Medication Guidelines

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**Activated Charcoal (Actidose)**

**Actions:** Activated charcoal is a fine black powder in suspension with consistency of motor oil. Once instilled into the GI tract it binds to the toxins present, and then is eliminated from the body.

**Indications:** Ingestion of certain oral poisons; overdose of both oral and IV medications. Poisoning following emesis or where emesis is contraindicated.

**Contraindications:** Caustic substances, corrosive substances, petroleum-based products.

**Side Effects:** Nausea, vomiting, constipation.

**Precautions:** Use during pregnancy. Activated charcoal and syrup of ipecac do not mix. Does not absorb all toxins. Must be stored in original container.

- **Adult Dosage:** 1 - 2 g/kg
- **Pediatric Dosage:** 0.5 - 1 g/kg (without Sorbital)

**How Supplied:** Oral ingestion; delivered PO, NG, OG

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**Adenosine**

**Indications:** Symptomatic PSVT. Slows tachycardia associated with AV node, decreases chronotropic & dromotropic activity of sinus pacemaker cells.

**Contraindications:** A-flutter, A-Fib, 2° & 3° AV Block, V-Tach

**Side Effects:** Transient dysrhythmias, facial flushing, dyspnea, CP, hypotension, headache, nausea, bronchospasms.

- **Adult Dose:** 6 mg Rapid IV/IO Push with 20 mL NS flush immediately after. 2nd dose: 12 mg Rapid IV/IO push 1-2 minutes after if needed.
- **Pediatric Dose:** 0.1 mg/kg Rapid IV/IO push with 20 mL NS flush. May repeat with 0.2 mg/kg

**How Supplied:** 6mg/2mL vial or pre-filled syringe
AMIODARONE (CORDARONE)  IV DRIP ADMINISTRATION – TRANSFER ONLY

Class: Antidysrhythmic

Pharmacology and Action: Amiodarone prolongs duration of action potential and effective refractory period. Its antianginal effect is based on the dilation of the coronary arteries, it reduces the peripheral vascular resistance, and is an antiarrhythmic agent for dysrhythmias of atrial and ventricular origin. It influences all the electrophysiologically important parts of the heart; it especially prolongs the action potential and refractory period of myocardial tissues and the atrioventricular conduction time. In comparison with other antiarrhythmic agents, amiodarone possesses fewer arrhythmogenous effects.

Indications: Pulseless or hemodynamically unstable ventricular tachycardia, ventricular fibrillation, refractory to any other therapy. Studies have indicated amiodarone is an effective first line medication for Pulseless V-tach or V-fib.

Precautions: No contraindications in V-fib or pulseless V-tach. Amiodarone is contraindicated in patients with preexisting sinus-node dysfunction and bradycardia causing syncope, 2nd or 3rd degree heart block, this relates to administration of amiodarone to the conscious patient. When administering amiodarone to a patient with unstable V-tach, monitor patient for hypotension and bradycardia. Amiodarone is also contraindicated in patients with thyroid disease or patients who are pregnant.

Side effects and special notes: Amiodarone must be drawn up slowly to avoid bubbles in the syringe. There are no contra-Indications with use of amiodarone in patients with pulseless V-fib or V-tach.

Administration procedure is as follows:

Emergency Use: For hemodynamically unstable ventricular tachycardia’s, an initial loading dose of 150 mg IV/IO over 10 minutes may be done during transfer.

Amiodarone Infusion: 360 mg IV/IO over 6 hrs. (1mg/min); then 540 mg IV/IO over 18 hours (0.5 mg/min). Maintenance infusions need in-line filter & should be mixed in a non PVC bag. This infusion should be started at the hospital prior to transport.

ASPIRIN (ASA)

Actions: Aspirin blocks pain impulses in the central nervous system, dilates peripheral vessels, and decreases platelet aggregation. The use of aspirin is strongly recommended in patients experiencing myocardial infarction.

Indications: Chest pain or unstable angina. Prevention of platelet aggregation in ischemia. Mild or moderate pain or fever.

Contraindications: Hypersensitivity to salicylates, GI bleeding, bleeding disorders, children <12yr with flu like symptoms, Peptic ulcer or recent surgery.

Side Effects: Thrombocytopenia, GI bleeding, nausea, vomiting, drowsiness, flushing, tinnitus.


➤ Adult Dosage: 4 Chewable ‘low dose’ tablets (324 mg P.O.)

How Supplied: Chewable tablet (81 mg) to be administered orally.
ATROPINE SULFATE [CARDIAC AGENT]

**Actions:** Natural occurring anticholinergic and muscarinic antagonist. Competitively inhibits acetylcholine effects (parasympathetic inhibition), but does not prevent acetylcholine release.

**Indications:** For treatment of symptomatic bradycardia and atrial ventricular block. Organophosphate Poisoning (see following protocol).

**Contraindications:** Patients with known hypersensitivity, tachycardia secondary to thyrotoxicosis or heart failure, narrow angle glaucoma, myasthenia gravis, acute hemorrhagic states associated with cardiovascular instability and GI obstruction.

**Side Effects:** Delirium, headache, fever, confusion, psychotic behavior, tachypnea, respiratory paralysis', tachydysrrhythmia, hypertension, circulatory collapse, nausea and vomiting, urinary retention, photophobia, blurred vision, Dilated pupils and hypersensitivity responses including anaphylaxis.

**Precautions:** Potentiation of atropine affect occurs with many medications, including tricyclic antidepressants, benzodiazepines, antihistamines, nitrates and nitrites, haloperidol, corticosteroids, procainamide, quinidine. Antagonism of atropine effects occur with histamine, thiazide, and metoclopramide. Atropine may delay or alter absorption of acetaminophen and levodopa.

- **Adult dosage:** Bradycardia: 0.5-1 mg IV/IO/IN, may repeat every 3-5 min, up to 0.04 mg/kg.
- **Bradycardic PEA:** 0.5-1 mg IV/IO push, may repeat in 3-5 minute intervals, up to 0.04 mg/kg.
- **Pediatric dosage:** Symptomatic Bradycardia: 0.02 mg/kg, may repeat once if necessary.
  0.1 mg minimum dose. Maximum single dose 0.5 mg in child; 1 mg in adolescent. Maximum total dose 1 mg in child; 2 mg in adolescent.
  **Bradycardic PEA:** **NOT** indicated in the pediatric patient in cardiac arrest.

**How Supplied:** Pre-filled syringe containing 1 mg in 10 ml.

ATROPINE SULFATE [AS AN ANTIDOTE FOR POISONING]

**Actions:** Atropine is potent parasympatholytic that bonds to acetylcholine receptors thus diminishing the actions of acetylcholine. Atropine stops the effects of the nerve agent by blocking the effects of over-stimulation and effectively counters the actions of the nerve agent at nerve receptors. Atropine also relieves the smooth muscle constriction in the lungs (wheezing, respiratory distress) and GI tract (diarrhea, cramps) and dries up respiratory tract secretions.

**Indications:** Organophosphate Poisoning (e.g. parathion, malathion, sevin, diazinon and many common roach and ant sprays, and common fertilizer sprays). Nerve gas poisoning (Sarin gas, VX gas) with symptoms of excessive cholinergic stimulation.

**Poisoning Signs Are:** Salivation - Pinpoint pupils - Lacrimation - Defecation - Bradycardia - Abdominal cramping - Urination - Emesis - Excessive sweating

**Contraindications:** None when used in the management of organophosphate or nerve gas poisoning.

**Side Effects:** Victims of organophosphate poisoning can tolerate and may require large doses of Atropine. Signs of atropinization (flushing, pupil dilation, dry mouth, tachycardia) are the end results of treatment. Reduction of secretions is the most important goal.

**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.

- **Adult dosage:** 2-5 mg IV/IO/IN, repeat with 2-5 mg Q 15 minutes until atropinization occurs.
- **Pediatric dosage:** 0.05-0.1 mg/kg, repeat every 15 minutes if necessary.

**How Supplied:** Pre-filled syringe containing 1 mg in 10 ml.
**ATROVENT NEBULIZER**

**Actions:** Ipratropium (as ipratropium bromide, trade name Atrovent) is an anticholinergic drug. It acts by blocking muscarinic receptors in the lung, inhibiting bronchoconstriction and mucus secretion. It is a non-selective muscarinic antagonist, and does not diffuse into the blood, which prevents systemic side-effects. Atrovent is a derivative of atropine but is a quaternary amine and therefore does not cross the blood-brain barrier, which prevents central side-effects (anticholinergic syndrome). Atrovent is considered a short-acting bronchodilator.

**Indications:** It is administered by inhalation for the treatment of obstructive lung diseases. Atrovent is also combined with albuterol (Proventil) (trade names Combivent and Duoneb) for the management of COPD and asthma. Atrovent is effective for the management of asthma.

**Contraindications:** Patients allergic or hypersensitive to Atropine or its derivatives. Patients with significant or symptomatic tachycardia including heart rate > 150, cardiac related chest pain, decreased level of consciousness, shock, or low blood pressure.

**Side Effects:** headache, dizziness; dry mouth, cough, hoarseness; nausea, upset stomach; or blurred vision.

**Precautions:** None when used in the above listed bronchoconstrictive diseases.

- **Adult Dosage:** 0.5 mg SVN. Should be used ONLY AFTER a beta-agonist. Administer full unit dose in adults and children over 12 y/o.
- **Pediatric Dosage:** In children less than 12 y/o, administer half a unit dose.

**Administration:** By nebulizer with 6 – 8 L/min oxygen

**How Supplied:** 0.5 mg in 2.5 ml single dose vial.

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**BENADRYL (DIPHENDHYDRAMINE)**

**Actions:** Diphenhydramine hydrochloride is an anticholinergic. It blocks the action of histamine released by cells during an allergic reaction. Direct effect on CNS. Can be a stimulant or more commonly a depressant, depending on individual variations. Anticholinergic, Anti-parkinsonian’s effect.

**Indications:** Allergic disorders, adjunct in anaphylaxis, drug induced extrapyramidal symptoms, dystonic reaction due to phenothiazine overdose.

**Contraindications:** Neonates, premature infants, nursing mothers

**Side Effects:** Drowsiness, dizziness, anticholinergic effects, gastritis, paradoxical excitement, hypotension.

**Precautions:** Use with caution in patients with a history of asthma and lower respiratory disorders, glaucoma, hyperthyroidism, HTN, cardiovascular disease, GI or urinary obstruction, pregnancy.

- **Adult dosage:** 25 - 50 mg IV/IM
- **Pediatric dosage:** 1 mg/kg IV or IM (neonates - not recommended)

**How Supplied:** 1 ml vial, 50 mg/cc
CALCIUM CHLORIDE 10%

**Actions:** Calcium chloride is an essential component for the functional integrity of both the nervous and the muscular systems, cardiac contractility, and circulation of the blood.

**Indications:** Magnesium Sulfate overdose, Calcium channel blocker overdose; adjunctive therapy for insect bites; hypocalcemia.

**Contraindications:** VF during cardiac arrest patient suffering digitalis toxicity; hypercalcemia.

**Adverse Reactions:** Hypotension; bradycardia to include asystole; necrotic if IV infiltrates.

**Drug Interactions:** May antagonize calcium channel blockers; exacerbate dysrhythmias secondary to digitalis therapy.

**Precautions:** Use in pregnancy; must flush IV lines after administration; may cause cerebral and coronary vasospasm.

- **Adult dosage:** 500-1,000 mg IV slow q 10 minutes – watch EKG during administration
- **Pediatric dosage:** 20 mg/kg IV slow q 10 minutes – watch EKG during administration

How Supplied: 1.36 mEq/ml (100 mg/ml) pre-filled syringe.

