation, and hypotension in the elderly (60 years or older) patient.
DOSAGE
Adult: 25-50 mg IV or 50 mg deep IM.
The patient may require as much as 100 mg.
Do not exceed 400 mg per day.

Pediatric: 1 mg/kg (maximum 50 mg),
(Dilute with 9 ml NS to Equal 50 mg / 10 ml).
Not to exceed 300 mg per day.
5. 13  Dopamine Hydrochloride (Intropin®)

**CLASS**
Sympathomimetic, Inotrop, Vasopressor

**ROUTE OF ADMINISTRATION**
IV Drip (piggyback)
400mg in 500 cc 0.9% NS yields a concentration of 800 ug/ml; 400 mg in 250 cc, 800 mg in 500 cc, and 1600 mg in 1000 cc all yield a concentration of 1600 ug/cc.

Note that "street rules" for calculation of dopamine dose in drops per minute (weight in pounds, drop last digit, then subtract 1) are applicable only with concentrations of 1600 mg/ml.

**ACTIONS**
Chemical precursor of norepinephrine that stimulates dopaminergic, beta-2-adrenergic, and alpha-adrenergic receptors.

Dosage-related:
- 1-2ug/kg/min produces vasodilation of renal, mesenteric, and cerebral arteries.
- 2-10ug/kg/min stimulates both beta-1- and alpha-adrenergic receptors, resulting in increased cardiac output.
- > 10ug/kg/min stimulates alpha-adrenergic receptors, resulting in renal, mesenteric, and peripheral arterial and venous vasoconstriction.

**NOTE:** Administration of dopamine should be titrated to the desired hemodynamic effect (usually low normal blood pressure).

**INDICATIONS**
Indicated in cardiogenic shock and hemodynamically significant hypotension.

**CONTRAINDICATIONS**
Dopamine is contraindicated in patients with pheochromocytoma (causes serious acute hypertension).
Hypovolemia as related to extreme trauma.

**ADVERSE REACTIONS AND SIDE EFFECTS**
Tachydysrhythmias may result from dopamine; ectopic beats, nausea and vomiting are more frequent adverse effects; may produce tissue necrosis and sloughing.

**WARNINGS**
Patients receiving monoamine oxidase inhibitors should receive no more than one-tenth of the normal dosage of dopamine. Dopamine should not be discontinued abruptly but should be tapered gradually.

**dosage**
Initially 5 ug/kg/min; titrate to systolic blood pressure > 90mmHg.
5.14.1 Epinephrine 1:000

**CLASS**
Sympathomimetic, Vasopressor used in shock

**ACTIONS**
Epinephrine is a sympathomimetic, which stimulates both alpha and beta-adrenergic receptors causing immediate bronchodilation, increase in heart rate and an increase in the force of cardiac contraction. Subcutaneous dose lasts 5-15 minutes.
- b1- contractility, inotropic, increase AV conduction, automaticity
- b2- bronchial dilation, skeletal muscle vasodilation
- a- peripheral vasoconstriction, fight or flight response

**INDICATIONS**
- Asthma.
- Anaphylaxis.
- Acute bronchial spasms associated with asthma, COPD or croup.
- Angioneurotic edema.
- Asystole, V-Fib, pulseless VT, PEA

**CONTRAINDICATIONS**
Hyperthyroidism, hypertension, cerebral arteriosclerosis in asthma. Should not be administered in elderly or debilitated patients with underlying cardiovascular disease.

In anaphylaxis, however, there are no contraindications.

**ADVERSE REACTIONS AND SIDE EFFECTS**
Same as for epinephrine 1:10,000 (see Drug Summary 5.15.2).

**WARNINGS**
Same as for epinephrine 1:10,000 (see Drug Summary 5.1.2). Also causes hyperglycemia. With the exception of cardiac arrest, Epinephrine 1:1,000 should not be given intravenously; it should be diluted first (1 mg in 9 ml of NS = 1:10,000 or 1 mg / 10 ml).

**DOSAGE**
Adult: 0.3 mg (0.3 cc) **subcutaneously.**
May be repeated every 15 minutes x 3 if patient in anaphylaxis if hypotensive, start an IV and administer 3 cc of a 1:10,000 solution slow IV.

Pediatric: 0.01 mg/kg up to 0.3 mg **subcutaneously.** Epinephrine (1:1000) is also given in a dosage of 0.1 mg/kg **ET** (max. 2 mg) as a cardiac agent.
CLASS
Sympathomimetic, Vasopressor used in shock

ACTIONS
Epinephrine is a sympathomimetic, which stimulates both Alpha and Beta-receptors. As a result of its effects, myocardial and cerebral blood flow are increased during ventilation and chest compression. Epinephrine increases systemic vascular resistance and thus may enhance defibrillation.

INDICATIONS
Asystole, ventricular fibrillation unresponsive to defibrillation; PEA. Other pediatric indications hypotension in patients with circulatory instability, bradycardia (before Atropine).

CONTRAINDICATIONS
None in the cardiac arrest situation.

ADVERSE REACTIONS AND SIDE EFFECTS
• CNS: Anxiety, headache, cerebral hemorrhage.
• Cardiovascular: Tachycardia, ventricular dysrhythmias, hypertension, angina, palpitations.
• GI: Nausea and vomiting.

WARNINGS
Epinephrine is inactivated by alkaline solutions never mix with Sodium Bicarbonate. Do not mix isoproterenol and epinephrine, results is exaggerated response. Actions if catecholamines is depressed by acidosis, attention to ventilation and circulation is essential. Antidepressants potentiate the effects of epinephrine.

DOSAGE
Adult:
IV push (1:10,000) 1 mg (10 ml) IV, repeat every 3-5 minutes.
ETT 1:1000, 2 mg in 10mls of NS q3 minutes
As a pressor infusion 1 mg / 250 ml D5W, start 2 mcg / min and titrate.

Pediatric:
0.01 mg/kg, (0.1 ml/kg IV or IO), repeat every 3-5 minutes.
Use Epinephrine (1:1000) 0.1 mg/kg (max. 2 ml) any time it is given ET.

Nebulizer Treatment
Adult:
0.3mg of 1:10,000 (3 mls.) in adult nebulizer @ 6 lpm. Use Caution: in patients over 45 or of possible cardiac history

Pediatric:
0.5mg of 1:10,000 (5 mls.) in adult mask nebulizer @ 6 lpm blow-by.
5.15 Etomidate (Amidate)

**CLASS**
General anesthetic

**ACTIONS**
Etomidate is a short-acting, non-barbituate hypnotic, lacking analgesic properties used for induction of general anesthesia. The action is at the level of the reticular activating system in the brain-system. Etomidate is generally considered to have minimal adverse effect on cardiac and respiratory function. The duration of action is 3-5 minutes and excretion is through the renal system.

