

# **Medications**



# Acetaminophen – 20.010

## CLASS: A

### PROTOCOL(S) USED IN:

Seizure

### PHARMACOLOGY AND ACTIONS:

Non-narcotic analgesic and antipyretic

### INDICATIONS:

Reduction of fever associated with febrile seizures in the pediatric patient.

### CONTRAINDICATIONS:

- A. Hypersensitivity
- B. DO NOT use with any other products that contain acetaminophen

### SIDE EFFECTS AND NOTES:

May be administered via rectal suppository (same dose) if patient is vomiting, the patient's gag reflex is absent or in question or the patient is not alert. Can be given up to every 4 hours. Do not exceed five doses a day.

### DOSING/DOSING CHART:

- A. 15 mg/kg PO/PR suppository or
- B. See chart below for other concentrations/forms

Weight	Age	80mg Tablets	160mg/tsp Elixir	80mg/0.8ml Drops	Mg
6-11 lbs	0-3 mos	---	¼ tsp	.4ml	40mg
12-17lbs	4-11mos	---	½ tsp	.8ml	80mg
18-23lbs	11-23mos	1 ½ tab	¾ tsp	1.2ml	120mg
24-35lbs	2-3yrs	2 tabs	1 tsp	1.6ml	160mg
36-47lbs	4-5yrs	3 tabs	1 ½ tsp	2.4ml	240mg
48-59lbs	6-8yrs	4 tabs	2 tsp	3.2ml	320mg
60-71lbs	9-10yrs	5 tabs	2 ½ tsp	4.0ml	400mg
72-95lbs	11-12yrs	6 tabs	3 tsp	4.8ml	480mg



# Activated Charcoal – 20.020

## CLASS: B

### PROTOCOLS USED IN: Poisoning & Overdoses

#### PHARMACOLOGY AND ACTIONS:

Activated charcoal adsorbs toxic substances ingested and inhibits GI adsorption by forming an effective barrier between the particulate material and the gastrointestinal mucosa. The effect is greatest if used within one hour of ingestion. It can absorb up to 99% of another substance to render it inert.

#### INDICATIONS:

Management of poisoning or overdose of many substances.  
May administer with order from OLMC or Poison Control.

#### CONTRAINDICATIONS:

- A. Patients with altered mental status or the inability to maintain their own airway.
- B. Patients who have aspirated or with a potential for aspiration.

#### PRECAUTIONS:

- A. Activated charcoal may be ineffective in some ingestions.
- B. Milk, ice cream and other dairy products will decrease the absorption capacity substantially.

#### SIDE EFFECTS AND NOTES:

May cause nausea, vomiting and black stool. May inactivate other drugs administered orally. Often used with magnesium citrate.

#### ADULT DOSING:

##### Poisoning & overdose -

- 1-2grams/kg premixed
- If needed to be mixed, ratio of 1:4 parts
- Administer orally or via nasogastric tube

#### PEDIATRIC DOSING:

Same as adult.



## Adenosine (Adenocard®) – 20.030

### CLASS: A

#### PROTOCOLS USED IN: Cardiac Dysrhythmias - Tachycardia

#### PHARMACOLOGY AND ACTIONS:

Adenosine is a naturally occurring nucleoside that has the ability to slow conduction through the AV node. Since most cases of PSVT involve AV nodal re-entry, Adenosine is capable of interrupting the AV nodal circuit and stopping the tachycardia, restoring normal sinus rhythm. It is eliminated from the circulation rapidly and has a half-life in the blood of less than ten seconds.

#### INDICATIONS:

To convert PSVT to a normal sinus rhythm, including PSVT that is associated with accessory bypass tracts (e.g. Wolff-Parkinson-White Syndrome).

#### CONTRAINDICATIONS:

- A. Second or third degree heart block.
- B. Sick Sinus Syndrome
- C. Known hypersensitivity

#### PRECAUTIONS:

- A. When doses larger than 12 mg are given by injection there may be a decrease in blood pressure secondary to a decrease in vascular resistance.
- B. The effects of Adenosine are antagonized by methylxanthines such as Theophylline and caffeine. Larger doses of Adenosine may be required.
- C. Adenosine effects are potentiated by dipyridamole (Persantine) resulting in prolonged asystole.
- D. In the presence of carbamazepine (Tegretol), high degree heart block may occur.
- E. Adenosine is not effective in converting atrial fibrillation, atrial flutter or ventricular tachycardia. May attempt Adenosine administration in monomorphic, wide complex tachycardia where SVT with aberrancy is suspected.
- F. All doses of adenosine should be reduced to one-half (50%) in the following clinical settings:
  - a. History of cardiac transplantation.
  - b. Patients who are on carbamazepine (Tegretol) and dipyridamole (Persantine).
  - c. Administration through any central line.

#### SIDE EFFECTS AND NOTES:

May cause facial flushing, shortness of breath, chest pressure, nausea, headache and lightheadedness.

**ADULT DOSING: 6 mg rapid IV.** May repeat with 12 mg IV x 2 if patient fails to convert after initial dose. Use a large proximal IV site with fluid bolus flush.

#### PEDIATRIC DOSING:

**PSVT - 0.1 mg/kg rapid IV.** May repeat with 0.2 mg/kg once if patient fails to convert after first dose. Use a large proximal IV site with fluid bolus flush. Max single dose correlates with adult doses.



## Albuterol (Ventolin®) – 20.040

### CLASS A: Respiratory Distress

### CLASS B: Hyper K & Crush injury

PROTOCOLS USED IN: Respiratory Distress, Hyperkalemia and Crush Injury

#### PHARMACOLOGY AND ACTIONS:

Albuterol is a potent, relatively selective Beta-2 adrenergic bronchodilator and is associated with relaxation of bronchial smooth muscle and inhibition of release of mediators of immediate sensitivity from cells, especially MAST cells. The onset of improvement in pulmonary function is within 2 – 15 minutes after the initiation of treatment and the duration of action is from 4 – 6 hours. Albuterol has occasional Beta-1 overlap with clinically significant cardiac effects.

#### INDICATIONS:

- A. To treat bronchial asthma and reversible bronchial spasm that occurs with chronic obstructive pulmonary disease.
- B. To treat hyperkalemia.

#### CONTRAINDICATIONS:

None in the prehospital setting.

#### PRECAUTIONS:

- A. The patient's rhythm should be observed for arrhythmias. Stop treatment if frequent PVC's develop or any tachyarrhythmias other than sinus tachycardia appear or if heart rate increases by more than 20 beats/minute.
- B. Paradoxical bronchospasm may occur with excessive administration.

#### SIDE EFFECTS AND NOTES:

Clinically significant arrhythmias may occur, especially in patients with underlying cardiovascular disorders such as coronary insufficiency and hypertension.

#### ADULT DOSING:

##### Respiratory distress -

2.5 mg via nebulizer. Repeat as needed.

##### Hyperkalemia -

10 mg via nebulizer. OLMC contact required.

##### Hyperkalemia secondary to crush injury -

OLMC contact required.

#### PEDIATRIC DOSING:

Same as adult



# Albuterol & Atrovent (DuoNeb®) – 20.041

## CLASS: A

### PROTOCOLS USED IN: Respiratory Distress

#### PHARMACOLOGY AND ACTIONS:

Ipratropium is an atropine derivative used for inhalation therapy. For severe asthma, Ipratropium taken in addition to a short acting beta agonist (such as Albuterol) can provide greater bronchodilation and clinical benefit than the beta agonist alone. It has no anti-inflammatory effects and does not decrease bronchial hyper-responsiveness.

#### INDICATIONS:

Bronchial Asthma and reversible bronchial spasm that occur with chronic pulmonary disease.

#### CONTRAINDICATIONS:

Stop treatment if pulse increases by 20 bpm, frequent PVCs develop, any tachyarrhythmias other than sinus tachycardia appear, chest pain, apnea, nausea or vomiting or increased shortness of breath occur.

#### PRECAUTIONS:

Ipratropium in the meter dose inhaler and auto-inhaler formulations should not be administered to individuals allergic to soy lecithin or related food products (e.g. soy beans, peanuts). The nebulized formulation may be administered to these patients.

#### SIDE EFFECTS AND NOTES:

- A. Patients with COPD should be monitored carefully for CO<sub>2</sub> retention and decreased levels of consciousness.
- B. Paradoxical bronchospasm may occur with excessive administration.
- C. Skeletal muscle tremors.
- D. Albuterol should be used with caution in pregnancy.
- E. Continually assess patient's respiratory rate, effort and lung sounds.