**NOTE:** Spearfish Regional OB kit contains Calcium Gluconate. Adult dose is 5 - 8 mL of 10% solution every 10 minutes as necessary. Contact medical control PRIOR to use – BOTH Calcium solutions cross the placenta.

DEXTROSE 50%

**Actions:** A monosaccharide, which provides calories for metabolic needs, spares body proteins and loss of electrolytes. Readily excreted by kidneys producing diuresis. It is a hypertonic solution. Dextrose is a 50% solution, which immediately elevates the serum glucose level.

**Indications:** For the treatment of acute hypoglycemia. May be used in conjunction with insulin for severe hyperkalemia.

**Contraindications:** Patients with severe hyperglycemia may have resultant or exacerbated ketoacidosis. Intracranial or intraspinal hemorrhage. Delirium Tremens’ with dehydration. CVA, head injury, low perfusion state.

**Side Effects:** Patients who are alert / responsive may experience transient paresthesia & lightheadedness.

**Precautions:** Infiltration of D50 may cause severe resultant skin and subcutaneous tissue necrosis. NEVER give Dextrose solution through an IO.

- **Adult dosage:** 25-50 ml of a 50% solution (12.5-25 grams) IV push over 3-5 minutes.

**How Supplied:** Supplied in glass vials containing 25 grams of 50% Dextrose.

Glucose Solution – D₂₅

- **Pediatric dosage:** 1 ml/kg of 50% solution IV over 3-5 minutes with IV fluids for dilution. Glucose test; If glucose test shows glucose < 60 (< 40 in neonates, D10 administration) If patient is > 2 years old, then use D50=1 ml/kg If patient is < 2 years old, then use D25=2 ml/kg (can dilute D50 with NS 1:1) If patient is neonate (< 6 months), use D10=3 ml/kg (is made by diluting D50 with NS 4:1)
**Actions:** Diltiazem is a calcium channel blocking agent that slows conduction and increases refractoriness in the AV node. This is used to control heart rate in patients with A-Fib, A-Flutter, and multifocal Atrial tachycardia.

**Indications:** Rapid response Atrial Fib & flutter, PSVT unresponsive to vagal maneuvers & ADENOCARD.

**Contraindications:** Sick sinus syndrome, > 2 or 3 degree heart block, severe hypotension, V-Tach, cardiogenic shock, a-fib/flutter with WPW or short PR interval. Do Not give with Furosemide in same IV line (flush line first)

**Side Effects:** Just about any dysrythmia, cardiac symptoms, nausea and vomiting, dizziness and headache, CHF. Increases serum digoxin levels.

- **Adult Dosage:** 0.25mg/kg (approx. 20 mg for most adults) over 2 min IV push. May repeat in 15 min. if response to first dose is inadequate. Usual second dose: 0.35mg/kg (approx. 25mg for most adults) over 2 min IV push.

**Continuous Infusion:** Add 25 cc of Diltiazem (5 mg/ml) to 100 ml of NS or D5W. Resulting concentration is 125 mg/125 ml or 1 mg/ml. Usual starting dose: 10 mg/hr (which is 10 ml/hr). Usual dose range: 5-15 mg/hr. Dosages above 15 mg/hr not recommended.

**Precautions:** Pregnancy, hypotension, PVC's may be present upon conversion. Do not mix in the same container as other medications. Avoid piggyback into other medication containing solutions if possible.

### The following are known incompatibles:

<table>
<thead>
<tr>
<th>Acetazolamide</th>
<th>Acyclovir</th>
<th>Aminopyline</th>
<th>Methylprednisolone</th>
<th>Ampicillin</th>
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<tr>
<td>Cefoperazone</td>
<td>Diazepam</td>
<td>Furosemide</td>
<td>Insulin</td>
<td>Hydrocortizone</td>
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<td>Meclocillin</td>
<td>Phenytoin</td>
<td>Rifampin</td>
<td>Cefamandole</td>
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<tr>
<td></td>
<td></td>
<td>Sulbactam</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### DILTIAZEM (5 mg/mL)

<table>
<thead>
<tr>
<th>DILTIAZEM (5 mg/mL)</th>
<th>Patient weight in kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bolus Doses in cc’s</td>
<td>50</td>
</tr>
<tr>
<td>1st Dose: 0.25 mg/kg</td>
<td>2.5 cc</td>
</tr>
<tr>
<td>2nd Dose: 0.35 mg/kg</td>
<td>3.5 cc</td>
</tr>
</tbody>
</table>

[for drip: mix 125 mg (25 cc) in 100 ml IV solution (1 mg/ml) & run at:]

<table>
<thead>
<tr>
<th>DILTIAZEM DRIP</th>
<th>mg/hour</th>
<th>5 mg</th>
<th>10 mg</th>
<th>15 mg</th>
</tr>
</thead>
<tbody>
<tr>
<td>µ Drops/minute</td>
<td>5 gtts</td>
<td>10 gtts</td>
<td>15 gtts</td>
<td></td>
</tr>
</tbody>
</table>
**DOPAMINE HCL**

**IV DRIP ADMINISTRATION**

**Actions:** Dopamine is an endogenous precursor of norepinephrine that stimulates adrenergic receptors of the sympathetic nervous system. Moderate doses (2-10 mcg/kg/minute) stimulate beta-1 receptors to increase heart rate, cardiac output, coronary blood flow, and myocardial oxygen consumption. Alpha effects predominate its higher doses (>10 mcg/kg/minute) and may result in renal and mesentery vasoconstriction as well as elevated peripheral vascular resistance.

**Indications:** When augmentation of cardiac performance, blood pressure or renal blood flow are required for the treatment of early shock and hypoperfusion syndromes owing to such etiologies as septicemia, refractory cardiac failure, cardiac surgery, trauma, and acute myocardial infarction.

**Contraindications:** Dopamine is contraindicated in patients with pheochromocytoma, uncorrected tachyarrhythmias, ventricular fibrillation or known hypersensitivity. Patients who are hypotensive should have volume correction and optimization prior to the initiation of dopamine.

**Side Effects:** Tachyarrhythmias, ischemia, widened QRS, vasoconstriction, azotemia, skin sloughing and necrosis and elevation of serum glucose.

**Precautions:** Dopamine effects may be potentiated by tricyclic antidepressants, diuretics, and cyclopropane. Beta-blockers antagonize the dopamine effect. Extravasation of dopamine infusions require discontinuation of the drug and immediate subcutaneous infiltration of 5 mg of phentolamine in 10 ml of saline. Administration of infusion should be by a control device and monitoring of blood pressure, ECG and pulse oximetry should be maintained as a minimum. Should not be mixed with alkaline solutions, bicarbonates or oxidizing drugs.

- **Dosage Guidelines:** Infusion rate should be initiated at 1-5 mcg/kg/min over 1 minute and titrated for effect. Infusion rates > 10 mcg/kg/minute are rarely needed. Adjustment of the infusion rate should occur by 1-4 mcg/kg/minute every 10-30 minutes as required. Increments of 5-10 mcg/kg/minute may be necessary in severely ill patients such as septic shock.

**How Supplied:** Pre-mixed bag of D5W with a concentration of 1600 µg/ml. Administration should be by infusion via precision control device such an infusion pump.

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### Dopamine Infusion Chart

<table>
<thead>
<tr>
<th>Wt. in Kg</th>
<th>45</th>
<th>50</th>
<th>55</th>
<th>60</th>
<th>65</th>
<th>70</th>
<th>75</th>
<th>80</th>
<th>90</th>
<th>95</th>
<th>95</th>
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</thead>
<tbody>
<tr>
<td>5 mcg/kg/min</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
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<td>13</td>
<td>14</td>
<td>15</td>
<td>16</td>
<td>17</td>
<td>18</td>
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</tr>
<tr>
<td>10 mcg/kg/min</td>
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<td>19</td>
<td>21</td>
<td>23</td>
<td>24</td>
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<td>15 mcg/kg/min</td>
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<td>30 mcg/kg/min</td>
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**DOBUTAMINE**

**IV Drip Administration – Transfer Only**

**Actions:** Dobutamine is a sympathetic amine producing an inotropic effect to increase cardiac output. It gives short-term inotropic support to adults with cardiac decompensation due to depressed myocardial contractility.

**Indications:** Short-term treatment of patients with cardiac decompensation due to depressed contractility resulting either from organic heart disease or cardiac surgical procedures.

**Contraindications:** None indicated.

**Side effects:** Increased heart rate, blood pressure, ventricular ectopy, phlebitis, nausea, headache, angina, palpations, shortness of breath.

**Precautions:** During the administration of dobutamine, as with any adrenergic agent, ECG and blood pressure should be continuously monitored. Dobutamine may cause a marked increase in heart rate or blood pressure, especially systolic pressure.

- **Dosage:** Initial starting dose is 2 - 5 mcg/kg/min.

**How Supplied:** Pre-mixed bag of 500 mg / 250 ml D5W (2000 mcg/ml) Administration should be by infusion via precision control device such as an infusion pump.

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### Dobutamine Infusion Rate (ml/hr) for 2,000 mcg/mL concentration

<table>
<thead>
<tr>
<th>Drug Delivery Rate (µg/kg/min)</th>
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<th>10</th>
<th>20</th>
<th>30</th>
<th>40</th>
<th>50</th>
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Provider Level authorized to administer the specific medication; B = EMT & I85  A=AEMT  P=Paramedic

Spearfish Emergency Ambulance Service, Inc.
**EPINEPHRINE**

**Actions:** Epinephrine is a sympathomimetic which stimulates both alpha and beta receptors. As a result of its effects, myocardial and cerebral blood flows 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, anaphylaxis with hypotension. Blocks insulin release and elevates serum glucose and may increase serum potassium lactate levels and oxygen consumption.

**Contraindications:** Epinephrine is contraindicated when known hypersensitivity exists, narrow angle glaucoma, non-anaphylactic shock, or organic brain damage. Organic heart disease and cardiac dilatation as well as digoxin toxicity may also be relative contraindications.

**Side Effects:** Side effects may include cerebral hemorrhage, hemiplegia, respiratory distress and apnea, dysrhythmias, angina, aortic rupture, peripheral / visceral vasoconstriction, N / V, renal failure.

**Precautions:** Epinephrine is inactivated by alkaline solutions - never mix with sodium bicarbonate. Do not mix Isuprel and Epinephrine - will get exaggerated response. Antidepressants potentiate the effect of epinephrine. Always assure correction of hypovolemia prior to initiating use. Use cautiously with the elderly, Parkinson's Disease, pre-existing cardiovascular renal disease, hypertension, diabetes, hyperthyroidism and psychoneurotic disorders.

- **Adult dosage:** Cardiac Arrest - 1 mg of 1:10,000 every 3-5 minutes as required followed by a peripheral flush (20ml NS)

  **AEMT/P** Asthma/Anaphylaxis - 0.3 - 0.5 mg of 1:1,000 SQ/IM/IV/IO/IN. Repeat every 5-15 minutes PRN.

- **Pediatric Dosage:** Cardiac Arrest: 0.01 mg/kg, IV/IO of 1:10,000 every 3-5 minutes. 0.1 - 0.2 mg/kg of 1:1,000 after 1st dose

  Asthma/Anaphylaxis: 0.01 mg/kg of 1:1,000 SQ/IV/IO/IM/IN (up to 0.3 mg)

  Unstable Bradycardia: 0.01 mg/kg, IV/IO of 1:10,000 solution every 3-5 minutes.