**INDICATIONS**
To induce general anesthesia to facilitate intubation or conscious sedation.

**CONTRAINDICATIONS**
None

**ADVERSE REACTIONS AND SIDE EFFECTS**
The most common side effects are nausea and vomiting. Can cause uncontrolled skeletal muscle activity. May cause trismus if pushed to fast.

**WARNINGS**
Supportive airway control must be monitored and under direct observation at all times. Etomidate can decrease the adrenal gland's production and steroid hormones in trauma patients. Monitoring of vital signs is important of conscious.

**DOSEAGE**
Adult & Pediatric (over 1 year of age):
0.3 mg/kg slow administration (about two minutes) IV.
Max dose of 30mg.
5.16  Glucagon

CLASS
Pancreatic hormone, Insulin antagonist
Glucose elevating agent

ACTIONS
Glucagon produced in the pancreas by the Alpha cells of the Islets of Langerhans, causes an increase in blood glucose concentrations. It is effective in small doses and no evidence of toxicity has been reported with its use. Glucagon acts only on liver glycogen, converting it to glucose, if patient has adequate glycogen reserves. Also, possesses positive inotropic and chronotropic properties.

INDICATIONS
• Glucagon is indicated for the treatment of hypoglycemia when an IV cannot be established and oral glucose is contraindicated.
• Possibly effective in symptomatic beta blocker overdose.

CONTRAINDICATIONS
Because glucagon is a protein, hypersensitivity is a possibility.

ADVERSE REACTIONS AND SIDE EFFECTS
Occasional nausea and vomiting.

WARNINGS
Glucagon should be administered with caution in patients with a history of insulinoma and/or pheochromocytoma.

DOSAGE
Adult: 0.5 to 1.0 unit (or 0.5-1.0 mg) of Glucagon IM (or IV),
This can be repeated twice,
May require very high IV doses for Beta blocker overdose (5-10 mg IV).

Pediatric:
For patients less than 20kg - 0.2mg/kg IM (Not as effective in children).

For patients over 20kgs - 1mg IM

For Beta blocker overdose give 0.5mg IVP/IM/IOP an repeated as needed until symptoms are gone.
CLASS
Pancreatic hormone, Insulin antagonist
Glucose elevating agent

ACTIONS
Haloperidol is a potent, long-acting Butyrophenone derivative with pharmacologic actions similar to those of Piperazine Phenothiazines but with higher incidence of extrapyramidal effects, less hypotensive and relatively low sedative activity. Exerts strong anti-emetic effect, and impairs central thermoregulation. Produces weak central anti-cholinergic effects and transient orthostatic hypotension. Actions thought to be due to blockade of Dopamine activity.

INDICATIONS
Used for management of manifestations of psychotic disorders and for the treatment of agitated states in acute and chronic psychoses.

CONTRAINDICATIONS
Combativeness from trauma, Hypersensitivity to Haloperidol, Parkinson's disease, seizure disorders, coma, alcoholism, severe mental depression, CNS depression, Thyrotoxicosis, and cocaine overdose.
Should not be administered in the presence of other sedatives. Should not be used in the management of dysphoria caused by Talwin

ADVERSE REACTIONS AND SIDE EFFECTS
• CNS: Parkinson-like symptoms, restlessness, lethargy, headache, exacerbation of psychotic symptoms.
• Cardio: Tachycardia, hypotension, hypertension (with overdose).
• GI: Nausea, vomiting.
• Other: Bronchospasm, laryngospasm, respiratory depression, dry mouth, hypersalivation, drooling.

WARNINGS
Orthostatic hypotension
Use with caution in patients: with severe cardiovascular disorders (may cause transient hypotension and/or precipitation of anginal pain), receiving anticonvulsant medication (may lower the convulsive threshold), with a history of allergic reactions to drugs.

DOSAGE
Adult: 5-10 mg IM/IN.
Follow with 50mg of Benadryl IM

Pediatric: 0.1mg/kg IM (maximum 5 mg).
**USES:**
This medication is used on the skin to relieve pain, itching and irritation due to insect bites, burns, scrapes, sunburn, rash or other skin disorders.

**HOW TO USE:**
This is used on the skin only as directed. Apply to clean, dry skin. Shake the container gently and hold it upright 2 to 3 inches away from the skin. Direct the spray nozzle to affected area and press to deliver a thin layer of medication. Avoid spraying in or near the eyes. Do not breathe in the spray. Do not use large amounts or apply this more often than directed as your condition will not clear faster, but the chance for side effects may increase.

**SIDE EFFECTS:**
Slight stinging, tingling or irritation may occur when first applied. Expect this. However, if irritation or redness continue, become worse or you develop a skin rash, notify your doctor. If you notice other effects not listed above, contact your doctor or pharmacist.

**PRECAUTIONS:**
Before using this, tell your doctor if you have: skin disorders, skin infections, sensitivity to skin products, allergies (especially to ester-type anesthetics). This medication should be used only when clearly needed during pregnancy. Discuss the risks and benefits with your doctor. It is not known if this drug is excreted into breast milk. Consult your doctor before breast-feeding.

**DRUG INTERACTIONS:**
Tell your doctor of any nonprescription or prescription medication you may use including: all skin products. Do not start or stop any medicine without doctor or pharmacist approval.

**OVERDOSE:** If overdose is suspected, contact your local poison control center or emergency room immediately. US residents can call the US national poison hotline at 1-800-222-1222. Canadian residents should call their local poison control center directly. This medicine may be harmful if swallowed.
ACTIONS
The action of hydroxocobalamin in the treatment of cyanide poisoning is based on its ability to bind to cyanide ions. Each hydroxocobalamin molecule can bind one cyanide ion by substituting it for the hydroxo ligand linked to the trivalent cobalt ion, thereby forming cyanocobalamin, which is then excreted in urine.

INDICATIONS
Hydroxocobalamin is indicated for known or suspected cyanide poisoning. Cyanide poisoning may result from inhalation, ingestion, or dermal exposure to various cyanide-containing compounds, including smoke from closed-space fires. Sources of cyanide poisoning include hydrogen cyanide and its salts, cyanogenic plants, aliphatic nitriles, and prolonged exposure to sodium nitro-prusside.

The presence and extent of cyanide poisonings are often initially unknown. There is no widely available, rapid confirmatory cyanide blood test. Treatment decisions must be made on the basis of clinical history and signs and symptoms of cyanide intoxication. If clinical suspicion of cyanide poisoning is high, hydroxocobalamin should be administered without delay.