#### ADULT DOSING:

##### Nebulizer:

**2.5mg Albuterol/0.5mg Atrovent mixed in 3mL of normal saline for a concentration of 0.83mg/ml with at least 6 lpm of oxygen flow. Coach patient to inhale slowly and exhale passively through nose.**

##### Metered Dose Inhaler (MDI)

##### 90mcg per puff

Assemble one BVM, one AeroChamber, oxygen tubing and Albuterol inhaler.

Begin with two Albuterol puffs into chamber and assist patient's ventilations using the BVM and high flow oxygen.

After one minute, repeat with two puffs. Repeat every two minutes if improvement is not noted. **DO NOT EXCEED 20 PUFFS.**

#### PEDIATRIC DOSING:

≤ 1 year of age: Nebulized dosage of 0.03ml/kg with a max dose of 1ml.



## **Amiodarone (Cordarone®) – 20.050**

**CLASS: A**

**PROTOCOL(S) USED IN: Cardiac Arrest VT/VF, Cardiac Dysrhythmia Tachycardia**

**PHARMACOLOGY AND ACTIONS:**

- A. Antiarrhythmic
- B. Prolongation of the myocardial cell-action potential duration & refractory period.
- C. Noncompetitive alpha and beta-adrenergic inhibition.
- D. Blocks sodium channels and, to some extent, the calcium channels.

**INDICATIONS:**

- A. Refractory sustained ventricular fibrillation/pulseless ventricular tachycardia.
- B. Ventricular Tachycardia with a pulse.

**CONTRAINDICATIONS:**

- A. None when given in the cardiac arrest setting.

**SIDE EFFECTS AND NOTES:**

- A. Hypotension
- B. Bradycardia
- C. Congestive heart failure
- D. AV Block
- E. Shaking vials will cause foaming of the medication

**ADULT DOSING:**

**Pulseless rhythms: 300 mg rapid IV/IO push followed by a 10ml NS flush**

**Rhythm with a pulse: 150 mg in a minimum of 50ml of NS over 10 minutes IV**

**PEDIATRIC DOSING:**

**Vfib/Vtach with/without a pulse: 5 mg/kg**



# Aspirin – 20.060

**CLASS: A**

**PROTOCOL(S) USED IN:** Chest Pain/Acute Coronary Syndrome

**PHARMACOLOGY AND ACTIONS:**

Blocks formation of thromboxane A2 which causes platelets to aggregate and arteries to constrict.

**INDICATIONS:**

Chest pain suspected of being in cardiac in origin.

**CONTRAINDICATIONS:**

- A. Known hypersensitivity
- B. Relatively contraindicated in patients with history of active ulcer disease or asthma.

**SIDE EFFECTS AND NOTES:**

- A. Higher doses can interfere with prostacyclin production and interfere with positive benefits.
- B. Aspirin alone, started within 24 hours of the onset of an acute MI, reduced overall mortality to almost the same degree as thrombolytic agents.

**ADULT DOSING:**

Chest pain (acute myocardial infarction)  
2-4 chewable baby aspirin 162-324 mg PO.

**PEDIATRIC DOSING:**

Not indicated for pediatric patients



# Atropine Sulfate – 20.070

## CLASS: A

**PROTOCOL(S) USED IN:** Cardiac Dysrhythmia Bradycardia, Poisoning & Overdose, RSI (Pediatric), Organophosphates

### PHARMACOLOGY AND ACTIONS:

- A. Muscarine-cholinergic blocking agent.
- B. Increases heart rate by blocking vagal response.
- C. Increases conduction through A-V node and increases ventricular sensitivity to atrial impulses.
- D. Reduces motility and tone of GI tract.
- E. Reduces action and tone of bladder which may cause urinary retention.
- F. Dilates pupils.

### INDICATIONS:

- A. Symptomatic bradycardias, 2<sup>nd</sup> and 3<sup>rd</sup> degree heart blocks and pacemaker failure.
- B. Sustained bradycardia induced during pediatric RSI
- C. Organophosphate and nerve gas poisoning.

### CONTRAINDICATIONS:

- A. Atrial fibrillation and atrial flutter
- B. Glaucoma

### SIDE EFFECTS AND NOTES:

- A. Bradycardia may be beneficial in the AMI setting. Administer only if there are signs of hypoperfusion (chest pain, low blood perfusion, altered mental status).
- B. In organophosphate poisoning, massive doses of 10-20 mg or more may be needed.
- C. Titrate dose by watching patient response.

### ADULT DOSING:

#### **Symptomatic Bradycardia:**

0.5 mg IV/IO push, repeat prn in 3-5 minute intervals to a maximum dose of 3 mg.

#### **Organophosphate Poisoning:**

1-5 mg IV/IO push. Doses should be repeated every 5 minutes until excessive secretions and sweating have been controlled

### PEDIATRIC DOSING:

#### **Symptomatic Bradycardia:**

0.02 mg/kg IV/IO Minimum single dose 0.1 mg, maximum single dose 0.5 mg. If no IV/IO may give 0.04 mg/kg ET. May repeat once.



# Calcium Chloride 10% – 20.080

**CLASS A: Hyperkalemia, Premedication for Antidysrhythmic Use**

**CLASS B: Calcium Channel Blocker OD (Except Cardiac Arrest),  
Hydrogen Fluoride exposure**

**PROTOCOL(S) USED IN: Cardiac Arrest, Cardiac Dysrhythmia Tachycardia,  
Hyperkalemia, Poisoning & Overdoses**

## **PHARMACOLOGY AND ACTIONS:**

Increases the force of myocardial contraction by initiation of myofibril shortening.  
The positive inotropic effects and vasoconstricting effects produce a rise in systemic arterial pressure.

## **INDICATIONS:**

1. Hyperkalemia
2. Suspected Calcium Channel Blocker OD
3. Hypotension prior to antidysrhythmic use
4. Hydrogen Fluoride exposure

## **CONTRAINDICATIONS:**

**Hypercalcemia and hypercalciuria (hyperthyroidism, Vitamin D overdose, bone metastases)**

**Patients on Digoxin**

**When administered in the same IV as Sodium Bicarbonate**

## **SIDE EFFECTS AND NOTES:**

- A. Extravasation of Calcium salts will cause necrosis of tissue. The IV should be secured and free blood return into the syringe should be checked 2-3 times during administration. If extravasation does occur, immediately stop administration.
- B. Administer slowly (no faster than 200 mg/min) and stop if patient complains of distress. Inject using a small needle into a large vein.
- C. Rapid injection of Calcium may cause vasodilatation, decreased blood pressure, bradycardia, cardiac arrhythmias, syncope and cardiac arrest. May produce coronary and cerebral artery spasms.
- D. One preloaded vial of 10 ml Calcium Chloride contains 1 g of calcium chloride salt (= 270 mg elemental calcium or 14 mEq calcium or 7 mmol calcium)

## **ADULT DOSING:**

**Premedication to Diltiazem (Systolic BP <90 mmHg): 500 mg slow IV/IO**

**Hyperkalemia: 1 g slow IV/IO over 5-10 minutes**

**Calcium Blocker OD: Contact OLMC - 1 g slow IV/IO over 5-10 minutes**

**Hydrogen Fluoride Exposure: Contact OLMC - See Exposure Protocol**

## Calcium Chloride 10% – 20.080

### PEDIATRIC DOSING:

**Hyperkalemia, Calcium Channel Blocker Overdose:**

20 mg/kg slow IV/IO over 5 – 10 minutes. Max dose 1 g - Contact OLMC for OD

## Calcium Gluconate – 20.081

**CLASS A: Hyperkalemia, Premedication for Antidysrhythmic Use**  
**CLASS B: Calcium Channel Blocker OD (Except Cardiac Arrest),**  
**Hydrogen Fluoride exposure**

**PROTOCOL(S) USED IN: Cardiac Arrest, Cardiac Dysrhythmia Tachycardia, Hyperkalemia, Poisoning & Overdoses**

**PHARMACOLOGY AND ACTIONS:**

Increases the force of myocardial contraction by initiation of myofibril shortening. The positive inotropic effects and vasoconstricting effects produce a rise in systemic arterial pressure.