**How Supplied:** Epinephrine is supplied in a 1:1,000 dilution of 1 mg/ml consisting of 1 ml ampule/vial. 1:10,000 dilution or 0.1 mg/ml supplied as 10 ml syringes of 1mg.

**EPINEPHRINE INFUSION**

**Actions:** Epinephrine is used to enhance myocardial contractility, increase peripheral resistance, and increase coronary artery and cerebral blood flow.

**Precautions:** Epinephrine should not be mixed in the same infusion bag, bottle or tubing with alkaline solutions such as sodium bicarbonate. The infusion rate should be slowed gradually over several hours as clinically indicated. Abrupt withdrawal should be avoided.

Extravasation of Epinephrine infusions require discontinuation of the drug and immediate subcutaneous infiltration of 5 mg of phenolamine in 10 ml of saline.

**See infusion table**

- **Dosage:** Unless specifically ordered: Initial infusion rate is 1 mcg/min. When maximal dose of 10mcg/min is reached without desired effect, notify MD. Titrate Epinephrine for systolic BP of 90-100 per Physician order.

**Procedure/Guidelines:** Start IV of D5W TKO. If Central line is available utilize this access. Obtain infusion pump. Compute Epinephrine Dosage: Standard dilution and infusion 4 mg in 250cc NS (16mcg/ml)

**Parameters:** Check BP every 5 minutes while increasing dose. Observe for tachyarrhythmia’s
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FENTANYL (SUBLIMAZE®)

**Class:** synthetic opioid analgesic

**Pharmacology and Action:** Fentanyl is a potent narcotic analgesic that suppresses pain by inhibiting ascending pathways in the central nervous system. Increases pain threshold, and alters pain reception by binding at opioid receptors in the brain. Onset of action if given IV is 1-2 minutes. Peak effects are seen within 3-5 minutes. Duration of action is typically 30-60 minutes. Onset of action if given IM is 7-15 minutes. Peak effects are seen within 20-30 minutes. Duration of action is typically 1-2 hours.

**Indications:** Severe pain (ie. from burns and isolated extremity injuries/fractures.) Chest pain from acute MI when patient is allergic to Morphine.

**Contraindications:** Patients with pain due to multi-system trauma or acute abdomen, patients with volume depletion or hypotension, patients with head, chest or abdominal trauma, alcoholism or antidepressant ingestion, ANY respiratory difficulty.

**NOTE:** Fentanyl is a potent respiratory depressant in Myasthenia Gravis and those patients who have received MAO inhibitor therapy in the last 2-3 weeks as well as those who have a known hypersensitivity to the drug.

**Side effects and special notes:** CNS – Euphoria, drowsiness, dizziness, pupillary constriction, respiratory depression and arrest. CV – Bradycardia, hypotension. GI/GU– Nausea and vomiting. Urinary retention. RESP – Apnea, Respiratory depression, broncho / laryngospasm, decreased cough/gag reflex.

**WARNINGS:** Rapid administration may cause chest wall rigidity, may inhibit or make ventilation impossible. Fentanyl should be used with great caution in patients who are concurrently using other narcotic analgesics, phenothiazines, benzodiazepines, sedative-hypnotics (barbiturates), tricyclic anti-depressants and other CNS depressants (including alcohol). May be reversed with Narcan (may require more than the usual dose).

- **Adult dosage:** 12.5 - 100 mcg (1 mcg/kg) slow (over 1-2 min.) IV/IO. May repeat after 15 minutes to a maximum total dose of 150 mcg. If IV route is not available, may give IM/IN dose of up to 100 mcg. **If severe pain persists; contact medical control for further orders.**

- **Pediatric dosage:** 1 mcg/kg IV/IO. IN dose of 1.5 mcg/kg may be used if IV/IO route is not accessible.

**How supplied:** 100 mcg / 2 ml (50 mcg/ml) vial.
**GLUCAGON**

**Class:** Antihypoglycemic/Pancreatic Hormone

**Action:** Glucagon converts glycogen to glucose. Glucagon increases the blood glucose levels in cases of hypoglycemia where an IV cannot be immediately started. Glucagon also acts as a smooth muscle relaxer for GI tract muscles. Glucagon also stimulates receptors in cardiac cells causing a positive inotropic action in beta-blocker overdose. A return to consciousness following the administration of Glucagon is 5 to 20 minutes. Actions completed by Glucagon are: reversal of hypoglycemia, dilation of the esophagus, increasing heart rate and conductive velocity in cardiac cells.

**Indications:** Hypoglycemia states when an IV cannot be immediately started. Beta-blocker overdose. Esophageal food blockage

**Contraindications:** Pregnancy or breastfeeding, DKA with or without consciousness. Since Glucagon is a protein, hypersensitivity is a possibility.

**Side effects:** Glucagon is known to cause nausea, vomiting, dizziness, hypotension, and headaches.

**Precautions:** Glucagon is only effective if there are sufficient stores of glycogen in the liver. Glucagon should be administered with caution to patients with a history of cardiovascular or renal disease. Because Glucagon is a protein, hypersensitivity may occur. Do not administer to patients with known hypersensitivity to the drug.

- **Adult dosage:** 1 mg given IM/IN, may repeat if necessary in 7 to 10 min.
- **Pediatric dosage:** Children under 20 kg should receive 0.5 mg given IM/IN. Children over 20 kg may use adult dose.

**How Supplied:** Glucagon must be reconstituted before administration. The rubber-stopper vials contain 1 unit of powder and 1 milliliter of diluting solution. Glucagon may be given IV, IM, IN or Sub-Q injection.

**HEPARIN**

**Actions:** Heparin is an anticoagulant that prevents or slows formation of blood clots. It does not break down existing clots. Onset of action is immediate when administered IV, with peak effects in 1–3 minutes. Plasma half-life is variable and averages 1–2 hours in healthy adults.

**Indications:** Used to maintain coronary artery patency after treatment with thrombolytic drugs. May be given concurrently with or immediately after tPA (Activase). Used at least 4–6 hours after treatment with streptokinase or eminase (APSAC). Venous thrombosis and pulmonary embolism, especially following surgery. Thromboembolism associated with chronic atrial fibrillation or mitral valve disease. Left ventricular thrombus formation and embolization associated with AMI, especially anterior transmural infarction. Disseminated intravascular coagulation (DIC), in selected cases. Rarely initiated in the prehospital setting. Heparin therapy begun in the hospital may be continued during inter-facility transfers.

**Contraindications:** Active hemorrhage. Use with extreme caution in patients with known bleeding disorders or other risk of hemorrhage. Severe thrombocytopenia. Heparin may cause paradoxical arterial thrombosis. Known hypersensitivity - use only in life-threatening situations. Patients receiving streptokinase or APSAC therapy.

**Drug Interactions:** May greatly increase risk of hemorrhage when administered with streptokinase, urokinase, or APSAC (Eminase). IV nitroglycerin may reduce the anticoagulant effects of heparin. Reduction in heparin dosage may be necessary if simultaneous IV nitroglycerin therapy is discontinued.

Protamine sulfate neutralizes effects of heparin.

**Precautions:** Discontinue the heparin immediately if hemorrhage occurs. Nosebleed, hematuria, or tarry stools may be initial signs of bleeding. Petechiae or easy bruising (e.g., during blood pressure checks) may precede hemorrhage. Discontinue therapy if signs of arterial thrombosis (extremity pain, loss of distal pulses, loss of
motor-sensory function) occur. Observe carefully for hypersensitivity reactions. Contact medical control if complications occur.

**Administration and Dosage:** For parenteral administration, heparin is available in concentrations of 1,000 to 40,000 USP units of heparin sodium per ml. Also available as heparin calcium, 25,000 U/ml. For full-dose therapy, heparin is administered by continuous IV infusion, intermittent IV injection, or deep subcutaneous injection. Low-dose heparin is usually administered by deep SQ injection. IM injection is contraindicated because of likelihood of pain, irritation, and hematoma at the injection site.

For full-dose continuous IV infusion therapy, the initial loading dose is usually 70--100 U/kg, followed by a maintenance infusion of 10--25 U/kg/hr, administered by infusion pump.

SQ or intermittent IV heparin injections will rarely be utilized during inter-facility transfers. Follow written orders and instructions by the patient’s physician.

### Heprin Premix Infusion – Drip Chart

<table>
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<tr>
<th>Rate (U/hr)</th>
<th>Flow (cc/hr or ml/hr)</th>
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<tbody>
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**LASIX (Furosemide)**

**Actions:** Furosemide is a potent, rapidly acting diuretic that inhibits re-absorption of sodium and chloride in the ascending loop of Henle.

**Indications:** Furosemide is indicated for treatment of pulmonary congestion associated with fluid overload, left ventricular dysfunction, and resulting hypoxemia. Furosemide may be used to treat edema from left ventricular dysfunction, cirrhosis, hypercalcemia, pulmonary edema, oliguria, cerebral edema and hypertension.

**Contraindications:** Patients with severe hypovolemia and/or hypoperfusion, patients with noted hyponatremia, hypokalemia, hypocalcemia, hypomagnesemia, coronary heart disease, and those receiving digitalis or other antiarrhythmic drugs, patients who have known allergies to sulfonamides.

**Side Effects:** Because of its volume depletion effects, side effects may include: tinnitus, lightheadedness, blurred vision, angina, shortness of breath, hyperventilation, hypotension, severe anaphylactic reactions can occur in patients who are allergic to sulfonamides.

**Precautions:** In patients with acute myocardial infarction and other disease states associated with abnormal left ventricular compliance, diuretics such as furosemide must be used cautiously since small changes in volume may induce large changes in left ventricular pressure and resultant cardiac output and coronary perfusion. Combination therapy with morphine and nitrates should be used cautiously since diuretics are synergistic with those drugs on pre-load. Use with caution in patients with Diabetes mellitus.

- **Adult dosage:** 0.5-1 mg/kg (20-40mg) IV slowly over 5-10 minutes. If the patient is on oral Lasix therapy, consider an initial IV dose that is twice the daily oral dose.
- **Pediatric dosage:** 1 mg/kg IV slowly over 5-10 minutes.

**How Supplied:** Standard 40 mg/4 ml vials undiluted.
**LEVOPHE D (NOREPINEPHRINE)**  
**IV DRIP ADMINISTRATION – TRANSFER ONLY**

**Action:** Norepinephrine is a potent vasoconstrictor used for blood pressure support in acute hypotensive states. Levophed should not be given to patients who are hypotensive due to volume deficits except as an emergency measure to maintain coronary and cerebral artery perfusion until blood volume replacement can be achieved.

In the treatment of shock, Dopamine is preferred over Norepinephrine. Norepinephrine should be limited to final attempts to maintain blood pressure in patients with severe shock.

**Procedure/Guidelines:** RCRH and Spearfish Regional will pre-mix as follows: Levophed must be diluted prior to use (ONLY mix with Dextrose 5%). Add 1 vial (4mg) to 250ml of D5W. Resulting concentration is 16 mcg/ml. Usual maintenance range is 2-4 mcg/minute (30 to 60 ml/hr). Higher doses may be required.