Common Signs and Symptoms of Cyanide Poisoning

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>Signs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Headache</td>
<td>Altered mental status (e.g., confusion, disorientation)</td>
</tr>
<tr>
<td>Confusion</td>
<td>Seizures or coma</td>
</tr>
<tr>
<td>Dyspnea</td>
<td>Mydriasis</td>
</tr>
<tr>
<td>Chest tightness</td>
<td>Tachypnea/hyperpnea (early)</td>
</tr>
<tr>
<td>Nausea</td>
<td>Bradypnea/apnea (late)</td>
</tr>
<tr>
<td></td>
<td>Hypertension (early) / hypotension (late)</td>
</tr>
<tr>
<td></td>
<td>Cardiovascular collapse</td>
</tr>
<tr>
<td></td>
<td>Vomiting</td>
</tr>
<tr>
<td></td>
<td>Plasma lactate concentration ³ 8 mmol/L</td>
</tr>
</tbody>
</table>

CONTRAINDICATIONS None.

ADVERSE REACTIONS AND SIDE EFFECTS
Serious adverse reactions include allergic reactions and increased blood pressure. Other side effects include:
Red-colored urine
Red-colored skin and mucous membranes, acne-like rash
Nausea, vomiting, diarrhea, bloody stools, trouble swallowing, stomach pain
Throat tightness, dry throat
Headache, dizziness, memory problems, restlessness
Infusion site reaction
Eye swelling, irritation, or redness
Swelling of feet and ankles
Irregular heartbeat, increased heart rate
Fluid in lungs
WARNINGS
In addition to hydroxocobalamin, treatment of cyanide poisoning must include immediate attention to airway patency, adequacy of oxygenation and hydration, cardiovascular support, and management of any seizure activity. Consideration should be given to decontamination measures based on the route of exposure. Many patients with cyanide poisoning will be hypotensive; however, elevations in blood pressure have also been observed in known or suspected cyanide poisoning victims.

DOSAGE
Adult: 5 g packaged as a single 5 g vial or in two 2.5 g vials administered as an IV infusion over 15 minutes (approximately 15 mL/min)—if using the two vials 7.5 minutes per vial. Depending on the severity of the poisoning and the clinical response, a second dose of 5 g may be administered by IV infusion for a total dose of 10 g. The rate of infusion for the second dose may range from 15 minutes (for patients in extremis) to 2 hours, as clinically indicated.

Pediatric: The safety and effectiveness of hydroxocobalamin have not been established in this population. In non-U.S. marketing experience, a dose of 70 mg/kg has been used to treat pediatric patients.
5.20 Ipratropium Bromide (Atrovent®)

CLASS
Anticholinergic (parasympatholytic) agent

ACTIONS
Causes bronchodilation, dries respiratory tract secretions.

INDICATIONS
Bronchial asthma, reversible bronchospasm associated with chronic bronchitis and emphysema.

CONTRAINDICATIONS
Patients with history of hypersensitivity to the drug, should not be used as primary agent in acute treatment of bronchospasm.

ADVERSE REACTIONS AND SIDE EFFECTS
Palpitations, dizziness, anxiety, tremors, headache, nervousness, dry mouth.

WARNINGS
Blood pressure, pulse, and EKG must be constantly monitored.

 ROUTES
Inhalation only.

DOSEAGE
Small-volume nebulizer: 500 µg should be placed in small volume nebulizer (typically administered with a agonist).

Pediatric Dosage
<1 year old not used.>
5.21 Labetalol Hydrochloride (Normodyne®, Trandate®)

CLASS
Sympathetic blocker
Alpha-adrenergic blocker, Beta-adrenergic blocker

ACTIONS
Labetalol combines both selective, competitive alpha1-adrenergic blocking and nonselective, competitive beta-adrenergic blocking activity in a single substance. These actions decrease blood pressure without reflex tachycardia and without a significant reduction in heart rate.

INDICATIONS
Control of blood pressure in severe hypertension.

CONTRAINDICATIONS
- Bronchial asthma.
- Overt cardiac failure.
- Greater than first degree heart block.
- Cardiogenic shock.
- Severe bradycardia.

ADVERSE REACTIONS AND SIDE EFFECTS
- Cardiovascular: Symptomatic postural hypotension, ventricular dysrhythmia, and rarely syncope, bradycardia, and heart block.
- CNS: Dizziness, tingling of the scalp/skin, numbness, vertigo, etc.
- Respiratory: Wheezing, bronchospasm.
- GI: Nausea / vomiting, etc.

WARNINGS
Use caution with patients that have a medical history of: liver problems, heart problems (e.g., mild/moderate congestive heart failure), lung disease (chronic bronchitis, emphysema), pheochromocytoma, diabetes, any allergies.

Blood pressure, pulse, and EKG must be constantly monitored. Atropine and transcutaneous pacing should be available.

DOSAGE
Adult: 20 mg slow (over 2 minutes) IV.
5.22 Furosemide (Lasix®)

CLASS
Diuretic

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

Rapid acting, potent diuretic; inhibits reabsorption of Sodium Chloride. It is also a venous dilator that decreases preload.

INDICATIONS
Cardiogenic Pulmonary Edema

CONTRAINDICATIONS
- Pregnancy
- Known hypersensitivity
- Dehydration or shock
- Anuria
- Hypersensitivity
- Sulfa allergy

ADVERSE REACTIONS AND SIDE EFFECTS
- Hypotension
- Headache
- Dizziness
- Hypovolemia
- Nausea
- Vomiting
- Dehydration
- Dry mouth
- Ototoxicity (hearing loss with too rapid IV administration)
- Tinnitus
- Hypochloremia
- Hypokalemia
- Hyponatremia
- Hyperglycemia

WARNINGS
Rapid administration may cause auditory problems including tinnitus and hearing loss.

DOSAGE
Adult: 40 mg, IV bolus.
5.23  Lidocane Hydrochloride

**CLASS**
Antiarrhythmic agent, Antidysrhythmic (class Ib)
Local anesthetic, Topical

**ACTIONS**

**INDICATIONS**
To be used during intubation of patients with possible ICP or reactive airway disease.

Used to assist in the implementation of the easy IO.

**CONTRAINDICATIONS**
- Allergy to caine related anesthetics
- Severe heart block
- Bradycardia unless pacemaker is in place
- WPW (Wolff-Parkinson-White syndrome)
- Pregnancy
- Use with caution in hypovolemic and cardiogenic shock

**ADVERSE REACTIONS AND SIDE EFFECTS**
Administration of Lidocaine may cause lightheadedness, confusion, blurred vision, hypotension, cardiovascular collapse, bradycardia, CNS depression (altered level of consciousness, slurred speech, irritability, muscle twitching, seizures) with high doses and localized anesthetic effects.

**WARNINGS**
Pregnancy safety: Category B.

Possible medication interactions that may occur:

- Metabolic clearance of lidocaine may be decreased in patients taking beta-adrenergic blockers or in patients with liver dysfunction.
- Apnea induced with succinylcholine may be prolonged with large doses of lidocaine.
- Cardiac depression may occur if lidocaine is given concomitantly with IV phenytoin.
- Additive neurological effects may occur with procainamide.