**INDICATIONS:**

1. Hyperkalemia
2. Suspected Calcium Channel Blocker OD
3. Hypotension prior to antidysrhythmic use
4. Hydrogen Fluoride exposure

**CONTRAINDICATIONS:**

**Hypercalcemia and hypercalciuria (hyperthyroidism, Vitamin D overdose, bone metastases)**

**Patients on Digoxin**

**When administered in the same IV/IO as Sodium Bicarbonate**

**SIDE EFFECTS AND NOTES:**

- A. Extravasation of Calcium salts will cause necrosis of tissue. The IV should be secured and free blood return into the syringe should be checked 2-3 times during administration. If extravasation does occur, immediately stop administration.
- B. Administer slowly (no faster than 200 mg/min) and stop if patient complains of distress. Inject using a small needle into a large vein.
- C. Rapid injection of Calcium may cause vasodilatation, decreased blood pressure, bradycardia, cardiac arrhythmias, syncope and cardiac arrest. May produce coronary and cerebral artery spasms.
- D. One vial of 10 ml Calcium Gluconate contains 1 g of calcium gluconate salt (= 93 mg elemental calcium or 4.6 mEq calcium or 2.3 mmol calcium)

**ADULT DOSING:**

**Premedication to Diltiazem (BP <90 mmHg):** 1 g slow IV/IO over 5-10 minutes

**Hyperkalemia:** 1 g slow IV/IO over 5-10 minutes

**Calcium Blocker OD:** Contact OLMC - 1 g slow IV/IO over 5-10 minutes

**Hydrogen Fluoride Exposure:** Contact OLMC - See Exposure Protocol

## Calcium Gluconate – 20.081

### PEDIATRIC DOSING:

#### Hyperkalemia, Calcium Channel Blocker Overdose:

50 mg/kg slow IV/IO over 5 – 10 minutes. Max dose 1 g - Contact OLMC for OD

## Dextrose 10 %, 25% & 50% - 20.090

### CLASS: A

PROTOCOL(S) USED IN: Altered Mental Status, Hypoglycemia

### PHARMACOLOGY AND ACTIONS:

- A. Glucose is used by the body as quick energy.
- B. Its use is regulated by insulin, which stimulates storage of glucose from the bloodstream lowering blood glucose levels.
- C. Glucagon, which mobilizes stored glucose into the bloodstream, raises glucose levels.

### INDICATIONS:

- A. Hypoglycemic states usually associated with insulin shock in diabetes.
- B. The unconscious patient, when history is unobtainable but after a blood glucose test.

### CONTRAINDICATIONS:

None

### SIDE EFFECTS AND NOTES:

- A. Determine blood glucose level prior to administration.
- B. If glucose monitor is unavailable, draw blood for a red top tube (5ml).
- C. Extravasation of dextrose will cause necrosis of tissue.
- D. IV should be secured in a large vein and free return of blood into the syringe or tubing should be checked 2-3 times prior to and during administration
- E. If extravasation does occur, immediately dilute with up to 10ml Lidocaine 1% or Normal Saline injected SQ into extravasated area.
- F. Dextrose may precipitate Wernicke's encephalopathy in alcoholics. If suspected, give Thiamine 50-100mg IV prior to administration of dextrose.
- G. Do not draw blood for glucose determination from site proximal to an IV containing glucose or dextrose.
- H. Effect is delayed in elderly patients with poor circulation.
- I. Recheck blood glucose level 5 minutes after administration.

### ADULT DOSING:

#### Hypoglycemia/Altered mental status -

12.5 - 25 grams of Dextrose 50% IV/IO into large, secure vein if patient isn't able to tolerate oral glucose.

### PEDIATRIC DOSING –

#### Hypoglycemia/Altered mental status - Repeat dose as needed.

- o Infants < 10 kg (birth to 1 year) with CBG < 45 mg/dcl:
  - o Give **2.5 - 5 ml/kg of Dextrose 10%.**
- o Children 10 kg – 35kg with CBG < 60 mg/dcl:
  - o Give **2 - 4 ml/kg of Dextrose 25%.**



# Diltiazem (Cardizem®) - 20.100

## CLASS: A

### PROTOCOL(S) USED IN: Cardiac Dysrhythmia Tachycardia

#### PHARMACOLOGY AND ACTIONS:

A calcium channel blocker that inhibits calcium ion influx across cardiac and smooth muscle cells, decreasing myocardium contractility and oxygen demand.

#### INDICATIONS:

- A. Rapid atrial fibrillation or atrial flutter.

#### CONTRAINDICATIONS:

- A. Sick sinus syndrome or second-or-third-degree AV block in the absence of an artificial pacemaker.
- B. Systolic BP below 90 mmHg.
- C. Wolff-Parkinson-White Syndrome or patients with ventricular tachycardia.

#### SIDE EFFECTS AND NOTES:

- A. Headache, dizziness
- B. Arrhythmias, bradycardia, heart failure, AV block-abnormal ECG.
- C. Hypotension, flushing
- D. Nausea, constipation, abdominal discomfort

#### ADULT DOSING:

- A. **0.25mg/kg** slow IV push; max dose 25mg.
- B. If no response, **0.35mg/kg** slow IV push after 15 minutes; max dose 25mg

#### PEDIATRIC DOSING:

NONE

## DILTIAZEM

### 1st Dose

Weight		0.25MG/KG	ML
100 lbs	45 kg	11.3 mg	2.3 ML
110 lbs	50 kg	12.5 mg	2.5 ML
120 lbs	54 kg	13.5 mg	2.7 ML
130 lbs	59 kg	14.8 mg	3 ML
140 lbs	63 kg	15.8 mg	3.2 ML
150 lbs	68 kg	17 mg	3.4 ML
160 lbs	73 kg	18.1 mg	3.6 ML
170 lbs	77 kg	19.3 mg	3.9 ML
180 lbs	82 kg	20.5 mg	4.1 ML
190 lbs	86 kg	21.5 mg	4.3 ML
200 lbs	91 kg	22.7 mg	4.5 ML
210 lbs	95 kg	23.8 mg	4.8 ML
220 lbs	100 kg	25 mg	5 ML

### 2nd Dose

Weight		0.35MG/KG	ML
100 lbs	45 kg	15.8 mg	3.2 ML
110 lbs	50 kg	17.5 mg	3.5 ML
120 lbs	54 kg	18.9 mg	3.8 ML
130 lbs	59 kg	20.7 mg	4.1 ML
140 lbs	63 kg	22 mg	4.4 ML
150 lbs	68 kg	23.8 mg	4.8 ML
160 lbs	73 kg	25 mg	5 ML
170 lbs	77 kg	25 mg	5 ML
180 lbs	82 kg	25 mg	5 ML
190 lbs	86 kg	25 mg	5 ML
200 lbs	91 kg	25 mg	5 ML
210 lbs	95 kg	25 mg	5 ML
220 lbs	100 kg	25 mg	5 ML

**MAX DOSE OF DILTIAZEM IS 25MG**

DOSE CALCULATED FOR 25MG/5ML CONCENTRATION



## Diphenhydramine (Benadryl®) – 20.110

**CLASS: A**

**CLASS B:** Contact medical control for administration of two or more IV sedative medications

**PROTOCOL(S) USED IN:** Altered Mental Status, Anaphylaxis, Nausea & Vomiting, Poisoning/Overdoses

**PHARMACOLOGY AND ACTIONS:**

- A. Antihistamine which blocks action of histamines released from cells during an allergic reaction.
- B. Direct CNS effects which include stimulant, or more commonly, depressant depending on individual variation.
- C. Anticholinergic.

**INDICATIONS:**

- A. Allergic reaction
- B. Acute dystonic reactions to antipsychotic and antiemetic medications
- C. Adjunctive therapy for anaphylaxis.
- D. Chemical sedation adjunct for a combative patient.

**CONTRAINDICATIONS:**

Relative contraindication for pregnant or lactating females.

**SIDE EFFECTS AND NOTES:**

- A. Sedation, blurred vision, anticholinergic effects.
- B. May enhance effects of alcohol or other depressants.
- C. Is NOT the first line drug for anaphylactic reactions.

**ADULT DOSING:**

Anaphylaxis, allergic reaction and sedation --  
25-50 mg slow IV/IO push or IM

Extrapyramidal symptoms –  
12.5- 25 mg slow IV/IO

**PEDIATRIC DOSING:**

Anaphylaxis, allergic reaction, and extrapyramidal symptoms -  
1-2 mg/kg slow IV or IO push or IM to a maximum of 50 mg



## Dopamine (Intropin®) – 20.120

### CLASS: A

**PROTOCOL(S) USED IN:** Cardiac Arrest Post Resuscitation, Cardiac Dysrhythmia  
Bradycardia, Respiratory Distress, Shock

### PHARMACOLOGY AND ACTIONS:

- A. Chemical precursor of epinephrine which occurs naturally in man.
- B. Has both alpha- and beta- receptor stimulating actions depending upon the dose.
- C. 1-2 mcg/kg: dilates renal and mesenteric vessels.
- D. 2-10 mcg/kg: beta effects on heart which usually increase cardiac output without increasing heart rate or blood pressure.
- E. 10-20 mcg/kg: alpha peripheral effects cause peripheral vasoconstriction and increase blood pressure.
- F. 20-40 mcg/kg: alpha effects reverse dilation of renal and mesenteric vessels resulting in decreased flow.