- Hypotension/cardiac arrest: Initial dose – 8-12 mcg/min IV infusion; titrate to effect
  
- Maintenance dose - 2-4 mcg/min

- Sepsis/septic shock: 0.01-3 mcg/kg/min IV infusion

**LIDOCAINE**

**Actions:** Lidocaine stabilizes cell membranes by interacting with fast sodium channels in a time-dependent and voltage-dependent manner. Effect is to suppress His-Purkinje automaticity and phase 4, diastolic depolarization of the ventricles. It also raises the ventricular threshold for fibrillation. It may increase coronary blood flow.

**Indications:** Lidocaine is a Class 1-B antiarrhythmic with local anesthetic properties. It is indicated for acute prophylaxis and treatment of ventricular dysrhythmias.

**Contraindications:** Patients with known hypersensitivity, Stokes-Adams syndrome. Severe sinoatrial node, AV node or intraventricular block without a functioning artificial pacemaker.

**Side Effects:** May produce respiratory depression, drowsiness, apprehension, and seizures. It has been known to be associated with dyspnea and respiratory depression and/or arrest. Lidocaine may cause hypotension, bradycardia heart block with cardiac arrest and has been associated with malignant hyperthermia. Potentiation of lidocaine effects occurs with cimetidine, phenytoin, procainamide, propranolol, quinidine.

**Precautions:** Reduce loading dose in patients with liver disease and do not administer more than 300 mg in any 1 hour period. Thrombophlebitis can occur at the infusion site.

- **Adult – Cardiac Arrest:** 1-1.5 mg/kg IV/IO/IN bolus. May repeat with ½ initial dose q 5-10 min PRN. Not to exceed a total of 3 mg/kg.

- **Pediatric – Cardiac Arrest:** 1 mg/kg IV/IO/IN bolus. May repeat with ½ initial dose q 5-10 min PRN. Max initial bolus is 100mg. Not to exceed a total of 3 mg/kg. Maintenance infusion range 1-4 mg/minute, maximum infusion rate 4 mg/minute.

- **PVC’s:** 1-1.5 mg/kg IV/IO/IN with ½ initial dose q 5-10 min PRN. Not to exceed 3 mg/kg.

- **Head Trauma:** 1 mg/kg IV/IO/IN

- **EZ-IO:** Adult – 20 - 40 mg (1-2 ml) for infusion site pain / Pediatric – 0.5 mg/kg for infusion site pain.

**How Supplied:** 2% solution is 20 mg/ml in 5ml pre-filled syringe.
LIDOCAINE DRIP

**Class:** Antiarrhythmic

**Action:** Lidocaine is an amide-type local anesthetic. It is frequently used to treat life threatening ventricular dysrrhythmias. Lidocaine has been shown to be effective in suppressing premature ventricular complexes. In addition, it is used to treat ventricular tachycardia and some cases of ventricular fibrillation.

Lidocaine also raises the ventricular fibrillation threshold. This raise in the threshold prevents PVC’s from inducing V-fib. Patients who have been successfully defibrillated should be treated with lidocaine.

**Indications:** Significant ventricular ectopy such as: Acute onset of 6 or more PVC’s/minute, PVC’s falling on the T-wave, multifocal PVC’s. Ventricular tachycardia or ventricular fibrillation without a pulse.

Ventricular tachycardia with a pulse. Wide complex tachycardia of uncertain origin.

**Contraindications to lidocaine include:** Hypersensitivity to the drug, second/third degree heart block, Adams-Stokes syndrome. Whenever PVC’s occur in conjunction with bradycardia, the bradycardia should be treated first with atropine then external pacing if atropine is unsuccessful, if PVC’s are still present after increasing the rate, lidocaine should be administered. Use lidocaine with caution in patients with hepatic disease, heart failure, hypoxia, respiratory depression, hypovolemia or shock, heart block or bradycardia and atrial fibrillation.

**Procedure and Guidelines:** Preparation: Start an IV of NS and run TKO.

- **Loading dose:** Give a lidocaine bolus of 1 mg/kg, followed immediately by an infusion of 2 mg/min. Notify physician immediately.

- **Continuous infusion:** Use lidocaine premix of 2 grams in 500ml of fluid, this gives a concentration of 4 mg/ml. Infuse lidocaine drip at 1-4 mg/minute. Notify physician if ectopy persists. If lidocaine toxicity is suspected, notify the physician.

**LIDOCAINE PREMIX INFUSION**

0.4% Lidocaine Hydrochloride - (4mg/mL) Infusion on an IV pump

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<td>2.0 mg/min</td>
<td>30 mL/hr</td>
<td>4.0 mg/min</td>
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**MAGNESIUM SULFATE**

**Actions:** Magnesium sulfate exhibits anticonvulsant properties when administered parenterally. When given in sufficient doses to produce hypermagnesia, the drug may suppress the CNS and block peripheral neuromuscular transmission, producing anticonvulsant effects.

**Pharmacokinetics:** When given IV, onset of action is immediate and duration is about 30 minutes. Magnesium readily crosses the placenta and is distributed into milk. Magnesium is excreted by the kidneys. Caution in patients with decreased renal function.

**Indications:** Magnesium is mainly used as an anticonvulsant for the prevention and control of seizures in severe preeclampsia or in eclampsia. Magnesium is considered the drug of choice for the prevention and control of seizures during pregnancy. Magnesium also is used in the management of uterine tetany, especially that associated with the use of oxytocic agents. Magnesium is also used in selected patients to inhibit uterine contractions in preterm labor. Ventricular ectopy - Torsades de Pointes.

**Side Effects:** Caused by magnesium intoxication. These symptoms include flushing, sweating, hypotension, depression of reflexes, flaccid paralysis, hypothermia, circulatory collapse, cardiac and CNS depression.

**Precautions:** Patients should be observed and serum magnesium concentration should be monitored to avoid over dosage. Disappearance of patellar reflex is a useful clinical sign to detect onset of magnesium toxication. In the event of overdose, artificial ventilation must be provided until a calcium chloride can be given IV. Magnesium should be administered with caution to patients with impaired renal function.

**Pregnancy and Lactation:** The neonate is usually not compromised by excess magnesium when given to the toxemic mother; however, if continuous IV infusion, the neonate may exhibit magnesium toxicity. IV magnesium should not be given 2 hours prior to delivery. Magnesium is present in breast milk for about 24 hours after parental administration and should be used cautiously in breast feeding mothers.

- **Adult Dosage:** *Eclampsia*: 1-2 grams dilute with NS flush – *slow* IVP over 5-10 minutes
  - *Ventricular Ectopy*: 2 grams in 20cc NS – SLOW IVP over 5 - 20 minutes. Usually given IV/IO. Not to be given faster than 150 mg/minute.

**How Supplied:** 1g / 2ml vial

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**MANNITOL**

**Actions:** Osmotic diuretic that inhibits tubular re-absorption of water and solutes. May increase renal blood flow and protect the kidney against nephron-toxin accumulation. Promotes fluid shift from erythrocytes to plasma and cells to extracellular fluid. Increases extracellular volume, plasma volume and circulation time, reduces intraocular pressure.

**Indications:** Promotes diuresis in the treatment and prevention of oliguric renal failure. Prophylaxis against renal tubular insults. Reduction of intracranial pressure and lowers intraocular pressure.

**Contraindications:** Patients with renal impairment who do not respond to a test dose, severe heart disease, pulmonary edema, severe dehydration, acute tubular necrosis, active intracranial bleeding and metabolic edema associated with increased capillary permeability unrelated to renal, hepatic or cardiac disorders.

**Side Effects:** Headache, nausea, vomiting, syncope, tachycardia, hypotension, acidosis, fever, chills, infusion site phlebitis and skin necrosis, urticaria.

**Precautions:** Solutions greater than 15% have a tendency to crystallize at low temperatures. Avoid extravasation as it causes skin necrosis. Lithium is possibly antagonized by mannitol.

**Dosage Guidelines:** Test dose for marked oliguria or suspected tubular damage: 0.2 g/kg or12.5 g over 3-5 minutes. Prevention of oliguric renal failure: 50-100 g over 90 minutes to several hours. Reduction of intracranial or intraocular pressure: 1.5-2.0 g/kg over 30-60 minutes. Drug intoxications: 0.5 g/kg or 25-50 g initially over 5-10 minutes, then 5-10% solution at a rate to maintain urine output at 100-500 ml/hr.
**MORPHINE SULFATE**

**Actions:** Derivative of opium with agonist effects on neurotransmitter binding and releasing of primary opiate receptor sites in the CNS and smooth muscle. Principal actions include analgesia via alteration of CNS response to noxious stimuli, peripheral vasodilation, respiratory depression, cough suppression, medulla induced nausea and vomiting, gastrointestinal hypomotility, increased urinary tract tone and histamine release. No significant cardiac effects are noted, although may cause hypotension.

**Indications:** Chest pain of cardiac origin unresponsive to oxygen and nitroglycerin. Pain from injury (excluding head, chest or abdomen,) severe burns, cardiogenic pulmonary edema, respiratory distress (excluding the respiratory contraindications.)

**Contraindications:** Morphine sulfate's contraindicated in patients with known hypersensitivity, acute bronchospasm, upper airway obstruction, and diarrhea induced by poisoning.

**Side Effects:** Altered mental status, visual disturbances, agitation, syncope, bradycardia and tachycardia, hypertension, nausea, vomiting, constipation, toxic bowel dilation in ulcerative colitis, urinary retention, urethral spasm, antidiuresis, thrombocytopenia.

**Precautions:** Use with caution in patients with toxic psychosis, those with renal or hepatic dysfunction, COPD, depressed myocardial function, and those taking sympatholytics. Use with extreme caution and consider reducing the dose in patients with ulcerative colitis, Addison’s disease, hypothyroidism, hypercapnia, cor pulmonale, myxedema, and delirium tremens. Potentiation of morphine effects can be seen with phenothiazines, antihistamines, barbiturates, tricyclic and other antidepressants, beta-adrenergic blockers and cimetidine.

- **Adult dosage:** Initial 2 - 4 mg (may increase dose in 2 mg increments after Initial dose,) slow IV/IO/IN. May repeat to a total of 10 mg.
- **Pediatric dosage:** 0.1 mg/kg slow IV/IO/IN.

**How Supplied:** 10 mg/ml syringe.

**NARCAN (NALOXONE)**

**Actions:** The mechanism of action is not fully understood. It does appear that Narcan antagonizes the effects of opiates by competing at same receptor sites. When given IV the action is apparent within (2) minutes. IM or SQ administration is slightly less rapid.

**Indications:** Narcan is indicated for the complete or partial reversal of narcotic depression and respiratory depression secondary to narcotics or related drugs: Heroin. Lomotil. Hydromorphone (dilaudid). Meperidine (demerol). Methadone, Pentazocine (talwin). Propoxyphene (darvon or darvocet). Morphine. Codeine. Percodan. Narcan can also be used for suspected acute opiate overdose.

**Contraindications:** Contraindicated in patients known to be hypersensitive to it.

**Side Effects and Adverse reactions:**

- CNS: Tremor, agitation, belligerence, pupillary dilation, seizures, increased tear production, sweating.
- CV: Hypertension, hypotension, ventricular tachycardia, pulmonary edema, ventricular fibrillation.
- GI: Nausea, vomiting.

**Warnings:** Narcan should be administered cautiously to persons including newborns of mothers who are known or suspected to be physically dependent on opiates. May need to repeat Narcan since duration of action of some narcotics may exceed that of Narcan. Narcan is not effective against a respiratory depression due to non-opioid drugs. Use caution during administration as patient may become violent as level of consciousness increases.