**DOSAGE**

**ET purpose**: 1.5 mg/kg for onset within 45 - 90 seconds

**IO purpose**: inject 1% Lidocaine into s.q. area of IO insertion site. Enough Lidocaine should be given to make slight skin bleb prior to IO insertion.
**CLASS**
Electrolyte, CNS depressant, Anticonvulsant

**ACTIONS**
Magnesium is an important cofactor for enzymatic reactions and plays an important role in neurochemical transmission and muscular excitability. Magnesium prevents or controls convulsions by blocking neuromuscular transmission and decreasing the amount of acetylcholine liberated at the end plate by the motor nerve impulse. Magnesium is said to have a depressant effect on the central nervous system, but it does not affect the mother, fetus or neonate when used as directed in eclampsia and pre-eclampsia. Magnesium acts peripherally to produce vasodilation.

**INDICATIONS**
- Parenteral anticonvulsant for the prevention and control of seizures in severe toxemia of pregnancy.
- Torsades de pointes.
- Suspected hypomagnesemic state (eg. chronic alcoholism and chronic use of diuretics).
- Refractory ventricular fibrillation.
- Asthma Refractory to other treatment

**WARNINGS**
Magnesium Sulfate Injections USP, 50% must be diluted to a concentration of 20% or less prior to IV infusion.

Because magnesium is removed from the body solely by the kidneys, the drug should be used with caution in patients with renal impairment. Monitoring magnesium serum levels and the patient's clinical status is essential to avoid the consequences of overdose in toxemia. Clinical indications that it is safe to give magnesium include the presence of patellar reflex (knee jerk) and absence of respiratory depression (approximately 16 breaths or more/ minute). **Calcium Chloride should be immediately available to counteract the potential hazards of magnesium intoxication in eclampsia.**

Intravenous use of magnesium sulfate should not be given to mothers with toxemia of pregnancy during the two hours immediately preceding delivery.

**ADVERSE REACTIONS AND SIDE EFFECTS**
Adverse effects of Magnesium Sulfate IV are usually the result of magnesium intoxication. Signs of hypermagnesemia include: flushing, sweating, hypotension, depression of reflexes, flaccid paralysis, hypothermia, circulatory collapse, depression of cardiac function and central nervous system depression. These symptoms can precede fatal paralysis.
DOSAGE
Eclamptic seizures: 4 gm IV (mixed in 50/100 ml of D5W/NS and administered over 4 minutes). May repeat once at 2 gm IV (mixed in 50/100 ml of D5W/NS and administered over 5 minutes).

Torsades de pointes and refractory VF: 1-2 gm IV (mixed in 50/100 ml of D5W/NS and administered over 1-2 minutes) followed by a maintenance infusion (1 gm in 250 ml of D5W/NS administered at 30-60 gtt/min).

Asthma Adult: 2 grams in 50/100ml of D5W/NS over 10-20 min.

Pediatric Asthma 20-50 mg/kg in 50/100ml of D5W/NS over 10-20 min.
5.25 Methylene Blue

**ACTIONS**
Low concentrations of methylene blue will convert methemoglobin to hemoglobin (methemoglobin is toxic and gives the blood a chocolate-brown color; it does not carry oxygen). High concentrations convert ferrous iron of hemoglobin to ferric iron, thereby forming methemoglobin.

**INDICATIONS**
Initial treatment of methemoglobinemia.

**CONTRAINDICATIONS**
Renal insufficiency (excreted in urine and bile).

**ADVERSE REACTIONS AND SIDE EFFECTS**
Cyanosis, profuse sweating, dizziness, headache, nausea, vomiting, diarrhea (turns urine and stool blue-green). May induce hemolysis in patients deficient in glucose-6-phosphate dehydrogenase.

**DOSAGE**
1 mg/kg of a 1% solution. Very slow IV push of 1 mL (10 mg) every 5 minutes.
**CLASS**
General anesthetic

**ACTIONS**
Midazolam is a shorter-acting benzodiazepine central nervous system depressant that produces sedation and lack of recall.

**INDICATIONS**
Sedation for seizures and postmedication for longer term sedation as needed.

**CONTRAINDICATIONS**
Known hypersensitivity and narrow-angle glaucoma.

**WARNINGS**
Midazolam does not protect against increase in intracranial pressure and bradycardia associated with intubation attempts.

**ADVERSE REACTIONS AND SIDE EFFECTS**
- Respiratory: Respiratory depression, laryngospasm, bronchospasm, dyspnea.
- Cardiovascular: PVC's, bradycardia, tachycardia, nodal rhythms, hypotension.
- CNS: Retrograde amnesia, altered mental status, dizziness, prolonged emergence from anesthesia, etc.
- GI: Nausea / vomiting, hiccoughs, coughing, etc.
- Local: Pain, redness, swelling, burning at injection site, etc.

**DOSAGE**
Adult: Sedation and/or seizures **2-4 mg IV, slowly.**
Max dose of **8 mg.**

Pediatric Sedation and/or seizures - **0.1mg/kg IV/IO/IN max of 5 mg. Repeat at the same dose if needed with a max of 5mg second dose**
CLASS
Analgesic - opium derivative, Schedule II narcotic
Opioid analgesic

ACTIONS
Morphine is a narcotic analgesic, which depresses the central nervous system and sensitivity to pain. Increases venous capacitance, decreases venous return and produces mild peripheral vasodilation. Morphine also decreases myocardial oxygen demand.

INDICATIONS
- Pain from acute myocardial infarction.
- Pulmonary edema.
- Pain Management.

CONTRAINDICATIONS
- Volume depletion or hypotension
- Head trauma
- Acute asthma
- Known hypersensitivity to MS

ADVERSE REACTIONS AND SIDE EFFECTS
- CNS: Euphoria, drowsiness, pupillary constriction, respiratory arrest.
- Cardiovascular: Bradycardia, hypotension.
- GI: Decreased gastric motility, nausea and vomiting.
- GU: Urinary retention.
- Respiratory: Bronchoconstriction, decreased cough reflex

WARNINGS
Morphine is detoxified by the liver. It is potentiated by alcohol, antihistamines, barbiturates, sedatives, and beta blockers.

DOSAGE
Adult: 2-10 mg IV slowly. Repeat with small increments every 5 minutes until desired response is achieved (max. 30 mg over 20 min for burns). Can also be given IM or SC.

Pediatric: 0.1-0.2 mg/kg IV slowly.

Infant: 0.05-0.1 mg/kg IV slowly.
5.28 Naloxone Hydrochloride (Narcan®)

CLASS
Synthetic opioid antagonist

ACTIONS
The mechanism of action is not fully understood. It does appear that Naloxone antagonizes the effects of opiates by competing at same receptor sites. When given IV, the action is apparent within two minutes. IM or SC administration is slightly slower.

INDICATIONS
Naloxone is indicated for the complete or partial reversal of opiate narcotic depression and respiratory depression secondary to opiate narcotics or related drugs:
- Codeine
- Morphine
- Methadone
- Lomotil
- Pentazocine (Talwin)
- Propoxyphene (Darvon)
- Percodan
- Fentanyl (Sublimaze) (Known on the street as white china).