### INDICATIONS:

- A. Primary indication is cardiogenic shock.
- B. May be useful in other forms of shock, except hypovolemic.

### CONTRAINDICATIONS:

- A. Hypovolemic shock
- B. Decrease or stop infusion if tachyarrhythmias or HTN occur.

### SIDE EFFECTS AND NOTES:

- A. Ectopic beats, N/V, angina, VT, VF, HTN, headache, ischemia, AMI
- B. Can precipitate hypersensitivity crisis in susceptible individuals especially those on MAO inhibitors.
- C. Best administered by an infusion pump to accurately regulate rate.
- D. Rule out hypovolemic shock and treat with appropriate fluids before administration of dopamine.
- E. Should not be added to sodium bicarbonate or other alkaline solutions since dopamine will be deactivated in alkaline solutions.

### ADULT DOSING:

Infusion rate should start between 2-10 mcg/kg/min based on specific treatment protocol, gradually increasing to 10-20 mcg/kg/min until desired effect is achieved.  
**Use microdrip chamber only.**

### PEDIATRIC DOSING:

Same as adult.



## Epinephrine – 20.130

CLASS: A

CLASS B: Asthma only (>3 doses,  
>40 y/o, and/or pmhx of CAD)

**PROTOCOL(S) USED IN:** Anaphylaxis, Cardiac Arrest - Asystole, Cardiac Arrest - PEA, Cardiac Arrest Post Resuscitation, Respiratory Distress, Cardiac Dysrhythmias - VF/VT, Cardiac Dysrhythmias – Bradycardia.

### PHARMACOLOGY AND ACTIONS:

- A. Catecholamine with alpha and beta effects.
- B. Increased heart rate, arterial blood pressure, systemic vascular resistance, automaticity, myocardial O<sub>2</sub> consumption and myocardial contractile force.
- C. Potent bronchodilator.

### INDICATIONS:

- A. Ventricular fibrillation
- B. Asystole
- C. Pulseless Electrical Activity
- D. Anaphylaxis
- E. Respiratory Distress
- F. Systemic allergic reactions, croup and epiglottitis
- G. Severe Asthma (**> 3 doses, patients >40 years of age, and/or pmhx of CAD require OLMC**)

### CONTRAINDICATIONS:

Use caution in patients with peripheral vascular insufficiency.

### SIDE EFFECTS AND NOTES:

- A. Anxiety, tremor, headache, tachycardia, palpitations, PVCs, angina and HTN
- B. Use caution in patients with peripheral vascular insufficiency.
- C. Should not be added directly to a bicarbonate infusion; catecholamine may be partially deactivated by alkaline solutions.
- D. When used for allergic reactions, increased cardiac work may precipitate angina and/or MI in susceptible individuals.
- E. Wheezing in an elderly patient is considered pulmonary edema or pulmonary embolus until proven otherwise.
- F. To make **Epi 1:10,000**: take a prefilled 10 mL saline flush and eject 1 mL of saline. Draw up 1 ml of 1:1000 Epi. Use for cardiac arrest only. Do not store, Epinephrine is susceptible to sunlight and will break down.
- G. IV Epinephrine delivery in anaphylaxis should be only considered in special circumstances such as severely hypotensive patients, patients in respiratory arrest, or those who have failed to respond to multiple IM injections of Epinephrine.
- H. For patients less than 70 kg in asthma or anaphylaxis consider starting IM doses of epinephrine at 0.3 mg.
- I. The most ideal injection site for IM Epinephrine is the lateral thigh.

## ADULT DOSING:

### Cardiac Arrest

1 mg 1:10,000 IV q 3 - 5 min.

May be given via ET at 2 - 2.5 times IV dose.

### Allergic Reaction, Anaphylactic Shock, Laryngeal Edema, Asthma

0.5 mg 1:1,000 IM may repeat 3 times

0.3-0.5mg 1:10,000 IV/IO

## PEDIATRIC DOSING:

### Cardiac Arrest, Bradycardia

0.01 mg/kg 1:10,000 IV/IO q 3 - 5 min.

0.1 mg/kg 1:1,000 via ET q 3 - 5 min.

### Allergic Reaction, Anaphylactic Shock, Severe Asthma

0.01 mg/kg 1:1,000 IM to a max single dose of 0.3 mg (0.3 cc) IM.

1 ml of 1:100,000 (0.1 mg in 10 ml) IV/IO over 1 min, and reassess. Repeat prn q 1 min.

### Croup/Epiglottitis

3 ml 1:1,000 via Nebulizer.

# Epinephrine (Push Dose) – 20.130

**CLASS:** A

**PROTOCOL(S) USED IN:** RSI, Cardiac Arrest Post Resuscitation, Shock, Bradycardias, Respiratory Distress

## **INTRODUCTION:**

Bolus dose pressors and inotropes have been used by the anesthesiologists for decades for treatment of short-lived hypotension, e.g. post-intubation or during sedation.

## **INDICATIONS:**

- A. Severe shock (MAP <50mmHg or SBP < 70 mmHg) not responsive to fluids.
- B. A bridge to drip pressors while they are being mixed.
- C. Short-lived hypotension, e.g. post-intubation or during sedation.
- D. ROSC with Hypotension.

## **CONTRAINDICATIONS:**

Cardiac Arrest

## **SIDE EFFECTS AND NOTES:**

- A. Onset is typically 60 to 90 seconds.
- B. Duration lasts around 5-10 minutes.
- C. Concentration is low enough that extravasation is not a concern.
- D. To make Epi 1:100,000:
  - a. Discharge 1 mL of saline from a 10 mL flush giving you 9 mL of saline.
  - b. Draw back 1 mL of Cardiac Epi (1:10,000) into the saline flush to get 10 mL of Push-Dose Epi (10 mcg/mL)
- E. Label the syringe once the medication has been diluted to avoid confusion.

## **ADULT DOSING:**

### **RSI with Hypotension**

1 ml of 1:100,000 IV/IO over 1min and reassess blood pressure until  $\geq$  90 systolic. Administer prior to sedation.

### **ROSC with Hypotension**

1 ml of 1:100,000 IV/IO over 1 min and reassess blood pressure until  $\geq$  90 systolic.  
Repeat prn q 1 min.

## **ROUTE: IV/IO**



# **Etomidate (Amidate®) – 20.140**

**CLASS: A**

**PROTOCOL(S) USED IN: Endotracheal Intubation RSI**

**PHARMACOLOGY AND ACTIONS:**

Exact mechanism of action unknown; may have GABA-like effects, depresses brain stem reticular formation activity and produces hypnosis.

**INDICATIONS:**

RSI in the hyposensitive patient.

**CONTRAINDICATIONS:**

Known hypersensitivity to drug/class/components

**SIDE EFFECTS AND NOTES:**

- A. The most frequent adverse reactions are transient venous pain on injection and transient skeletal muscle movements.
- B. Etomidate may also cause nausea and/or vomiting.
- C. Caution in elderly patients.

**ADULT DOSING:**

**Induction agent for rapid sequence intubation -**

0.3 mg / kg IV/IO slow push. Max single dose = 30 mg.

**PEDIATRIC DOSING:**

**Same as adult**



# Fentanyl (Sublimaze®) – 20.150

## CLASS: A

**PROTOCOL(S) USED IN:** Abdominal Pain, Chest Pain, Pain Management, Endotracheal Intubation RSI

## PHARMACOLOGY AND ACTIONS:

Fentanyl is a pure opioid analgesic used to manage pain.

## INDICATIONS:

- A. Pain management
- B. Extremity Fractures
- C. Back and neck injuries when sedation/pain relief is necessary to prevent a patient from moving around and potentially injuring themselves.
- D. Burns
- E. Trauma

## CONTRAINDICATIONS:

- A. Patients with known intolerance to Fentanyl
- B. Use caution if patient is pregnant, pregnancy risk category C

## SIDE EFFECTS AND NOTES:

- A. Respiratory depression
- B. Decreased BP; monitor BP before and after administration. Systolic BP must be over 90mmHg
- C. Decreased level of consciousness; watch for respiratory depression.
- D. Decreased heart rate.
- E. Have naloxone available to reverse over administration.
- F. May follow administration with Zofran for nausea.
- G. A dose of 100mcg is approximately equivalent to 10mg of morphine.