- **Adult dosage:** An initial dose of 0.4 - 2 mg IV/IO/IM/IN. Repeat dosage may be required. Suspected overdose with synthetic narcotics (Talwin, Darvocet) may require larger dose.
- **Pediatric dosage:** 0.1 mg/kg IV/IO/IM/IN - not to exceed 2 mg.

**How Supplied:** Narcan is available in 0.4 mg/ml vials.
Nitroprusside (Nipride®) – IV Drip Administration – Transfer Only

Class: Antihypertensive/Vasodilator

Action: Nipride is a rapid-acting agent that acts directly on vascular smooth muscle to produce peripheral vasodilation. Nipride is used for short-term, rapid reduction of blood pressure in hypertensive crises. Nipride acts by dilating both peripheral arteries and veins, this results in an immediate reduction in BP.

Indications: Hypertensive crisis in which a prompt reduction in blood pressure is essential.

Contraindications: Aortic Stenosis, Caution in acute MI.

Side Effects: WARNING: Nipride is not suitable for direct injection. The solution must be further diluted in 5% dextrose before infusion. Nipride injection can cause precipitous decreases in blood pressure. In patients not properly monitored, these decreases can lead to irreversible ischemic injuries or death. Nipride should only be used when equipment and personnel allow blood pressure to be continuously monitored. Except when used briefly or at low (<2mcg/kg/min) infusion rates, Nipride gives rise to important quantities of cyanide ion, which can reach toxic levels. The usual dose rate is 0.5-10 mcg/kg/minute, but infusion at the maximum dose rate should never last more than 10 minutes. If blood pressure is not controlled after 10 minutes of infusion at the maximum rate, administration of nipride should be terminated immediately.

Procedure and Guidelines: Start IV of D5W and run TKO. Obtain infusion pump, proper tubing, and pt’s weight in kg. Standard dilution, unless otherwise ordered, is 50 mg nipride in 250 cc D5W (200mcg/ml) – Mix with D5W ONLY. Nipride is light sensitive and must be covered with opaque material, this is provided in the nipride package. The tubing need not be covered. Once nipride is mixed it must be discarded after 24 hours.

Dosage: Unless ordered by the physician: Start nipride infusion at 0.1 mcg/kg/min to 0.5 mcg/kg/min.

Increase dosage by 0.1 to 0.5 mcg/kg/minute every 5 to 10 minutes until: Therapeutic end-point is reached as specified by physician, or the patient is receiving an infusion rate of 2 mcg/kg/minute. If the nipride infusion rate of 2 mcg/kg/minute and the therapeutic end-point has not been reached, notify the physician. Dosage range 0.1-0.5 mcg/kg/min, but higher doses up to 10 mcg/kg/minute may be needed.

Parameters to monitor: Blood pressure every 5-10 minutes while increasing the infusion rate and no less than hourly when the therapeutic effect is reached. Watch for hypotension, if hypotension develops:

Decrease nipride infusion by 50%. Recheck blood pressure, if stable, keep nipride at present rate. If blood pressure continues low for 10 minutes, discontinue nipride and notify Medical Control. Monitor for decrease in urinary output, change in sensorium, and cold clammy skin.

Nitroprusside Drip Chart

[Mix 50 mg in 250 ml D5W (200 mcg/ml) & run at:] Microdrops/minute (or ml/hr)

<table>
<thead>
<tr>
<th>mcg/kg/minute</th>
<th>2.5</th>
<th>5</th>
<th>10</th>
<th>20</th>
<th>30</th>
<th>40</th>
<th>50</th>
<th>60</th>
<th>70</th>
<th>80</th>
<th>90</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.1 mcg</td>
<td></td>
<td>*</td>
<td>*</td>
<td></td>
<td>0.3</td>
<td>0.6</td>
<td>0.9</td>
<td>1.2</td>
<td>1.5</td>
<td>1.8</td>
<td>2</td>
<td>2.4</td>
</tr>
<tr>
<td>0.5 mcg</td>
<td></td>
<td>*</td>
<td>*</td>
<td></td>
<td>1.5</td>
<td>3</td>
<td>4.5</td>
<td>6</td>
<td>7.5</td>
<td>9</td>
<td>10</td>
<td>12</td>
</tr>
<tr>
<td>1 mcg</td>
<td></td>
<td>*</td>
<td>1.5</td>
<td>3</td>
<td>6</td>
<td>9</td>
<td>12</td>
<td>15</td>
<td>18</td>
<td>21</td>
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<td>27</td>
</tr>
<tr>
<td>2 mcg</td>
<td>1.5</td>
<td></td>
<td>3</td>
<td>6</td>
<td>12</td>
<td>18</td>
<td>24</td>
<td>30</td>
<td>36</td>
<td>42</td>
<td>48</td>
<td>54</td>
</tr>
<tr>
<td>4 mcg</td>
<td>3</td>
<td>6</td>
<td>12</td>
<td>24</td>
<td>36</td>
<td>48</td>
<td>60</td>
<td>72</td>
<td>84</td>
<td>96</td>
<td>108</td>
<td>120</td>
</tr>
<tr>
<td>8 mcg</td>
<td>6</td>
<td>12</td>
<td>24</td>
<td>48</td>
<td>72</td>
<td>96</td>
<td>120</td>
<td>144</td>
<td>168</td>
<td>192</td>
<td>216</td>
<td>240</td>
</tr>
<tr>
<td>10 mcg</td>
<td>7.5</td>
<td>15</td>
<td>30</td>
<td>60</td>
<td>90</td>
<td>120</td>
<td>150</td>
<td>180</td>
<td>210</td>
<td>240</td>
<td>270</td>
<td>300</td>
</tr>
</tbody>
</table>
Nitroglycerin: (Nitrostat, Nitro-bid, Nitro-Dur, Nitrol, NTG) antianginal, coronary and peripheral vasodilator.

**Actions:** Smooth muscle relaxant. Dilates coronary arteries increasing blood flow and perfusion to the myocardium. Vasodilation which decreases preload and cardiac work.

**Indications:** Chest pain associated with angina pectoris and acute MI. Acute pulmonary edema.

**Contraindications:** Patients taking Viagra (sildenafil citrate), Cialis, Levitra. Allergy or known hypersensitivity to nitroglycerin. Head trauma. Hypovolemia, hypotension (BP<90mmHg systolic in adults), and shock.

**Adverse reactions/Side Effects:** Headache, dizziness, and weakness, Tachycardia, fainting, and hypotension. Monitor blood pressure between doses.

- **Adult dosage:** 0.4 mg. SL tablet q 3-5 min. MAX of 3 doses in 15 min. Additional doses as needed with systolic BP >90mmHg. Each tablet contains 0.4 mg. **AEMT must stay with the MAX of 3 doses.**

- **Nitro Paste (Transport ONLY):** 2% ointment starting at ½ inch, increase in ½ inch increments until desired results are achieved every 6-8 hrs.

Nitroglycerin Infusion 50 mg / 250 ml = 200 mcg/ml  *(increase by 10 mcg/min = increase of 3 cc/hr)*

<table>
<thead>
<tr>
<th>Dosage</th>
<th>Pump setting</th>
<th>Dosage</th>
<th>Pump setting</th>
<th>Dosage</th>
<th>Pump setting</th>
<th>Dosage</th>
<th>Pump setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 mcg/min</td>
<td>1.5 cc/hr</td>
<td>30 mcg/min</td>
<td>9 cc/hr</td>
<td>70 mcg/min</td>
<td>21 cc/hr</td>
<td>110 mcg/min</td>
<td>33 cc/hr</td>
</tr>
<tr>
<td>10 mcg/min</td>
<td>3.0 cc/hr</td>
<td>40 mcg/min</td>
<td>12 cc/hr</td>
<td>80 mcg/min</td>
<td>24 cc/hr</td>
<td>120 mcg/min</td>
<td>36 cc/hr</td>
</tr>
<tr>
<td>15 mcg/min</td>
<td>4.5 cc/hr</td>
<td>50 mcg/min</td>
<td>15 cc/hr</td>
<td>90 mcg/min</td>
<td>27 cc/hr</td>
<td>130 mcg/min</td>
<td>39 cc/hr</td>
</tr>
<tr>
<td>20 mcg/min</td>
<td>6.0 cc/hr</td>
<td>60 mcg/min</td>
<td>18 cc/hr</td>
<td>100 mcg/min</td>
<td>30 cc/hr</td>
<td>140 mcg/min</td>
<td>42 cc/hr</td>
</tr>
</tbody>
</table>
PROCAINAMIDE HCL

**Actions:** Procainamide exerts a depressing antiarrhythmic action on the heart, slowing the rate, slowing conduction, reducing myocardial irritability, and prolonging the refractory period. Decreases membrane permeability of the cell and prevents loss of sodium and potassium ions. Onset of action should occur in 2 to 3 minutes. Half-life is 3 to 4 hours.

**Indications:** Suppresses PVC’s and recurrent ventricular tachycardia when lidocaine is contraindicated or has not suppressed ventricular arrhythmias. Used to treat wide-complex tachycardias difficult to distinguish from VT (lidocaine is preferred)

**Contraindications:** Complete atrioventricular heart block, second or third degree AV block unless an electrical pacemaker is operative, preexisting QT prolongation, torsade de pointes, known sensitivity to procainamide. Procainamide is excreted by the kidneys. Caution use in patients with renal failure.

**Side Effects:** Hypotension with a blood pressure drop over 15 mm Hg, PR interval prolongation, QRS complex widening, QT interval prolongation, ventricular asystole, V-Fib, VT.

**Precaution:** Use extreme caution in first and second degree blocks, VT after an Myocardial infarction, digitalis intoxication, CHF, any structural heart disease and impaired liver or reduced kidney function.

- **Loading Dose:** 100 mg every 5 minutes or 50 mg per minute IV Drip. May be given as an infusion until arrhythmia suppressed or 500 mg is administered. Wait 10 minutes to allow adequate distribution, then resume dosing until arrhythmia suppressed or maximum initial dose (1gm or 17 mg/kg) is reached, or side effects appear (hypotension, QRS widening by 50%)

- **Maintenance Dose:** After arrhythmia is suppressed or max. Dose reached, follow initial dose with an infusion of 1 to 4 mg/min. Titrate to control arrhythmias.
  - decrease dose to 12 mg/kg for loading dose.
  - decrease dose by 1/3 for mild renal failure impairment.
  - decrease dose by 2/3 for severe renal impairment.

**How Supplied:** Add 1 gram of procainamide to 50, 250, or 500 ml of NS or LR, which yields 20 mg/ml, 4 mg/ml, or 2 mg/ml respectively. 20 mg/ml should be used as a loading dose. 2 and 4 mg/ml dilutions may be used for loading or maintenance based on fluid restrictions. Use an infusion pump or a microdrip (60 gtt/ml) for infusion to deliver a constant rate. Up to 50 mg may be given direct IV over 1 minute with extreme caution, follow with a maintenance infusion at 1 to 4 mg/min.
PROPOFOL (DIPRIVAN) IV DRIP ADMINISTRATION – TRANSFER ONLY

**Actions:** Propofol is highly protein bound in vivo and is metabolized by conjugation in the liver. Its rate of clearance exceeds hepatic blood flow, suggesting an extrahepatic site of elimination as well. It has several mechanisms of action, both through potentiation of GABA-A receptor activity, thereby slowing the channel closing time, and also acting as a sodium channel blocker.

The elimination half-life of propofol has been estimated to be between 2–24 hours. However, its duration of clinical effect is much shorter because propofol is rapidly distributed into peripheral tissues. When used for IV sedation propofol typically wears off in minutes. Propofol is versatile; the drug can be given for short or prolonged sedation as well as for general anesthesia. Its use is not associated with nausea as is often seen with opioid medications.