Naloxone can also be used for suspected acute opiate overdosage.

Narcotic agonist:
- Morphine Sulfate Heroin
- Hydromorphone (Dilaudid) Methadone
- Meperidine (Demerol) Paregoric
- Fentanyl citrate (Sublimaze) Oxycodone (Percodan, Percocet)
- Codeine Propoxyphene (Darvon, Darvocet)

Narcotic agonist and antagonist Butorphanol tartrate (Stadol)
- Pentazocine (Talwin)
- Nalbuphine (Nubain)

CONTRAINDICATIONS
Naloxone is contraindicated in patients known to be hypersensitive to it.

Use with extreme caution in narcotic-dependent patients who may experience withdrawal syndrome (including neonates of narcotic-dependent mothers).

Is incompatible with bisulfite and with alkaline solutions.
ADVERSE REACTIONS AND SIDE EFFECTS
- CNS: Tremor, agitation, belligerence, papillary dilation, seizures, increased tear production, sweating, seizures secondary to withdrawal.
- Cardiovascular: Hypertension, hypotension, ventricular tachycardia, pulmonary edema, ventricular fibrillation.
- GI: Nausea, vomiting

WARNINGS
Naloxone should be administered cautiously to persons including newborns of mothers who are known or suspected to be physically dependent on opiates may precipitate an acute abstinence syndrome. May need to repeat Naloxone is not effective against a respiratory depression due to non-opiate drugs. Use caution during administration as patient may become violent as level of consciousness increases.

DOSAGE
Adult: An initial dose of 2 mg may be administered IV, IN, IM, SC, or ET. May repeat in 2-3 minutes. If no response after 6mg, then condition is probably not due to narcotic. (Fentanyl may require larger doses of Naloxone to reverse effects)

Pediatric: 0.1 mg/kg IV, IM, IO, ET or SC. May repeat with 0.1 mg/kg if no improvement is noted.
5.29.1  Nitroglycerin (Nitrostat®, Nitrolingual® Spray)

**CLASS**
Vasodilator, Nitrate

**ACTIONS**
Nitroglycerin is a direct vasodilator, which acts principally on the venous system although it also produces direct coronary artery vasodilation as a result. There is a decrease in venous return, which decreases the workload on the heart and thus, decreases myocardial oxygen demand. Sublingual nitroglycerin is readily absorbed. Pain relief occurs within one to two minutes and therapeutic effects can last up to 30 minutes.

**INDICATIONS**
- Chest pain or discomfort associated with suspected AMI or Angina Pectoris
- Pulmonary edema with hypertension

**CONTRAINDICATIONS**
- Patients increased intracranial pressure, systolic <110 mm Hg, children under 12.
- Patients who have taken medication for erectile dysfunction in the past 24 hours.

**WARNINGS**
Tolerance to nitrates easily develops, which necessitates increasing the dosage. Nitroglycerin tablets are inactivated by light, heat, air and moisture. Must be kept in amber glass containers with tight-fitting lids. Do not leave cotton in container. Once opened, nitroglycerin has a shelf life of 3 months. Patients should keep all but a few days’ supply of the drug in the refrigerator. Do not shake Nitrolingual spray. Alcohol will accentuate vasodilating and hypotensive effects.

**ADVERSE REACTIONS AND SIDE EFFECTS**
- CNS: Headache, dizziness, flushing, nausea and vomiting.
- Cardiovascular: Hypotension, reflex tachycardia.

**DOSAGE**
Adult: 0.4 mg (1 tablet or 1 spray sublingual).
May repeat in 3-5 minutes (no maximum as long as bp is above 110SBP).
5.29.2 Nitroglycerin (Nitro-Bid Ointment®)

CLASS
Vasodilator, Nitrate

ACTIONS
Same as Nitrostat.

INDICATIONS
Same as Nitrostat. Used when continued effects of Nitroglycerin are desired.

CONTRAINDICATIONS
Same as Nitrostat.

WARNINGS
Same as Nitrostat. In the event that the patient requires cardioversion or pacing, avoid placing paddles or defibrillator or pacing pads near Nitro patch. It may be necessary to remove Nitro patch and wipe off skin prior to placing paddles or patches before cardioversion or pacing.

ADVERSE REACTIONS AND SIDE EFFECTS
Same as Nitrostat.

DOSAGE
Adult: 1 inch of 2% ointment topically for transdermal absorption.
CLASS
Anesthetic

ACTIONS
Nitrous oxide is a colorless gas, which acts on the central nervous system. When mixed with 50% oxygen and inhaled, it produces an effect similar to a mild intoxicant. The patient laughs and talks but does not go to sleep. When inhaled, nitrous oxide has potent analgesic effects, which dissipate within 2-5 minutes after stopping administration.

INDICATIONS
Moderate to severe pain, as in trauma, acute MI, burns, renal colic, and labor.

CONTRAINDICATIONS
Nitrous oxide is contraindicated in any altered state of consciousness, (eg. head injury, alcohol ingestion, drug OD). It is also contraindicated in COPD patients, acute pulmonary edema, pneumothorax, decompression sickness, air embolus, and abdominal pain with distention or suspicion of obstruction, pregnancy (except during delivery), and patients that are unable to self-administer Nitronox.

ADVERSE REACTIONS AND SIDE EFFECTS
Light-headedness, confusion, drowsiness, nausea and vomiting.

WARNINGS
Since nitrous oxide is heavier than air, it may accumulate on the floor of ambulance. During transits of more than 15 minutes, nitrous oxide may effect ambulance personnel.

DOSAGE
Blended mixture of 50% nitrous oxide and 50% oxygen, which is self-administered through inhalation. Also apply O2 cannula at 4-6 L to maintain O2 therapy when nitrous oxide is not being administered.

Note: Also see Medical Procedure 4.21, Nitrous Oxide-Nitronox
5.31 Oral Glucose (Glutose®, Insta-Glucose)

CLASS
Monosaccharide (simple sugar).

ACTIONS
After absorption from GI tract, glucose is distributed in the tissues and provides a prompt increase in circulating blood sugar.

INDICATIONS
Conscious hypoglycemic states

CONTRAINDICATIONS
None

ADVERSE REACTIONS AND SIDE EFFECTS
Nausea

WARNINGS
• Altered L.O.C
• Ascertain the patient's ability to swallow an oral preparation of glucose without airway compromise;
• Must be swallowed, not absorbed sublingually, or buccally.

DOSAGE
1 to 2 tubes Orally
Use second tube of oral glucose based on blood glucose results
CLASS
Anti-platelet drug
Thienopyridine class inhibitor of P2Y12 ADP platelet receptors

ACTIONS
Plavix has an anti-platelet effect that inhibits the ability of platelets to clump together as part of a blood clot.