## ADULT DOSING:

**Pain management:** 50 mcg given slowly IV/IM/IO/IN titrated to patient's condition and response. **Max total dosage of 400 mcg.** Contact OLMC for additional doses.

**RSI: 1-2 mcg/kg IV/IO**

## PEDIATRIC DOSING:

**1 microgram/kg IV/IO/IM/IN.** May repeat with 0.5 -1 mcg/kg every 3-5 minutes as needed to a maximum of 4 mcg/kg. Do not exceed adult dosing



# Glucagon – 20.160

**CLASS A: Hypoglycemia**

**CLASS B: Beta Blocker OD**

**PROTOCOL(S) USED IN: Altered Mental Status, Poisoning & Overdoses**

**PHARMACOLOGY AND ACTIONS:**

- A. Increases blood glucose concentration by converting liver glycogen to glucose.
- B. Parenteral administration of glucagon produces relaxation of the smooth muscle of the stomach, duodenum, small bowel and colon.

**INDICATIONS:**

- A. Hypoglycemia when IV access is unavailable or delayed.
- B. Beta Blocker overdoses.

**CONTRAINDICATIONS:**

None

**SIDE EFFECTS AND NOTES:**

- A. N/V and generalized allergic reactions have been reported.
- B. Glucagon should not be used at concentrations greater than 1 unit (1mg).
- C. Should not be used unless solution is clear and of water-like consistency.

**ADULT DOSING:**

**Hypoglycemia-**

**1 unit (1 mg) IM.** If no effect in 8-10 minutes, repeat 1 unit. IV glucose must be given if patient fails to respond to glucagon

**Beta Blocker OD-**  
**Contact OLMC**

**PEDIATRICS:**

**Hypoglycemia- 0.5 mg IM.** (< 5 y/o or < 20 kg) to a maximum of 1 mg

**Beta Blocker OD- contact OLMC**



## Glucose (Oral) – 20.170

**CLASS: A**

**PROTOCOL(S) USED IN: Altered Mental Status**

**PHARMACOLOGY AND ACTIONS:**

Provides a quickly absorbed form of glucose to increase blood glucose levels.

**INDICATIONS:**

Conscious patient with suspected hypoglycemia.

**CONTRAINDICATIONS:**

- A. Decreased level of consciousness
- B. Active vomiting

**SIDE EFFECTS AND NOTES:**

Duration of effect is limited; patient should consume foods high in carbohydrates as soon as possible.

**ADULT DOSING:**

15-30 gm PO. May be repeated until desired effects have been achieved.

**PEDIATRIC DOSING:**

Same as adult



## Haloperidol (Haldol®) – 20.180

**CLASS: A**

**CLASS B:** Contact medical control  
for administration of two or more IV sedative medications

**PROTOCOL(S) USED IN: Patient Restraint Physical & Chemical**

**PHARMACOLOGY AND ACTIONS:**

- A. Haloperidol has similar pharmacologic properties to those in phenothiazines.
- B. It is thought to block dopamine (type 2) receptors in the brain, altering mood and behavior.

**INDICATIONS:**

- A. Acute psychotic episodes
- B. Emergency sedation of severely agitated or delirious patients.

**CONTRAINDICATIONS:**

- A. CNS depression
- B. Coma
- C. Known hypersensitivity
- D. Pregnancy
- E. Severe liver or cardiac disease.

**SIDE EFFECTS AND NOTES:**

- A. Dose-related extrapyramidal reactions
- B. Hypotension
- C. Orthostatic hypotension
- D. Nausea, vomiting
- E. Allergic reactions
- F. Blurred vision

**ADULT DOSING:**

- A. 5 mg IM/IV every 4-8 hours as needed

**PEDIATRIC DOSING:**

- A. 0.5mg IM



# Hydroxocobalamin (Cyano-Kit®) – 20.190

## CLASS: A

### PROTOCOLS USED IN: Hydrogen Cyanide

#### PHARMACOLOGY AND ACTIONS:

Hydroxocobalamin (vitamin B12a) is an effective antidote in the treatment of cyanide poisoning based on its ability to bind cyanide ions. Each Hydroxocobalamin molecule can bind one cyanide ion to form cyanocobalamin (vitamin B12), which is then excreted in the urine. Cyanide is an extremely potent toxic poison. In the absence of rapid and adequate treatment exposure to a high dose of cyanide can result in death within minutes due to inhibition of cytochrome oxidase resulting in arrest of cellular respiration.

#### INDICATIONS:

Cyanide poisoning or smoke inhalation with suspected cyanide poisoning due to the presence of coma, persistent hypotension or cardiorespiratory arrest.

#### CONTRAINDICATIONS:

None

#### PRECAUTIONS:

Hydroxocobalamin has physical (particulate) and chemical incompatibilities with many medications and it is best to administer other drugs or products (e.g. blood) through a separate intravenous line.

#### SIDE EFFECTS AND NOTES:

- A. The most frequently occurring side effects are chromaturia (red colored urine) and erythema (skin redness) which occur in nearly all patients.
- B. Other reported serious side effects include allergic reactions, temporary increases in blood pressure, nausea, headache and infusion site reactions.
- C. Because of its deep red color, Hydroxocobalamin has also been found to interfere with certain laboratory tests based on light absorption including co-oximetric measurements or carboxyhemoglobin, methemoglobin and oxyhemoglobin.

#### ADULT DOSING:

**Cyanide poisoning or smoke inhalation with suspected cyanide poisoning - 5 grams IV or IO over 15 minutes.** Vial should be reconstituted with 200 ml of normal saline. Contact OLMC regarding second dose. Monitor for clinical response.

#### PEDIATRIC DOSING:

**Cyanide poisoning or smoke inhalation with suspected cyanide poisoning - 70 mg / kg IV or IO over 15 minutes.** Vial should be reconstituted with 200 ml of normal saline. Contact OLMC regarding second dose. Monitor for clinical response.



## Ipratropium Bromide – 20.200

**CLASS: A**

### **PROTOCOLS USED IN: Respiratory Distress**

#### **PHARMACOLOGY AND ACTIONS:**

Ipratropium is an atropine derivative used for inhalation therapy. For severe asthma, Ipratropium taken in addition to a short acting beta agonist (such as Albuterol) can provide greater bronchodilation and clinical benefit than the beta agonist alone. It has no anti-inflammatory effects and does not decrease bronchial hyper-responsiveness.

#### **INDICATIONS:**

As a supplement to Albuterol in patients with asthma and COPD.

#### **CONTRAINDICATIONS:**

**Do not use in patients with severe glaucoma.**

#### **PRECAUTIONS:**

Ipratropium in the meter dose inhaler and auto-inhaler formulations should not be administered to individuals allergic to soy lecithin or related food products (e.g. soy beans, peanuts). The nebulized formulation may be administered to these patients.

#### **SIDE EFFECTS AND NOTES:**

- A. Dry mouth.
- B. Pharyngeal irritation.
- C. Increased intra-ocular pressure in glaucoma patients.

#### **ADULT DOSING:**

**Asthma/ COPD -**

0.5 mg via nebulizer.

#### **PEDIATRIC DOSING:**

**Same as adult dosing**



## CLASS: A

**PROTOCOL(S) USED IN:** Altered Mental Status, Endotracheal Intubation RSI, Patient Restraint Physical & Chemical

### PHARMACOLOGY AND ACTIONS:

- A. Sedative/dissociative analgesia
- B. Generalized CNS depression
- C. The exact mechanism of action is unknown; it acts on the cortex and limbic receptors producing dissociative analgesia and sedation.

### INDICATIONS:

- A. Probable excited delirium.
- B. Sedation during RSI.

### CONTRAINDICATIONS:

- A. Known hypersensitivity.
- B. Hypertension

### SIDE EFFECTS AND NOTES:

- A. Respiratory depression
- B. Laryngospasm
- C. Emergence Delirium

### ADULT DOSING:

Probable excited delirium/Patient Chemical Restraint:

**4 mg/kg IM or 1 mg/kg IV**

RSI Induction dose:

**1-2 mg/kg IV/IO push. Single max dose of 200 mg.**

Continued sedation and analgesia:

**0.5-1 mg/kg IV/IO.**

Pain Management:

**0.1- 0.3 mg/kg** for pain refractory to 200 mcg of Fentanyl or 20 mg of Morphine. Mix Ketamine in 50-100cc bag or 20cc of NS. Give slowly over 10 minutes.

### PEDIATRIC DOSING:

Same as adult RSI Induction dose.