**Indications:** Propofol is a short-acting intravenous nonbarbiturate sedative agent used for the induction of general anesthesia for adults and children, maintenance of general anesthesia, and sedation in medical contexts, such as intensive care unit (ICU) sedation for intubated, mechanically ventilated adults, and in procedures such as colonoscopies and endoscopies and dental surgery. Its effects are similar to that of Sodium Pentothal. It provides no analgesia.

**Side Effects:** Aside from the hypotension (mainly through vasodilatation) and transient apnea following induction doses, one of propofol’s most frequent side effects is pain on injection, especially in smaller veins. This pain can be mitigated by pretreatment with lidocaine. Patients tend to show great variability in their response to propofol, at times showing profound sedation with small doses. A more serious but rare side effect is dystonia. Mild myoclonic movements are common, as with other intravenous hypnotic agents. Propofol has not been known to trigger malignant hyperpyrexia. Another recently described rare, but serious, side effect is propofol infusion syndrome. This potentially lethal metabolic derangement has been reported in critically-ill patients after a prolonged infusion of high-dose propofol in combination with catecholamines and/or corticosteroids.

**Precaution:** Use with opiates or sedatives may intensify the reduction of systolic, diastolic, and mean arterial pressure, and cardiac output and may decrease induction dose requirements.

**Adverse Reactions:**
- **CNS:** movement, headache, dizziness, twitching, colonic/myoclonic movement
- **CV:** hypotension, bradycardia, hypertension
- **DERM:** flushing
- **GI:** nausea, vomiting, ABD cramping
- **RESP:** apnea, cough / hiccups
- **LOCAL:** injection site burning/stinging, pain, tingling, numbness, coldness
- **Other:** fever

**Contraindications:** Allergy to eggs or soybeans/soy products.

- **Dosage:** Drip is initiated at hospital starting at 20 mcg/kg/minute or greater.

- **Maintenance of Sedation Therapy:** Increase drip by 5-15 mcg/kg/min every 5-10 minutes until desired affect is achieved. **If patient requires a rate greater than 50 mcg/kg/min, contact physician.** Reassess patient’s sedation level using the Richmond Sedation Scale and monitoring criteria every 10-15 minutes until target level is achieved; then as clinically indicated or a minimum of every 4 hours if comfortable.

*May make propofol changes every 5-10 minutes.*

1. If patient is more sedated than the ordered **Richmond Sedation Scale**, decrease the dose by one-half and reassess in 10-15 minutes or as ordered.

2. Monitor B/P every 15 minutes with initial titration and throughout transport.

3. Document **Richmond Sedation Scale (RASS)** with each set of vital signs or when adjusting the dose.
**ROCURNONIUM BROMIDE (ZEMURON)  TRANSFER ONLY**

**Action:** Nondepolarizing blocker competes with acetylcholine at cholinergic receptor sites on the skeletal muscle membrane. This action blocks acetylcholine’s neurotransmitter actions, preventing muscle contraction.

**Indications:** Relax skeletal muscle and manage patients who are fighting mechanical ventilation.

**Adverse Reactions:** Neuromuscular blockers may cause apnea, hypotension, hypertension, arrhythmias, tachycardia, bronchospasm, excessive bronchial or salivary secretions, nausea/vomiting, and skin reactions.

**Contraindications/Cautions:** Hypersensitivity to any of the drugs components. Use cautiously in elderly patients and those with hepatic disease, severe obesity, bronchogenic cancer, electrolyte disturbances, altered circulation or edema.

- **Maintenance of Sedation Therapy:**
  - **Adult:** Initially, 0.6 mg/kg IV/IO bolus – 0.6–1.0 mg/kg for additional sedation.
  - **Peds:** 0.3-0.5 mg/kg IV/IO

- **Administration Requirement:** Patient must be chemically sedated prior to transport, Patient MUST be intubated prior to transport, Physician ordered for maintenance of sedation.

**How Supplied:** Pre-filled syringes containing 50 mg/5 ml (10 mg/ml).

You **MUST USE A SEDATIVE** with Rocuronium; **Fentanyl and/or Versed**

- **Fentanyl (Induction):** 2-10 mcg/kg IV for analgesia in awake patient
- **Versed (sedative):** 0.5-4 mg IV/IO/IN for sedation & anti-anxiety in awake patient

1. Monitor B/P every 15 minutes with initial titration and throughout transport.
2. Refer to and document **Richmond Sedation Scale (RASS)** with each set of vital signs or when adjusting dose.

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**SODIUM BICARBONATE**

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: Cardiac arrest, Salicylate or Barbiturate/Tricyclic antidepressant OD.

**Contraindications:** Congestive heart failure; alkalotic states.

**Side Effects:** Sodium Bicarbonate administration increases CO2 which rapidly enters cells, causing paradoxical intracellular acidosis. Administration may cause metabolic alkalosis which is difficult to reverse in the field. Hypernatremia. Hyperosmolality of the blood can occur, resulting in cerebral impairment 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 administered catecholamines. Will precipitate if mixed with calcium chloride. Administration should be guided by arterial blood gases and pH.

**Special notes:** Sodium Bicarbonates lack of proven efficacy and its numerous adverse effects have lead to the reconsideration of its role in cardiac resuscitation. Effective ventilation and circulation of blood during CPR are the most effective treatments for acidosis associated with cardiac arrest. Metabolic acidosis lowers the threshold for the induction of ventricular fibrillation, but has no effect on defibrillation threshold. Metabolic acidosis from medical causes develops slowly, and field treatment is rarely indicated. May be considered for the dialysis patient in cardiac arrest due to suspected hyperkalemia.

**Cardiac arrest Dose:**

- **Adults:** 1 mEq/kg IV. Repeat with 0.5 mEq/kg q 10 min.
- **Pediatrics:** 1 mEq/kg IV. Repeat with 0.5 mEq/kg q 10 min. **MAX** 10 mEq/min.
- **Neonatal:** 0.5 mEq/kg IV, IO (diluted) slowly. May repeat in 10 min.

**How Supplied:** ADULT -Pre-filled syringes containing 50 mEq/50 mL. **INFANT 4.2% – 5 mEq/10 mL**
**THIAMINE**

**Class:** Vitamin (B1)

**Pharmacology and Action:** Thiamine is required for carbohydrate metabolism. The brain is extremely sensitive to thiamine deficiency. Chronic alcohol intake interferes with the body’s use of thiamine. Thiamine is administered by intra-muscular injection or by IV push and is rapidly absorbed by the body.

**Indications:** Coma of unknown origin, especially when alcohol may be involved. Suspected alcoholics and malnourished patients receiving dextrose-containing solutions. Delirium tremens. Wernicke’s Encephalopathy

**Precautions:** None significant in emergency use.

**Side effects and special notes:** Some side effects of thiamine are as follows: hypotension, dyspnea, respiratory failure, sweating, pain at injection site, pulmonary edema. Any comatose patient, especially patients suspected to be alcoholic or possibly under the influence of alcohol should receive thiamine by IV push along with 50% dextrose and narcan.

> **Adult dosage:** 100 mg IV push or IM injection. Thiamine may be given IM or IV, the IV route is preferred. Administer Thiamine PRIOR to 50% Dextrose solution.

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**VALIUM (DIAZEPAM)**

**Actions:** Diazepam is frequently prescribed for the treatment of anxiety and stress. In the emergency care setting it used to treat alcohol withdrawal and seizure activity. The results are derived from the action of diazepam on the limbic, thalamic, hypothalamic, and the spinal cord areas of the CNS.

**Indications:** Seizures, acute alcohol withdrawal, amnesia effect for cardioversion, acute anxiety states.

**Contraindications:** Coma states, shock states, substance abuse, known hypersensitivity.

**Adverse Reactions:** Respiratory depression, psychomotor impairment and reflex tachycardia.

**Drug Interactions:** IV lines must be flushed between meds; may potentate other meds.

**Precautions:** Use in pregnancy, venous irritation, and short duration as anticonvulsant.

> **Adult dosage:** Seizure; 5-10 mg IV/IO slow maybe repeated q 2-5 min max 30mg.

> Sedation; 5 - 15 mg over 2-3 min

> **Pediatric dosage:** Seizure; 0.25 mg/kg IV/IO slow maybe repeated 2-5 min max 10mg

> **Rectal dose** - 0.5 mg/kg with max of 10mg

**How Supplied:** 10 mg / 2 ml (5 mg/ml) syringe.
**VERSED® (MIDAZOLAM HCL)**

**Actions:** Short-acting benzodiazepine with dose-dependent CNS depressant effects.

**May decrease:** intraocular pressure, mean arterial blood pressure, cardiac output, stroke volume and peripheral vascular resistance. Decreases cerebrospinal fluid pressures in the absence of intracranial lesions, but conversely, may augment cerebrospinal fluid pressure with intracranial pathology.

**Indications:** Induction of sedation and amnesia. May be used for persistent seizure activity.

**Contraindications:** Contraindicated with known hypersensitivity, narrow-angle glaucoma, untreated open-angle glaucoma.

**Side Effects:** Headache, ataxia, increased cough reflex, auditory disturbances, hyporeflexia, apnea, bronchospasm, hypotension, PVC's, junctional rhythm, bradycardia, phlebitis, chills, hiccups and acid taste.

**Precautions:** Do not give intra-arterial. Do not administer rapidly. Use with caution in patients that are older or debilitated, hypotensive, CHF, renal insufficiency, ETOH or other CNS depressants.

- **Adult dosage:** Sedation; 1-2 mg IV/IO/IN q 30 minutes PRN. Seizures; 1-2 mg IN if IV route is not accessible.
- **Pediatric dosage:** Sedation; 0.05 - 0.1 mg/kg, MAX 4 mg IV/IO/IN. Seizures; 0.2 mg/kg IN if IV route is not accessible. **MUST Contact Medical Control for orders PRIOR to Administration**

**How Supplied:** Supplied as a 1mg/ml in 2 ml vial
1. Monitor B/P every 15 minutes with initial titration and throughout transport.
2. Refer to and document **Richmond Sedation Scale (RASS)** with each set of vital signs or when adjusting dose.

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**XOPENEX INHL (LEVALBUTEROL HCL)**

**Class:** Sympathomimetic bronchodilator

**Pharmacology and Action:** Xopenex is a nebulized medication for the treatment of Asthma and COPD. Xopenex is a smooth muscle relaxant for all airway muscles from the trachea to the terminal bronchioles.

Xopenex (levalbuterol HCl) Inhalation Solution is indicated for the treatment or prevention of broncho-spasm in adults and adolescents 12 years of age and older with reversible obstructive airway disease.

**Indications:** As a bronchodilator, it is used to treat asthma and COPD. In general, levalbuterol has similar pharmacokinetic and pharmacodynamics properties to albuterol; however, its manufacturer has implied that the presence of only the R-enantiomer produces fewer side effects. Physicians sometimes elect to use levalbuterol in patients with a history of supraventricular tachycardia or other arrhythmias because it is thought that levalbuterol may produce less direct effects on β₁-adrenergic receptors in the heart. For similar reasons, some pediatricians also use levalbuterol for patients who experience hyperactivity or jitteriness from racemic albuterol.

**CONTRAINDICATIONS:** Xopenex (levalbuterol HCl) Inhalation Solution is contraindicated in patients with a history of hypersensitivity to levalbuterol HCl or racemic albuterol.