It is an inhibitor of adenosine diphosphate (ADP) induced platelet aggregation acting by direct inhibition of ADP binding to its receptor and of the subsequent ADP-mediated activation of glycoprotein GPIIb/IIIa complex.

INDICATIONS
Clopidogrel is used to prevent heart attacks and strokes in persons with heart disease (recent heart attack, unstable angina), recent stroke, or blood circulation disease (peripheral vascular disease).

CONTRAINDICATIONS
• Hypersensitivity to the drug substance
• Active pathological bleeding; peptic ulcer or intracranial hemorrhage

ADVERSE REACTIONS AND SIDE EFFECTS
Common side effects are easy bruising; minor bleeding

WARNINGS
• Consult with physician if patient has a history of:
  • blood disorders (e.g., hemophilia),
  • bleeding conditions (e.g., active peptic ulcers),
  • recent surgery
  • recent serious injury (physical trauma)
  • severe liver disease, severe kidney disease
  • history of abnormal bleeding, other conditions that may put then at high risk for bleeding (e.g., certain stomach/abdominal problems, certain eye diseases)

DOSAGE
(or IV).
5.33 Pralidoxime (2-PAM®, Protopam Chloride®)

**ACTIONS**
Pralidoxime reactivates cholinesterase that has been deactivated by organophosphorous pesticides and related products. It inactivates acetylcholine at both muscarinic and nicotinic sites in the periphery.

**INDICATIONS**
Organophosphorous toxicity; used as an adjunct to systemic atropine administration.

**CONTRAINDICATIONS**
- Poisoning with Sevin (a carbamate insecticide); Sevin increases the drug’s toxicity.
- Use with extreme caution in patients with a history of asthma, renal insufficiency, and peptic ulcers.

**ADVERSE REACTIONS AND SIDE EFFECTS**
- CNS: Dizziness, headache, drowsiness, excitement.
- Cardiovascular: Tachycardia.
- EENT: Blurred vision, diplopia, impaired accommodation, laryngospasm.
- GI: Nausea.
- Other: Muscular weakness or rigidity, hyperventilation.

**DOSAGE**
Adult: IV infusion 1-2 g in 100 mL of saline over 30 minutes.
If pulmonary edema is present, give IVP over 5 minutes.
Pediatric: 20-40 mg/kg in 100 mL of saline over 30 minutes as IV infusion.

**PACKAGED**
1 g dry powder: Mix with 20 cc sterile water (50 mg/mL).
**CLASS**
Buffer, Alkalinizing agent, Antacid

**ACTIONS**
An alkalizing agent used to buffer acids present in the body during and after severe hypoxia. Bicarbonate combines with excess acids (usually lactic acid) present in the body to form a weak, volatile acid. This acid is broken down into CO2 and H2O. Sodium bicarbonate is effective only when administered with adequate ventilation and oxygenation.

**INDICATIONS**
Metabolic acidosis due to the following causes:
- Salicylate (aspirin) overdose
- Barbiturate overdose
- Tricyclic antidepressant overdose
- Hyperkalemia
- Severe ketoacidosis
- Cardiac arrest
- Shock
- Physostigmine toxicity
- Methanol toxicity
- Ethylene glycol toxicity

**CONTRAINDICATIONS**
Congestive heart failure; alkalotic states.

**ADVERSE REACTIONS AND SIDE EFFECTS**
Metabolic alkalosis; hypernatremia; cerebral acidosis; sodium and H2O retention, which can cause CHF.

**WARNINGS**
Excessive bicarbonate therapy inhibits the release of oxygen. Bicarbonate does not improve the ability to defibrillate. May inactivate simultaneously if administered with catecholamines. Will precipitate if mixed with calcium chloride. Administration should be guided by arterial blood gases and pH, when available.

**DOSAGE**
Adult: 1 mEq/kg IV (8.4%). Repeat with 0.5 mEq/kg q 10 minutes.
Pediatric: 1 mEq/kg IV (8.4%). Repeat with 0.5 mEq/kg q 10 minutes.
Infant: 1 mEq/kg IV (4.2%) slowly. May repeat in 10 minutes.
5.35 Sodium Nitrite

**ACTIONS**
Sodium nitrite produces methemoglobinemia, which combines with the cyanide ion to form cyanmethemoglobin. It dissociates to liberate free cyanide, which is then converted to thiocyanate by sodium thiosulfate. The end product is excreted in the urine.

**INDICATIONS**
- Cyanide toxicity
- Hydrogen sulfide toxicity

**CONTRAINDICATIONS**
- Hypotension: If the patient presents in a hypotensive state, consider skipping this step and proceeding to administration of sodium thiosulfate.
- Pregnancy: Sodium nitrite crosses the placenta and can induce methemoglobinemia in the fetus.

**ADVERSE REACTIONS AND SIDE EFFECTS**
- Cardiovascular: Syncope, hypotension.
- Blood: Excessive methemoglobinemia is likely to occur with decreased arterial oxygen saturation.

**DOSAGE**
Adult: 300 mg IV over 4-5 minutes.
Pediatric: 0.2 mL/kg IV over 4-5 minutes. Use extreme caution because methemoglobin can be fatal in children.
Repeat Dose: For both adults and children, give half the initial dose after 30 minutes.
5.36  Sodium Thiosulfate

ACTIONS
Sodium thiosulfate converts cyanide to the less toxic thiocyanate. The thiocyanate is then excreted in the urine.

INDICATIONS
Used in acute cyanide toxicity; not useful in hydrogen sulfide toxicity.

CONTRAINDICATIONS
None in acute cyanide toxicity.

DOSAGE
Adult: 12.5 g (50 mL of 25% solution) given by slow IV over 10 minutes.
**5.37 Methylprednisolone (Solu-Medrol®)**

**CLASS**
Glucocorticoid, Corticosteroid

**ACTIONS**
While the exact mechanism of corticosteroid activity is unknown, these agents decrease inflammatory and immune responses by stabilizing membranes within white blood cells responding to a site of infection, injury, irritation, or inflammation.

**INDICATIONS**
- Allergic Reaction
- Respiratory Distress

**CONTRAINDICATIONS**
Use of this agent is contraindicated in patients allergic to any component of the formulation, those with systemic fungal infections (ask about these in patients on chemotherapy or with AIDS), and in premature infants.

**ADVERSE REACTIONS AND SIDE EFFECTS**
The majority of adverse reactions to corticosteroids are dose and duration dependent. In the EMS setting, look for euphoria, behavioral alterations, hypertension, and hyperglycemia. Effects of long-term use include edema, cataracts, peptic ulceration, pancreatitis, delayed wound healing, acne, the development of a "buffalo hump" (a subcutaneous fat deposit over the upper thoracic vertebrae), rounded "moon facies", osteoporosis, hirsutism, hypokalemia, and increased susceptibility to infection.