# Lidocaine – 20.220

## CLASS: A

**PROTOCOL(S) USED IN:** Endotracheal Intubation RSI, Intraosseous Access & Infusion

## PHARMACOLOGY AND ACTIONS:

- A. Depresses automaticity of Purkinje fibers thus increasing ventricular fibrillation threshold.
- B. Decreases conduction rate and force of contraction mainly at toxic levels.
- C. Single bolus effect disappears in 10-20 minutes due to redistribution in the body.
- D. Metabolic half-life is about 2 hours; toxicity develops with repeated doses.

## INDICATIONS:

- A. Pre-paralytic for RSI
- B. Local anesthetic for IO placement.

## CONTRAINDICATIONS:

- A. Supraventricular dysrhythmias
- B. Atrial fibrillation or flutter
- C. 2<sup>nd</sup> or 3<sup>rd</sup> degree heart blocks
- D. Hypotension

## SIDE EFFECTS AND NOTES:

- A. Seizures, slurred speech, AMS

## ADULT DOSING:

- A. Preparalytic (RSI)  
1-1.5 mg/kg IV/IO
- B. IO insertion  
0.5 mg/kg IO not to exceed 50 mg

## PEDIATRIC DOSING:

- A. Preparalytic (RSI)  
1.5-2 mg/kg IV up to 6 years old
- B. IO Insertion  
Same as adult



## Lorazepam (Ativan®) – 20.230

**CLASS: A**

**CLASS B:** Contact medical control for administration of two or more IV sedative medications

**PROTOCOL(S) USED IN: Altered Mental Status, Seizures, Patient Restraint Physical & Chemical**

**PHARMACOLOGY AND ACTIONS:**

- A. Benzodiazepine with antianxiety and sedative effects.
- B. Anticonvulsant

**INDICATIONS:**

- A. Status Epilepticus
- B. Chemical Sedation for transcutaneous pacing
- C. Relief of anxiety

**CONTRAINDICATIONS:**

- A. Hypersensitivity
- B. Acute narrow-angle glaucoma

**SIDE EFFECTS AND NOTES:**

- A. Apnea, N/V, drowsiness, restlessness, confusion, delirium, HTN, hypotension
- B. **Class D pregnancy category;** may cause fetal damage
- C. When administering, dilute medication 1:1 with NS prior to administration.

**ADULT DOSING:**

**Status epilepticus**

**2-4 mg IM or slow IV/IO over 2 minutes.** May repeat once if still seizing after 5-10 minutes. Max of 8 mg. Contact OLMC for further doses PRN.

**Chemical Sedation**

**2 mg IM or 1 mg IV**

**Severe Anxiety**

**1 mg IN, IM or slow IV**

**PEDIATRIC DOSING:**

**Status epilepticus**

Consider **Ativan** (28 days to 12 years) dose: 0.05-0.1mg/kg IV/IO/IM over 2-5 mins. IV diluted 1:1 with Normal Saline  
i. If still seizing after 5-10mins you can repeat dose once



# Magnesium Sulfate – 20.240

## CLASS A: ACLS

## CLASS B: Eclampsia and Asthma

**PROTOCOL(S) USED IN:** Cardiac Arrest (V-fib/tach), Cardiac Dysrhythmia  
Tachycardia, Seizure, Respiratory Distress

### PHARMACOLOGY AND ACTIONS:

- A. CNS Depressant
- B. Stabilizes muscle cell membranes by interacting with the sodium/potassium exchange system.
- C. Smooth muscle relaxant
- D. Vasodilator
- E. Bronchodilator

### INDICATIONS:

- A. Severe refractory VF
- B. Torsades
- C. Eclampsia
- D. Asthma

### CONTRAINDICATIONS:

- A. Renal Disease
- B. Heart Block

### SIDE EFFECTS & SPECIAL NOTES

- A. Hypotension
- B. Asystole
- C. Respiratory & CNS Depressant

### ADULT DOSING:

#### Refractory V Fib / Torsades -

1.0-2.0 grams diluted in 10ml NS IV/IO over 1-2 minutes.

#### Tachycardia with a pulse: Wide QRS Irregular Rhythm

1.0-2.0 grams diluted in 10ml NS IV/IO over 5 minutes.

#### Eclampsia -

4.0-6.0 grams diluted in 10ml NS IV/IO over 1-2 minutes. OLMC required.

#### Asthma

1-2 grams diluted to 10cc in NS IV. Administer slowly. OLMC required.  
(Contraindicated in the hypotensive pt.).

### PEDIATRIC DOSING:

#### Tachycardia with a pulse

25 mg/kg IV over 1-2 min. Max dose 2g. OLMC required.

## Magnesium Sulfate – 20.240

# Midazolam (Versed®) – 20.250

## CLASS A: Seizure and Sedation

**CLASS B: Sympathomimetic OD,**  
administration of two or more IV sedative medications

**PROTOCOL(S) USED IN:** Endotracheal Intubation RSI, Seizure, Cardiac Dysrhythmias Brady, Cardiac Dysrhythmias Tachy, Poisoning and Overdoses, Patient Restraint Physical & Chemical

## PHARMACOLOGY AND ACTIONS:

- A. Sedative/hypnotic benzodiazepine
- B. Generalized CNS depression
- C. Therapeutic effects include short term sedation and postoperative amnesia

## INDICATIONS:

- A. Status seizure (any seizure that has lasted longer than 2 minutes or two consecutive seizures without regaining consciousness)
- B. Sedation and amnesia during RSI and cardioversion/cardiac pacing
- C. Sympathomimetic Overdoses such as cocaine and methamphetamine.

## CONTRAINdications:

- A. Hypersensitivity or cross sensitivity with other benzodiazepines
- B. Acute narrow angle glaucoma
- C. Shock
- D. Comatose patients or those with pre-existing CNS depression
- E. Severe, uncontrolled pain

## SIDE EFFECTS AND NOTES:

- A. Respiratory depression
- B. HA, excess sedation, drowsiness, agitation
- C. Blurred vision
- D. Cardiac arrhythmias
- E. N/V, rashes
- F. Increased risk of hypotension with antihypertensives, acute ingestion of alcohol or nitrates

## ADULT DOSING:

### Seizures

**5 mg IM or 2.5 IV/IO.** May repeat PRN. Max dose of 10 mg for seizures lasting longer than 5 minutes.

### Pacing/Cardioversion -

**5 mg IM or 2.5 IV/IO**

### Chemical restraint -

**2 mg IV/IM.**

### Pre-medication for RSI -

**0.1 mg/kg IV** if BP is >90mmHg. Single max dosage of 10 mg.

### Sedation after intubation -

**0.05-0.1 mg/kg IV** if BP is >90mmHG. Single max dosage of 5 mg

**Sympathomimetic Overdose – contact OLMC for dosing**

## Midazolam (Versed®) – 20.250

### PEDIATRIC DOSING:

#### **Seizures -**

**0.1 mg/kg IV/IO.** If no IV access, administer **0.2 mg/kg IM** to a maximum initial dose of 2.5 mg. May repeat to a maximum dose of 5 mg for seizures lasting longer than five minutes.

#### **Pacing -**

**0.1 mg/kg IV to max of 2.5 mg or 0.2 mg/kg IM to max of 5mg.**

#### **Pre-medication for RSI -**

**0.1 mg/kg IV/IO** not to exceed 2mg

#### **Sedation after intubation with or without paralytics -**

**0.1 mg/kg IV** not to exceed 2mg.

**Sympathomimetic OD – contact OLMC.**

# Morphine Sulfate – 20.260

## CLASS: A

**PROTOCOL(S) USED IN:** Abd Pain, Chest pain, Pain Management, Respiratory Distress

### PHARMACOLOGY AND ACTIONS:

- A. Analgesic
- B. Peripheral vasodilator
- C. Pupil constriction
- D. Respiratory depressant
- E. Cardiac effect of vasodilation: decreases myocardial oxygen consumption, decreases left ventricular end-diastolic pressure, decreases cardiac workload, may decrease incidence of dysrhythmias.

### INDICATIONS:

- A. Chest pain not relieved by NTG
- B. Pulmonary edema
- C. Extremity fractures in absence of any head, chest, or abdominal injuries.
- D. Back and neck injuries when sedation/pain relief are necessary to prevent a patient from moving around and potentially injuring themselves.