- **Adult dosage:** 1.25 mg (dilute with 3 ml NS or Atrovent in SVNeb), may repeat once.
- **Pediatric dosage:** 0.75 - 1.25 mg in 2.5 ml NS SVNeb, in peds 6-11 y/o. **If no relief switch to Atrovent.**

**How Supplied:** 1.25 mg in 0.5 ml single dose container.
**ZOFRAN (ONDANSETRON)**

**Class:** Antiemetic

**Pharmacology and Action:** Zofran is a serotonin 5-HT₃ receptor antagonist used mainly as an antiemetic to treat nausea and vomiting. Its effects are thought to be on both peripheral and central nerves. Ondansetron reduces the activity of the vagus nerve, which activates the vomiting center in the medulla oblongata, and also blocks serotonin receptors in the chemoreceptor trigger zone. It has little effect on vomiting caused by motion sickness, and does not have any effect on dopamine receptors or muscarinic receptors.

**Indications:** The 5-HT₃ receptor antagonists are the primary drugs used to treat and prevent chemotherapy-induced nausea and vomiting (CINV). Many times they are given intravenously about 30 minutes before beginning therapy. Ondansetron is also effective in controlling post-operative nausea and vomiting (PONV) and post-radiation nausea and vomiting, and is a possible therapy for nausea and vomiting due to acute or chronic medical illness or acute gastroenteritis.

**Precautions:** Ondansetron is a well-tolerated drug with few side effects. Constipation, dizziness and headache are the most commonly reported side effects associated with its use. There have been no significant drug interactions reported with this drug's use.

**Side effects and special notes:** Zofran is also used off-label to treat hyperemesis gravidarum in pregnant women, but there is no conclusive data available on its safety in pregnancy, especially during the first trimester. It is also often used to treat cyclic vomiting syndrome.

- **Adult dosage:** 4 mg IV push, may repeat X 1.
- **Pediatric dosage:** 0.1 mg/kg, MAX 4 mg IV

**How Supplied:** 4 mg vial (2 mg/ml)

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### RICHMOND AGITATION-SEDATION SCALE (RASS)

<table>
<thead>
<tr>
<th>Score</th>
<th>Term</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>+4</td>
<td>Combative</td>
<td>Overly combative, violent, Immediate danger to crew</td>
</tr>
<tr>
<td>+3</td>
<td>Very Agitated</td>
<td>Pulls or removes tube(s) or catheter(s); aggressive</td>
</tr>
<tr>
<td>+2</td>
<td>Agitated</td>
<td>Frequent non-purposeful movement; fights ventilator</td>
</tr>
<tr>
<td>+1</td>
<td>Restless</td>
<td>Anxious but movements not aggressive or vigorous</td>
</tr>
<tr>
<td>0</td>
<td>Alert / Calm</td>
<td>Not fully alert, but has sustained awakening (eye opening/eye contact) to voice (greater than 10 sec)</td>
</tr>
<tr>
<td>-1</td>
<td>Drowsy</td>
<td>Not fully alert, but has sustained awakening (eye opening/eye contact) to voice (less than 10 sec)</td>
</tr>
<tr>
<td>-2</td>
<td>Light Sedation</td>
<td>Briefly awakens with eye contact to voice (less than 10 sec)</td>
</tr>
<tr>
<td>-3</td>
<td>Moderate Sedation</td>
<td>Movement or eye opening to voice (but no eye contact)</td>
</tr>
<tr>
<td>-4</td>
<td>Deep Sedation</td>
<td>No response to voice, but movement or eye opening to physical stimulation</td>
</tr>
<tr>
<td>-5</td>
<td>Unarousable</td>
<td>No response to voice or physical stimulation</td>
</tr>
</tbody>
</table>

*Verbal Stimulation*  
*Physical Stimulation*
<table>
<thead>
<tr>
<th>Level</th>
<th>Medication</th>
<th>Adult Dose</th>
<th>Pediatric Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.5 - 1 g/kg</td>
</tr>
<tr>
<td>B</td>
<td>Activated Charcoal</td>
<td>1 - 2 g/kg</td>
<td>0.5 - 1 g/kg</td>
</tr>
<tr>
<td>P</td>
<td>Adenosine</td>
<td>1st: 6 mg IV Push</td>
<td>1st: 0.1 mg/kg IV Push</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2nd: 12 mg IV Push</td>
<td>2nd: 0.2 mg/kg</td>
</tr>
<tr>
<td>B</td>
<td>Aspirin</td>
<td>324 mg (4 chewable tablets)</td>
<td></td>
</tr>
<tr>
<td>P</td>
<td>Atropine (Cardiac)</td>
<td>Brady: 0.5 - 1 mg IV/IO</td>
<td>Brady: 0.02 mg/IO</td>
</tr>
<tr>
<td>P</td>
<td>Atropine (poisoning)</td>
<td>2 - 5 mg q 15 min IV/IO</td>
<td>0.05 - 0.1 mg/kg q 15 min IV/IO</td>
</tr>
<tr>
<td>A</td>
<td>Atralvent Nebulizer</td>
<td>0.5 mg</td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>Benadryl</td>
<td>25 - 50 mg IV/IO/IM</td>
<td>1 mg/kg IV/IO/IM</td>
</tr>
<tr>
<td>P</td>
<td>Calcium Chl 10%</td>
<td>500 - 1000 mg IV/IO</td>
<td>slow</td>
</tr>
<tr>
<td>A</td>
<td>Calcium Chl 10%</td>
<td>25 - 50 ml (25 g) IV</td>
<td>slow (dilute w/ IV fluids)</td>
</tr>
<tr>
<td>P</td>
<td>Diazepam</td>
<td>Seizure: 5 - 10 mg IV/IO/IM slow</td>
<td>Seizure: 0.25 mg/kg IV/IO/IM (max 10 mg)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sedation: 5 - 15 mg slow</td>
<td>Rectal: 0.5 mg/kg (max 10 mg)</td>
</tr>
<tr>
<td>A</td>
<td>Epinephrine</td>
<td>1:1=1:1000</td>
<td></td>
</tr>
<tr>
<td>P</td>
<td>Epinephrine</td>
<td>1:1=1:1000 1:10</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Arrest: 1mg q 3-5</td>
<td>1:1=1:1000 1:10 Arrest/Bday: 0.01 mg/kg (max 0.2 mg/kg)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Asthma/Allergy: 0.3-0.5 mg</td>
<td>Asthma/Allergy: 0.01mg/kg &lt;0.3mg</td>
</tr>
<tr>
<td>P</td>
<td>Fentanyl</td>
<td>12.5 - 100 mcg IV/IO/IM/IN slow</td>
<td>1 mcg/kg IV/IO/IM/IN slow</td>
</tr>
<tr>
<td>P</td>
<td>Furosemide</td>
<td>0.5 – 1 mg/kg IV/IO</td>
<td>slow</td>
</tr>
<tr>
<td>A</td>
<td>Glucagon</td>
<td>1 mg IV/IO/SQ/IM/IN</td>
<td>slow</td>
</tr>
<tr>
<td>P</td>
<td>Lasix</td>
<td>0.5 – 1 mg/kg IV/IO</td>
<td>slow</td>
</tr>
<tr>
<td>P</td>
<td>Lidocaine</td>
<td>1-1.5 mg/kg IV/IO</td>
<td>slow</td>
</tr>
<tr>
<td>P</td>
<td>Magnesium Sulfate</td>
<td>Cardiac: 1-2 g IV slow (over 5-10 min)</td>
<td>Eclampsia: 1-2 g in NS flush over 5-10 min</td>
</tr>
<tr>
<td>P</td>
<td>Morphine</td>
<td>2 - 4 mg IV/IO/IM/IN</td>
<td>slow</td>
</tr>
<tr>
<td>A</td>
<td>Narcan</td>
<td>0.4 – 2 mg IV/IO/IM/IN (may repeat)</td>
<td>0.1 mg/kg IV/IO/IM/IN slow</td>
</tr>
<tr>
<td>B</td>
<td>Nitroglycerin</td>
<td>0.4 mg SL q 5 min X 3</td>
<td>EMT may Assist</td>
</tr>
<tr>
<td>P</td>
<td>Rocuronium</td>
<td>0.6-1.0 mg/kg IV/IO</td>
<td>0.3-0.5 mg/kg IV/IO Transfer ONLY</td>
</tr>
<tr>
<td>P</td>
<td>Sodium Bicarb.</td>
<td>1 mEq/kg IV/IO repeat ½ q 10 min</td>
<td>1 mEq/kg IV/IO repeat ½ q10 min</td>
</tr>
<tr>
<td>A</td>
<td>Thiamine</td>
<td>100 mg IV/IM/IO PRIOR to D 50</td>
<td></td>
</tr>
<tr>
<td>P</td>
<td>Versed</td>
<td>1-2 mg IV/IO/IN q30 min PRN</td>
<td>0.05—1 mg/kg IV/IO/IN (MAX 4 mg) MUST have MD Order Prior to use</td>
</tr>
<tr>
<td>A</td>
<td>Xopenex Neb</td>
<td>1.25 mg in 2.5 ml NS (may repeat X1)</td>
<td>0.075 mg/kg in 2.5 ml NS (may repeat X1)</td>
</tr>
<tr>
<td>A</td>
<td>Zofran</td>
<td>4 mg IV/IO/IM/IN (may repeat X 1)</td>
<td>0.1 mg/kg IV/IO/IM/IN (MAX 4 mg)</td>
</tr>
</tbody>
</table>
### INTUBATION & SEDATION - QUICK REFERENCE GUIDE

#### Pre-event Equipment Checklist for Intubation

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AIRWAY Assessment</strong></td>
<td></td>
</tr>
<tr>
<td>Mallampati Classification (if possible)</td>
<td></td>
</tr>
<tr>
<td>Mouth Opening (at least two fingers width) - Cervical mobility</td>
<td></td>
</tr>
<tr>
<td>IV or IO patent</td>
<td></td>
</tr>
<tr>
<td>Cardiac Monitor / Pulse Oximeter / Automatic blood pressure cuff / End-tidal CO2 monitor</td>
<td></td>
</tr>
<tr>
<td>BVM with Oxygen / Suction (confirm working)</td>
<td></td>
</tr>
<tr>
<td>Endotracheal Tubes / Stylet / Laryngoscope Handle &amp; Blades / 10 mL syringe / Tube Holder</td>
<td></td>
</tr>
</tbody>
</table>

#### ADULT Intubation & Sedation Guidelines

**Pre-oxygenate**

Pre-oxygenate with 100% oxygen by mask. Assist ventilations as needed. Apply cricoide pressure if victim is unconscious.

**Pre-medicate**

Pre-medicate as appropriate; then WAIT 3 MINUTES after drug administration

- **Fentanyl (Induction):** 2-10 mcg/kg IV/IO/IN for analgesia in awake patient
- **Versed (sedative):** 0.5-4 mg IV/IO/IN for sedation & anti-anxiety in awake patient
- **Atropine:** 0.02 mg/kg IV – for child less than 5 y/o (minimum dose 0.1 mg)
- **Lidocaine:** 1 mg/kg IV (head injury)

**Placement: Performance**

Perform endotracheal intubation. If unable to intubate within 20 sec. – BVM for 30-60 sec. and Reattempt. Use O2 sats as a guide. Treat bradycardia with Atropine 0.5 mg IV push.

**Placement: Primary confirmation**

Perform primary confirmation of ET placement:
- By direct visualization of ET passing through vocal cords
- By chest rise/fall with each ventilation (bilaterally)
- By auscultation: epigastrium; anterior chest L and R; midaxillary line L and R.