**DOSAGE**
Adult: 125 mg in both respiratory and allergic conditions

Pediatric: 2 mg/kg in both respiratory and allergic conditions

**ROUTE OF ADMINISTRATION:**
- Methylprednisolone is preferentially administered IV.
- It may also be administered IM in equivalent doses in adults.

**NOTES**
Methylprednisolone is also used in emergency care in the initial management of spinal trauma. A dose of 30 mg/kg is administered over one hour followed by a 5.4 mg/kg/hour drip. As this medication has a "window" of 3-8 hours after injury for administration, it is not in protocol for this agent to be used by BSOFD or FLFD EMS personnel for this indication.
5.38 Succinylcholine Chloride (Anectine®)

CLASS
Neuromuscular blocking agent (depolarizing).

ACTIONS
Skeletal muscle relaxant, paralyzes skeletal muscles including respiratory muscles.

INDICATIONS
To achieve paralysis to facilitate endotracheal intubation.

CONTRAINDICATIONS
Patients with known hypersensitivity to the drug.

ADVERSE REACTIONS AND SIDE EFFECTS
Prolonged paralysis, hypotension, bradycardia.

DOSAGE
Adult: 1.5 mg/kg Routes: IV.

Pediatric: 2 mg/kg Routes: IV.
5.39 Terbutaline

ACTIONS
Terbutaline is primarily an injectable beta₂ sympathomimetic. It produces fewer cardiovascular side effects and more prolonged bronchodilation than some other medications.

INDICATIONS
Relief of bronchospasm in patients with reversible obstructive airway disease, including asthma.

CONTRAINDICATIONS
Hypersensitivity.

ADVERSE REACTIONS AND SIDE EFFECTS
- CNS: Headache, nervousness, insomnia, tremor, dizziness.
- Cardiovascular: Tachycardia, hypertension, angina.
- GI: Nausea and vomiting, dry mouth.

WARNINGS
Use terbutaline with caution in patients with coronary artery disease, hypertension, hyperthyroidism, and diabetes. Administer cautiously to patients on MAO inhibitors or tricylic antidepressants. Beta blockers and terbutaline will inhibit each other.

DOSAGE
Adult: 0.25 mg SQ.
Pediatric: 0.01 mg/kg SQ. Rarely used in pediatric patients younger than 12 years.
**5.40 Tetracaine Hydrochloride 0.5% Eye Drops**

**CLASS**
Local anesthetic.

**ACTIONS**
Stabilizes membranes of conjunctival and corneal pain fibers to inhibit depolarization and perception of pain.

**INDICATIONS**
Tetracaine is intended for use in the patient who is unable to cooperate with you in adequately flushing the eye(s) due to discomfort or pain.

**CONTRAINDICATIONS**
The use of tetracaine is contraindicated in patients with known hypersensitivity to the drug. Tetracaine may cross-react in patients with allergy to procaine (Novocain) or chloroprocaine (Nesacaine) and is relatively contraindicated in these patients as well.

**ADVERSE REACTIONS AND SIDE EFFECTS**
Many patients experience a transient (< 60 seconds) stinging or burning in the eye after instillation of the medication. Long term use can result in softening and damage to the cornea and sensitization to the agent (with increased chances of future allergic reactions).

**WARNINGS**
Do not use the solution if it contains crystals.

Discolored solutions should not be used. Containers must be kept tightly closed.

Warn patient not to touch or rub eye while cornea is anesthetized. This may cause corneal abrasion, further injury, and greater discomfort once tetracaine wears off.

**DOSAGE**
2 drops of 0.5% solution

**ROUTE OF ADMINISTRATION**
Medication should be instilled into eye in lower conjunctival sac. Patient should be instructed to look up towards the top of the head while the paramedic pulls down the lower lid and instills the medication within the pouch formed by the inner surface of the lower lid and the conjunctiva.
5.41 Ketorlac Tromethamine (Toradol®)

CLASS
Nonsteroidal anti-inflammatory (NSAIDs)

ACTIONS
Toradol works by reducing hormones that cause inflammation and pain in the body.

Ketorolac is used to relieve moderately severe pain, usually pain that occurs after an operation, kidney stones, back pain or other painful procedure. It belongs to the group of medicines called nonsteroidal anti-inflammatory drugs (NSAIDs). Ketorolac is not a narcotic and is not habit-forming. It is 30 times the strength of aspirin. It will not cause physical or mental dependence, as narcotics can. However, ketorolac is sometimes used together with a narcotic to provide better pain relief than either medicine used alone.

INDICATIONS
Used for pain that occurs after an operation, trauma, kidney stones, back pain or other painful procedure.

CONTRAINDICATIONS
Do not use Toradol if the patient is allergic to ASA or NSAIDs, or if they are taking any blood thinning or anticoagulants.

Do not use if they have:
- severe renal disease or kidney transplant
- a bleeding or blood clotting disorder
- a closed head injury or bleeding in brain
- a stomach ulcer or a history of stomach or intestinal bleeding
- patient needing surgery
- a surgical candidate with open fracture or fracture deformities
- if breast-feeding a baby

ADVERSE REACTIONS AND SIDE EFFECTS
Nausea, vomiting, bloating, gas, loss of appetite, sweating, dizziness, drowsiness, blurred vision, dry mouth, irritation at the injection site and abnormal tastes may also occur. Stomach upset is the most common side effect.

Other side effects include:
- chest pain, weakness, shortness of breath, slurred speech, problems with vision or balance
- black, bloody, or tarry stools
- coughing up blood or vomit that looks like coffee grounds
- swelling or rapid weight gain
- urinating less than usual or not at all
- nausea, stomach pain, low fever, loss of appetite, dark urine, clay-colored stools, jaundice
- fever, sore throat, and headache with a severe blistering, peeling, and red skin rash
- the first sign of any mouth sores or skin rash, no matter how mild
- pale skin, easy bruising, severe tingling, numbness, pain, muscle weakness; or
- fever, headache, neck stiffness, chills, increased sensitivity to light, purple spots on the skin, and/or seizure (convulsions).
DOSAGE
Adult:
30mg IV
60mg IM
5.42 Acetaminophen (Tylenol®)

CLASS
Analgesics (pain relievers) and Antipyretics (fever reducers)

ACTIONS
Tylenol is a pain reliever and a fever reducer.

INDICATIONS
- Used for fevers > 100.2 to prevent increase of fever and to lower body temperature.
- Can be used post-febrile seizure as long as patient is responsive.
- Pain relief of minor pediatric injuries

CONTRAINDICATIONS
Use with caution by mouth if noted AMS or lethargy.