### CONTRAINDICATIONS:

- A. Known allergy to morphine or sulfates (Sulfa drugs are not sulfates)
- B. Hypotension
- C. Head injuries
- D. Patients with respiratory difficulties except for pulmonary edema
- E. Major blood loss
- F. Decreased level of consciousness

### SIDE EFFECTS AND NOTES:

- A. In STEMI patients, avoid MS because of the problems with absorption of antiplatelet agents.
- B. Respiratory depression
- C. Decreased BP
- D. Decreased level of consciousness
- E. Decreased heart rate
- F. N/V
- G. Have naloxone available to reverse over administration
- H. Allergic reactions
- I. May follow administration with Zofran for nausea

### ADULT DOSING:

**Pain - Musculoskeletal injuries, burns, chest pain -**

2-5 mg IV/IO/IM/IN. Repeat every 3-5 minutes to max of 20 mg.

### PEDIATRIC DOSING (< 20kg):

**Pain - Musculoskeletal injuries, burns, chest pain -**

0.1-0.2 mg/kg IV/IO/IM/IN. Repeat every 3-5 minutes Do not exceed adult dosing



## Naloxone (Narcan®) – 20.270

### CLASS: A

### PROTOCOL(S) USED IN: Altered mental status, Poisoning & Overdoses

#### PHARMACOLOGY AND ACTIONS:

- A. Narcotic antagonist
- B. Competitively binds to narcotic sites, but exhibits almost no pharmacologic activity of its own.
- C. Duration of action is 30-80 minutes.

#### INDICATIONS:

- A. Reversal of narcotic overdose
- B. Coma of unknown etiology

#### CONTRAINDICATIONS:

None noted

#### SIDE EFFECTS AND NOTES:

- A. Acute withdrawal symptoms in addicted patients
- B. Be prepared to restrain patient
- C. Titrate dosing to keep patient awake, responsive and free from respiratory depression, but somewhat groggy.
- D. Patients who have received Narcan must be transported to the hospital because coma may recur when Narcan wears off.

#### ADULT DOSING:

Reversal of opioid effects, coma of unknown etiology –

0.4 - 2mg IV/IO/IM/IN to a max dose of 8mg, initial dose titrated to patient's respirations.

\*if no response, repeat 2mg dose up to 8mg

\*larger and repeated doses may be required to reverse Darvon overdose

#### PEDIATRIC DOSING:

If suspected opiate overdose

0.1 mg/kg IV/IO/IM/IN to a maximum of 2 mg.



**CLASS A: Chest Pain & Respiratory Distress      CLASS B: Hypertensive Crisis**

**PROTOCOL(S) USED IN: Chest Pain, Hypertension, Respiratory Distress**

**PHARMACOLOGY AND ACTIONS:**

- A. Vasodilator
- B. Decreases peripheral resistance
- C. Generalized smooth muscle relaxation
- D. Reduces venous tone

**INDICATIONS:**

- A. Chest, arm, neck pain thought to be related to coronary ischemia.
- B. Angina
- C. Control of hypertension during hypertensive crisis
- D. Pulmonary edema

**CONTRAINDICATIONS:**

- A. Hypotension
- B. Hypovolemia
- C. Patients with known or suspected elevated ICP
- D. Aortic Stenosis
- E. Severe bradycardia or tachycardia
- F. Patients who have taken Viagra® (sildenafil citrate) or Levitra® (vardenafil HCl) within 24 hours, or who have taken Cialis® (tadalafil) within 48 hours.  
Contact OLMC for direction.

**SIDE EFFECTS AND NOTES:**

- A. Common side effects are headache, flushing, dizziness or burning under the tongue.
- B. Hypotension; IV line should be established prior to administration
- C. Reflex tachycardia
- D. Syncope
- E. May be effective in relieving chest pain due to esophageal spasm.
- F. Therapeutic effect is enhanced but adverse effects are increased when patient is upright.
- G. NTG loses potency easily; should be stored in a dark glass container with tight lid and not exposed to heat.

**ADULT DOSING:**

**0.4 mg SL every 3-5 minutes or IV infusion starting at 5 mcg/min and titrating to effect as long as systolic BP ≥ 100 mmHg. Increase IV rate by 10mcg/min every 5 minutes until pain subsides or BP trends lower.**

**PEDIATRIC DOSING: Not recommended in pediatric patients.**



# Ondansetron (Zofran®) – 20.290

CLASS: A

CLASS B: pts < 2 y/o

## PROTOCOL(S) USED IN: Nausea & Vomiting

### PHARMACOLOGY AND ACTIONS:

Selective antagonist of a specific type of serotonin receptor located in the CNS at the chemoreceptor trigger zone and in the peripheral nervous system on nerve terminals of the vagus nerve. Drugs blocking action may occur at both sides.

### INDICATIONS:

Prevention and control of uncomplicated nausea and vomiting.

### CONTRAINDICATIONS:

Known hypersensitivity to Zofran or similar medications.

Caution in patients with hepatic impairment.

### SIDE EFFECTS AND NOTES:

- A. Headache, malaise, fatigue, dizziness, fever, sedation
- B. Extrapyramidal symptoms; have Benadryl available

### ADULT DOSING:

#### Nausea & vomiting -

**4 mg IM/IN or slow IV over 2-5 minutes.** If nausea and/or vomiting are inadequately controlled after 10 minutes, may repeat **4 mg** once for max dosage of 8 mg.

### PEDIATRIC DOSING:

- A. Ondansetron use in patients under 2 years of age requires OLMC consultation.
- B. For children < 40 kg administer **Ondansetron 0.1mg/kg** via slow IV push over 2 minutes up to a total maximum IV dose of 4mg.



# Oxygen – 20.300

## CLASS: A

### PROTOCOL(S) USED IN: All when indicated

#### PHARMACOLOGY AND ACTIONS:

Raises the amount of oxygen in the blood and the amount delivered to the tissues.

#### INDICATIONS:

- A. Suspected hypoxia or respiratory distress from any cause.
- B. Acute chest pain where MI is suspected.
- C. Shock from any cause
- D. Major trauma
- E. Carbon monoxide poisoning

#### CONTRAINDICATIONS: None

#### SIDE EFFECTS AND NOTES:

- A. DO NOT WITHHOLD OXYGEN from patients with COPD. Be prepared to assist ventilations if needed. Initial flow should be no greater than 2lpm to start.
- B. Consider Oxygen to maintain a SpO<sub>2</sub> ≥ 94%.
- C. Patient should be breathing adequately on their own, if not, assist with BVM.
- D. Oxygen supports combustion, use caution.
- E. Non-humidified O<sub>2</sub> is drying and irritating to mucous membranes.

DOSAGE	INDICATIONS
Low Flow (1-2lpm)	Patients with chronic lung disease
Moderate Flow (4-6lpm)	Precautionary use for trauma, chest pain
High Flow (10-15lpm)	Severe respiratory distress

OXYGEN THERAPY			
Method	Device	Flow Rate	O <sub>2</sub> % Inspired Air
Low Flow	Nasal Cannula	1-2 lpm	25-28%
Moderate Flow	Nasal Cannula	6 lpm	50-60%
High Flow	Non-rebreather mask	10-25 lpm	90+%



## Oxytocin (Pitocin®) – 20.310

**CLASS: B**

**PROTOCOL USED IN: OB/GYN & Childbirth Emergencies**

**PHARMACOLOGY AND ACTIONS:**

- A. Hormone which increases electrical and contractile activity in uterine smooth muscle.
- B. Can initiate or enhance rhythmic contractions of the uterus.
- C. Exhibits rapid onset with a very short half-life, rapid inactivation and excretion.

**INDICATIONS:**

Control of post-partum hemorrhage

**CONTRAINDICATIONS:**

Rule out multiple fetuses before administration

**SIDE EFFECTS AND NOTES:**

- A. Administration should follow delivery of placenta.
- B. In large doses, oxytocin exhibits a transient, but marked vasodilating effect and reflex tachycardia.
- C. Cardiac dysrhythmias may be precipitated or aggravated by oxytocin.
- D. Fundal massage and nursing can stimulate natural release of pitocin from mother's pituitary gland.

**ADULT DOSING:**

10 USP units (10mg) IM. Contact Medical Control.

**PEDIATRIC:** not recommended in pediatric patients.



# Pralidoxime (2-Pam®) – 20.320

## CLASS: A

### PROTOCOLS USED IN: Organophosphate Poisoning

#### PHARMACOLOGY AND ACTIONS:

The principal action of Pralidoxime is to reactivate cholinesterase which has been inactivated by an organophosphate pesticide or related compound. The drug's most critical effect is in relieving paralysis of respiratory muscles. Atropine is always required concurrently to block the effect of acetylcholine.

#### INDICATIONS:

- A. As an antidote in the treatment of poisoning due to organophosphate pesticides and chemicals.
- B. Control of overdose by anticholinesterase drugs (e.g. treatment of myasthenia gravis).