**Placement: Secondary confirmation**

Perform secondary confirmation of ET placement:
- By ETCO2 monitoring
- Esophageal detector device
- Monitor O2 saturation

**Placement: prevent dislodgment**

Secure ET with commercial ET holder
In out-of-hospital setting – immobilize cervical spine with C-Collar

**Maintain Sedation for Intubated Pt.**

For ADULT patients being transferred: Maintain sedation to prevent tube dislodgment;

- **Fentanyl:** 2-10 mcg/kg IV/IO PRN  **AND Versed or Rocuronium AS NEEDED**
- **Versed:** 1-4 mg IV/IO q 15 minutes PRN or as ordered by MD
- **Rocuronium:** 0.6-1.0 mg/kg q 30 minutes PRN or as ordered by MD – **MUST USE SEDATION**
- **Propofol:** (Infusion) may increase 5-15 mcg/kg/min or as ordered by MD – **SEE PROTOCOL**

<table>
<thead>
<tr>
<th>Sedative</th>
<th>Dosage IV Push</th>
<th>Onset</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fentanyl</strong></td>
<td>Induction: 2 – 10 mcg/kg Sedation (titrate): 3 mcg/kg</td>
<td>60 seconds</td>
<td>30 – 60 min</td>
</tr>
<tr>
<td><strong>Versed</strong></td>
<td>Induction: 0.07–0.3 mg/kg Sedation (titrate): 0.02–0.04 mg/kg</td>
<td>2 minutes</td>
<td>1 – 2 hours</td>
</tr>
<tr>
<td><strong>Propofol</strong></td>
<td>Initial start @ 20-35 mcg/kg/min (may increase 5-15 mcg/kg/min)</td>
<td>40 seconds</td>
<td>3 – 5 min</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dose</th>
<th>Route</th>
<th>Duration of Paralysis</th>
<th>Side Effects</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rocuronium</td>
<td>0.6-1.2 mg/kg</td>
<td>IV</td>
<td>40+ min</td>
<td>Minimal cardiovascular side effects</td>
<td>Rapid-action onset like succinylcholine</td>
</tr>
</tbody>
</table>
**Reference Tables / Labs / Calculations**

### IV Fluid Rates in Drops/Minute

<table>
<thead>
<tr>
<th>DRIP SET:</th>
<th>10</th>
<th>20*</th>
<th>60</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 cc/hr</td>
<td>5</td>
<td>10</td>
<td>30</td>
</tr>
<tr>
<td>60 cc/hr</td>
<td>10</td>
<td>20</td>
<td>60</td>
</tr>
<tr>
<td>100 cc/hr</td>
<td>17</td>
<td>33</td>
<td>100</td>
</tr>
<tr>
<td>200 cc/hr</td>
<td>33</td>
<td>67</td>
<td>200</td>
</tr>
<tr>
<td>300 cc/hr</td>
<td>50</td>
<td>100</td>
<td>300</td>
</tr>
<tr>
<td>400 cc/hr</td>
<td>67</td>
<td>133</td>
<td>400</td>
</tr>
<tr>
<td>500 cc/hr</td>
<td>83</td>
<td>167</td>
<td>500</td>
</tr>
<tr>
<td>1000 cc/hr</td>
<td>167</td>
<td>333</td>
<td>1000</td>
</tr>
</tbody>
</table>

*Hospital Pump tubing=20 gtt/cc

### Pediatric Vital Signs

<table>
<thead>
<tr>
<th>AGE</th>
<th>HR-Awake</th>
<th>HR-Sleep</th>
<th>Resp. Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infant &lt;1y/o</td>
<td>85—205</td>
<td>80—160</td>
<td>30—60</td>
</tr>
<tr>
<td>Toddler 1-4y/o</td>
<td>85—190</td>
<td>75—160</td>
<td>24—40</td>
</tr>
<tr>
<td>School-age 4-9</td>
<td>60—140</td>
<td>60—90</td>
<td>22—34</td>
</tr>
<tr>
<td>Adolescent</td>
<td>60—100</td>
<td>50—90</td>
<td>12—16</td>
</tr>
</tbody>
</table>

**Typical Systolic BP for 1-10 y/o:** 90 + (age yrs X 2) mmHg  
**Lower Systolic Limit for 1-10 y/o:** 70 + (age yrs X 2) mmHg  
**Lower Range-Normal Systolic BP for >10 y/o:** approx. 90 mmHg  
**Typical MEAN AP (50th%) = 55 + (age yrs X 1.5) mmHg**

### Common Lab Values

<table>
<thead>
<tr>
<th>HEMATOLOGY</th>
<th>Male</th>
<th>Female</th>
<th>ARTERIAL BLOOD GAS</th>
</tr>
</thead>
<tbody>
<tr>
<td>RBC</td>
<td>4.2 - 5.6 M/mL</td>
<td>3.8 - 5.1 M/mL</td>
<td>pH</td>
</tr>
<tr>
<td>WBC</td>
<td>3.8 – 11 K/mm³</td>
<td></td>
<td>PaCO2</td>
</tr>
<tr>
<td>Hgb</td>
<td>14 – 18 g/dL</td>
<td>11 – 16 g/dL</td>
<td>PaO2</td>
</tr>
<tr>
<td>Hct</td>
<td>39 – 54%</td>
<td>34 – 47%</td>
<td>HCO3</td>
</tr>
<tr>
<td>MCV</td>
<td>78 – 98 fL</td>
<td></td>
<td>O2 Sats</td>
</tr>
<tr>
<td>Neutrophils</td>
<td>50 – 81%</td>
<td></td>
<td>BLOOD CHEMISTRIES</td>
</tr>
<tr>
<td>Bands</td>
<td>1 – 5 %</td>
<td></td>
<td>BUN</td>
</tr>
<tr>
<td>Lymphocytes</td>
<td>14 – 44 %</td>
<td></td>
<td>Ca++ (calcium)</td>
</tr>
<tr>
<td>COAGULATION</td>
<td></td>
<td></td>
<td>Cl- (chloride)</td>
</tr>
<tr>
<td>Platelets</td>
<td>140,000 – 450,000/ml</td>
<td></td>
<td>Creatinine</td>
</tr>
<tr>
<td>Plasminogen</td>
<td>62 – 130%</td>
<td></td>
<td>Glucose</td>
</tr>
<tr>
<td>PT</td>
<td>10 – 14 sec.</td>
<td></td>
<td>Mg++ (magnesium)</td>
</tr>
<tr>
<td>PTT</td>
<td>32 – 45 sec.</td>
<td></td>
<td>Phosphorus</td>
</tr>
<tr>
<td>Fibrinogen</td>
<td>160 – 450 mg/dL</td>
<td></td>
<td>K+ (potassium)</td>
</tr>
<tr>
<td>INR</td>
<td>0.9 – 1.1</td>
<td></td>
<td>Na+ (sodium)</td>
</tr>
</tbody>
</table>

**“3:00 AM Rule”**  
To convert lbs to Kg, divide lbs by 2 and subtract 10%

**Drug Dose Calculation**  
\[
\text{dose ordered (mg)} \times \frac{\text{vol. of drug in pkg (mL)}}{\text{amt of drug in package (mg)}} = \text{volume to admin}
\]

**IV Fluids Infusion Formula**  
\[
\text{Total amt (ml)} \times \frac{\text{drop factor}}{\text{Total time (in minutes)}} = \text{drops/minute}
\]

**NS - IV Fluid - Burn Resuscitation**  
\[
\frac{(\% \text{burn area}) \times (\text{pt. wt. in Kg})}{4} = \text{mL/hr (over 8 hrs)}
\]
Criteria: ST Elevation Myocardial Infarction with onset of symptoms less than 12 hours

- In-the-door to out-the-door is less than 30 minutes.
- Call RCRH Emergency Department who will then notify the Cardiologist on call 605-719-8222 or 1-800-865-2920
- Indications for TNK with STEMI:
  - ST elevation > 1mm in 2 contiguous leads, symptom onset to DX time less than 12hrs
  - New LBBB, less than 12 hrs
  - True posterior MI, less than 12 hrs
  - ST elevation symptom to Dx for 12-24h with continued chest pain and ST elevation
- Contraindications for TNK with STEMI:
  Absolute - Active internal bleeding (not menses)
  - Ischemic CVA within 3 months
  - Structural cerebrovascular lesion
  - Malignant intracranial neoplasm
  - Significant closed head trauma (3months)
  - Suspected aortic dissection
  - Prior hemorrhagic CVA (ever)
  Relative - Uncontrolled HTN on presentation
  - Ischemic CVA >3 months ago
  - Prolonged CPR (>10 min)
  - Surgery w/in 3 wks
  - Active PUD
  - Non compressible vascular puncture
  - Prior exposure (>5days) for SK or APSAC
  - Pregnancy
  - Warfarin INR>2-3 or bleeding diathesis
  - Recent internal bleeding (w/in 2-3 wks)

- Adjunctive Antithrombin Regimens:
  - Enoxaparin (Lovenox): 30 mg IV bolus followed 15 min. later by 1mg/kg SQ every 12h (if serum creatinine is less than 2.5 mg/dl for men and less than 2mg/dl for women)
    - For patients greater than or equal to 75 y/o, no IV bolus and decrease dose to 0.75mg/kg SQ every 12h
    - For any patient with an estimated CrCl less than 30ml/min, 1mg/kg SQ every 24h, or use UFH
  or
  - Unfractionated Heparin: 60 units/kg (max 4000units) IV bolus, then 12units/kg/hour (initial max 1000units/hr) infusion, adjusted to aPTT 1.5-2 times control (50-70sec)
  and
  - Clopidogrel (Plavix): 300 mg loading dose in patients less than 75 years of age - then 75 mg PO each day
Criteria: ST Elevation Myocardial Infarction
with onset of symptoms less than 12 hours

- In-the-door to out-the-door goal is less than 30 minutes.
- Activate Ambulance or Life Flight if appropriate and available:
  - Call RCRH Emergency Department who will then notify the Cardiologist on call and activate a STEMI Alert: 605-719-8222 or 1-800-865-2920
- If unable to complete Primary PCI within 90 min., refer to TNK Protocol
- Monitor, Oxygen, IV with saline— in left hand/arm if possible
- Aspirin—81 mg, (give 4 chewable) PO
- Clopidogrel (Plavix) 600 mg PO (confer with Cardiologist first)
- Nitroglycerin 0.4 mg SL (repeat as needed or IV)
- Enoxaparin (Lovenox): 30 mg IV bolus followed 15 min. later by 1mg/kg SQ every 12 h (if serum creatinine is less than 2.5 mg/dl for men and less than 2 mg/dl for women)
  - For patients greater than or equal to 75 y/o, no IV bolus and decrease dose to 0.75mg/kg SQ every 12 h
  - For any patient with an estimated CrCl less than 30ml/min, 1mg/kg SQ every 24 h, or use UFH
- Beta Blocker: Metoprolol (Lopressor) 25 mg PO if stable
- Morphine Sulfate as needed for pain
- Metoclopramide (Reglan) 10 mg IV as needed for nausea
- Second IV, saline locked
- Attach hands free defibrillator pads
- Sedation: consider Versed for transport
- Fax STEMI Transfer Data Sheet to RCRH Cath Lab at 605-719-8983
- Please notify RCRH ED Admissions of patient’s ETA and demographic data: 605-719-8212 or Fax: 605-719-1009