ADVERSE REACTIONS AND SIDE EFFECTS
Although not all of these side effects may occur, if they do occur they may need medical attention:

Rare
- Yellow eyes or skin

Symptoms of overdose
- Diarrhea
- Increased sweating
- Loss of appetite
- Nausea or vomiting
- Stomach cramps or pain
- Swelling, pain, or tenderness in the upper abdomen or stomach area

Check with your doctor as soon as possible if any of the following side effects occur:

Rare
- Bloody or black, tarry stools
- Bloody or cloudy urine
- Fever with or without chills (not present before treatment and not caused by the condition being treated)
- Pain in lower back and/or side (severe and/or sharp)
- Pinpoint red spots on skin
- Skin rash, hives, or itching
- Sores, ulcers, or white spots on lips or in mouth
- Sore throat (not present before treatment and not caused by the condition being treated)
- Sudden decrease in amount of urine
- Unusual bleeding or bruising
- Unusual tiredness or weakness
WARNINGS
The presence of other medical problems may affect the use of this medicine.
- Alcohol abuse or
- Kidney disease (severe) or
- Hepatitis or other liver disease—The chance of serious side effects may be increased
- Phenylketonuria—Some brands of acetaminophen contain aspartame, which can make a condition worse

If Tylenol is taken with certain other drugs the effects of either could be increased, decreased, or altered;
- Alcohol
- Cholestyramine (Questran)
- Isoniazid (Nydrazid)
- Nonsteroidal anti-inflammatory drugs such as Dolobid and Motrin
- Oral Contraceptives
- Phenytoin (Dilantin)
- Warfarin (Coumadin)
- Zidovudine (Retrovir)

Taking certain other medicines together with acetaminophen may increase the chance of unwanted effects. The risk will depend on how much of each medicine the patient takes every day, and on how long they will take the medicines together.

- Aspirin or other salicylates
- Diclofenac (e.g., Voltaren)
- Diflunisal (e.g., Dolobid)
- Etodolac (e.g., Lodine)
- Fenoprofen (e.g., Nalfon)
- Floctafenine (e.g., Idarac)
- Flurbiprofen, oral (e.g., Ansaid)
- Ibuprofen (e.g., Motrin)
- Indomethacin e.g., Indocin)
- Ketoprofen (e.g., Orudis)
- Ketorolac (e.g., Toradol)
- Meclofenamate (e.g., Meclomen)
- Mefenamic acid (e.g., Ponstel)
- Nabumetone (e.g., Relafen)
- Naproxen (e.g., Naprosyn)
- Oxaprozin (e.g., Daypro)
- Phenylbutazone (e.g., Butazolidin)
- Piroxicam (e.g., Feldene)
- Sulindac (e.g., Clinoril)
- Tenoxicam (e.g., Apo-Tenoxicam)
- Tiaprofenic acid (e.g., Surgam)
- Tolmetin (e.g., Tolectin)
DOSAGE
15mg/kg p.o. Not to exceed one time dose of 650mg.

ROTE OF ADMINISTRATION: Use a disposable syringe to inject liquid medication into check area of mouth. (No sharp attached) Then dispose of syringe.

Onset - oral: 15 - 20 minutes
Peak: 1 - 1.5 hours
Duration: 4 - 6 hours
CLASS
Posterior pituitary hormone

ACTIONS
Vasopressin is the naturally occurring antidiuretic hormone. In unnaturally high doses much higher than those needed for antidiuretic hormone effects vasopressin acts as a non-adrenergic peripheral vasoconstrictor. Vasopressin acts by direct stimulation of smooth muscle V1 receptors. In recent studies, after a short duration of ventricular fibrillation, vasopressin during CPR increased coronary perfusion pressure, vital organ blood flow, ventricular fibrillation median frequency, and cerebral oxygen delivery.

INDICATIONS
Vasopressin is indicated for patients with shock-refractory VF and VT without a pulse.

CONTRAINDICATIONS
None in the adult cardiac arrest. Not indicated in children under 12 years old

PRECAUTIONS
None in cardiac arrest.

ADVERSE REACTIONS AND SIDE EFFECTS
None in cardiac arrest.

DOSAGE
Adult: 40 units IV push or ET.
CLASS
Nondepolarizing neuromuscular blocker

ACTIONS
Vecuronium bromide is a non-depolarizing skeletal muscle relaxant. Binding with cholinergic receptor sites inhibits transmission of nerve impulses, antagonizing the action of acetylcholine. Has no analgesic properties and the patient maybe conscious, but unable to communicate by any means. First muscles affected include eyes, face, neck; followed by limbs, abdomen, chest; diaphragm affected last. Recovery usually occurs in the reverse order and may take longer than 60 minutes. IV onset of actions in 30-60 seconds, peaks in 3-5 minutes and lasts for 30-60 minutes.

INDICATIONS
Authorized paramedic only may induce general anesthesia to facilitate intubation. It may also be used by a paramedic post intubation during treatment of the patient while using Induced Hypothermia.

WARNINGS
Causes respiratory paralysis; supportive airway control must be continuous and under direct observation at all times. Myasthenia gravis and other neuromuscular diseases increase sensitivity to the drug.

ADVERSE REACTIONS AND SIDE EFFECTS
Hypersensitivity reactions are possible.

DOSAGE
Adult & Pediatric (over 16 years of age): 0.1 mg/kg slow administration (30-60 seconds) IV. Usually 5-7 mg for an average sized adult.
**CLASS**
Anitemetic, Serotonin Receptor Antagonist, 5-HT3

**ACTIONS**
Antiemetic - The mechanism by which ondansetron works to control nausea and vomiting is not fully understood; it is believed that the antiemetic properties occur as a result of serotonin receptor antagonism.

**INDICATIONS**
Nausea and vomiting due to chemotheropy.
Prophylactic use prior to administration of pain management medication.
Nausea and vomiting with moderate to severe dehydration or electrolyte imbalance.

**WARNINGS**
- Liver disease (metabolizes in the liver)
- Breast-feeding (passes through breast milk)
- Pregnancy (no adverse effects are known)
- Patients with a history, or family history, of Long QT syndrome; transient EKG changes have been seen with IV administration including QT interval prolongation.

**ADVERSE REACTIONS AND SIDE EFFECTS**
- GI: Constipation, diarrhea, dry mouth
- Neurological: Headache, dizziness, drowsiness/sedation
- Immunological: Anaphylaxis (rare)
- Other: Fatigue, malaise, chills
- Cardiovascular: Cardiac dysrhythmia (rare), hypotension
- Respiratory: Bronchospasm
- Musculoskeletal: Muscle pain

**Interactions**
Adverse reactions seen in patients receiving ondansetron have typically been noted at doses significantly higher than are used in protocol and in patients receiving the medication for longer periods of time.

Ondansetron may precipitate at the stopper/vial interface in vials that are stored upright. Potency and safety are not affected. If precipitate is observed, re-dissolve by shaking the vial vigorously.

**DOSAGE**
Supplied 4mg/2ml (2mg/ml)
Adult: 4 mg slow IV/IM, no less than 30 seconds; recommended over 2-5 minutes.
Pediatrics
For patients greater than 40 kg, 4 mg IV over 2-5 minutes
For patients less than 40 kg, - 0.1mg/kg over 2-5 minutes