#### CONTRAINDICATIONS:

None in the emergency setting.

#### PRECAUTIONS:

- A. Rapid IV injection may cause tachycardia, laryngospasm, muscle rigidity and transient neuromuscular blockade. Administration should be done slowly and preferably by infusion.
- B. Pralidoxime is a relatively short acting drug, repeat dosing may be necessary.

#### SIDE EFFECTS AND NOTES:

Dizziness, blurred vision, diplopia, headache, drowsiness, nausea, tachycardia and muscle weakness have been reported following administration.

#### ADULT DOSING:

Refer to Haz-Mat Protocol – Organophosphate Poisoning for dosing.

#### PEDIATRIC DOSING:

Refer to Haz-Mat Protocol – Organophosphate Poisoning for dosing.



# Rocuronium (Zemuron®) – 20.330

**CLASS: A**

**PROTOCOL(S) USED IN:** Endotracheal Intubation RSI

**PHARMACOLOGY AND ACTIONS:**

Non-depolarizing neuromuscular blocking agent

**INDICATIONS:**

Paralysis to facilitate rapid sequence intubation

**CONTRAINDICATIONS:**

Known hypersensitivity

**SIDE EFFECTS AND NOTES:**

- A. Use caution in patients with impaired hepatic or respiratory function or severe obesity.
- B. Arrhythmia, tachycardia, N/V, bronchospasm, hypotension, HTN, rash or edema.
- C. Must be able to ventilate patient
- D. Must be accompanied by sedation
- E. Pregnancy Category B; only use if potential benefits justifies the potential risk to the fetus.

**ADULT DOSING:**

First dose: 1.0 mg/kg IV/IO

Maintenance: 0.1- 0.5 mg/kg IV/IO

**PEDIATRIC DOSING:**

Paralytic agent: 0.6 - 1.0 mg/kg IV/IO

Maintenance: 0.1 – 0.2 mg/kg IV/IO



## Sodium Bicarbonate – 20.340

**CLASS A: Cardiac Arrest, Hydrogen Cyanide**

**CLASS B-Hyper K,  
Crush injury, Tricyclic Antidepressant OD**

**PROTOCOL(S) USED IN: Cardiac Arrest protocols, Crush Injury/Entrapment,  
Hyperkalemia, Poisoning & Overdose, Hydrogen Cyanide Exposure**

### **PHARMACOLOGY AND ACTIONS:**

- A. An alkalotic solution which neutralizes acids found in the blood.
- B. Acidosis depresses cardiac contractility, and the cardiac response to catecholamine and makes the heart more likely to fibrillate.

### **INDICATIONS:**

- A. To treat wide complex arrhythmias in:
  - a. Tricyclic Antidepressant OD
  - b. Suspected Hyperkalemia
  - c. Sodium Channel Blocker OD/effect
- B. Suspected Hyperkalemia

**CONTRAINDICATIONS: None**

### **SIDE EFFECTS AND NOTES:**

- A. Should not be given in with catecholamine or calcium.
- B. May increase cerebral acidosis, especially in diabetics who are ketotic.
- C. In respiratory arrest without cardiac arrest, the treatment of choice is ventilation, no sodium bicarbonate unless cardiac arrest has occurred and the patient does not respond to adequate ventilation or other standard ACLS treatment modalities.

### **ADULT DOSING:**

**Cardiac arrest- 1 mEq/kg IV/IO initially followed by 0.5mEq/kg every 10 minutes**

**Tricyclic Overdose- 1 mEq/kg IV/IO**

(If patient exhibits arrhythmias or a widening QRS complex). **Contact OLMC**

**Hyper K/Crush Injury- 50 mEq IV/IO. Contact OLMC**

### **PEDIATRIC DOSING:**

All Indications: **1 mEq/kg IV/IO**



## Succinylcholine – 20.350

### CLASS: A

PROTOCOL(S) USED IN: Endotracheal Intubation RSI

### PHARMACOLOGY AND ACTIONS:

- A. Short acting depolarizing skeletal muscle relaxant.
- B. Binds to cholinergic receptors in the motor neuron endplate to cause muscle depolarization (fasciculations) followed by paralysis.
- C. Complete paralysis occurs with 1 minute; recovery usually seen within 4-6 minutes.
- D. Has no effect on consciousness or pain threshold.

### INDICATIONS:

Paralysis to facilitate rapid sequence intubation

### CONTRAINDICATIONS:

- A. Acute narrow angle glaucoma
- B. Penetrating eye injuries
- C. Burns or crush injuries > 12-24 hours
- D. Avoid in patients with kidney failure, diagnosed or family history of neuromuscular disease or skeletal muscle myopathy such as Duchenne's Muscular Dystrophy.

### SIDE EFFECTS AND NOTES:

- A. May cause malignant hyperthermia, ventricular dysrhythmias, bradycardia in pediatrics, hyperkalemia, hypotension, increased intraocular pressure and ICP.
- B. Histamine release may occur.
- C. Bradycardia is usually seen in patients under 5 years old and will generally respond to oxygenation and atropine.
- D. Ventricular dysrhythmias may be treated with oxygenation.

### ADULT DOSING:

**1.5 mg/kg IV/IO;** a second equal dose may be given if paralysis is not achieved within 60-120 seconds of initial administration.

### PEDIATRIC DOSING:

**2 mg/kg IV/IO depending on age.**



**CLASS: A**

**PROTOCOL(S) USED IN: Altered Mental Status**

**PHARMACOLOGY AND ACTIONS:**

- A. Vitamin commonly referred to as vitamin B1.
- B. B1 is required for the conversion of pyruvic acid to acetyl-coenzyme A.
- C. If thiamine deficiency occurs, the brain cannot obtain glucose to use as energy.
- D. Chronic alcoholism or starvation interferes with the absorption, intake, and utilization of thiamine.

**INDICATIONS:**

- A. Administered with D50 in patients suspected of malnutrition of chronic alcoholism or chemotherapy.
- B. Coma of unknown origin, especially if alcohol may be involved.
- C. Delirium tremens

**CONTRAINDICATIONS:**

**Known hypersensitivity**

**SIDE EFFECTS AND NOTES:**

- A. There may be a few cases of hypersensitivity to thiamine

**ADULT DOSING:**

**100mg IV/IO or IM if IV access cannot be obtained.**

**PEDIATRIC DOSING: NOT INDICATED IN PEDIATRIC PATIENTS**



# Vasopressin – 20.370

## CLASS: A

### PROTOCOL(S) USED IN: Cardiac Arrest Protocols

#### PHARMACOLOGY AND ACTIONS:

- A. Vasopressor that stimulates smooth muscle V1 receptors.
- B. Peripheral vasoconstrictor, but provides some cerebral and cardiac dilation.
- C. Naturally occurring antidiuretic hormone.
- D. Half-life is 10-20 minutes

#### INDICATIONS:

May consider in VF and pulseless VT

#### CONTRAINDICATIONS:

None in cardiac arrest

#### SIDE EFFECTS AND NOTES:

- A. May increase peripheral vascular resistance and provoke cardiac ischemia and angina.

#### ADULT DOSING:

**40 units IV/IO** one time, may be given via ET at same dose.  
If no response in 10-20 minutes, it is acceptable to return to epinephrine 1 mg every 3-5 minutes.

#### PEDIATRIC DOSING:

Not indicated in pediatrics.



## **Vecuronium (Norcuron®) – 20.380**

### **CLASS: A**

### **PROTOCOLS USED IN: Endotracheal Intubation RSI**

#### **PHARMACOLOGY AND ACTIONS:**

Vecuronium is a non-depolarizing neuromuscular blocking agent causing skeletal muscle relaxation. It reversibly binds the acetylcholine receptor, blocking the action of acetylcholine. Neuromuscular blockade occurs within 2-3 minutes. Time to recovery is 30-45 minutes. Vecuronium metabolism is 5-35% renal with the remainder done in the liver.

#### **INDICATIONS:**

- A. For sustained neuromuscular blockade in the intubated patient.
- B. As the first line agent for Rapid Sequence Induction in the patient where Succinylcholine is contraindicated.

#### **CONTRAINDICATIONS:**

**None**

#### **PRECAUTIONS:**

- A. Patients with renal or hepatic failure may experience prolonged paralysis.
- B. Vecuronium has no effect on consciousness and must be used with a sedative or induction agent.

#### **SIDE EFFECTS AND NOTES:**

- A. Vecuronium exhibits minimal side effects and does not substantially affect heart rate or rhythm, systolic or diastolic blood pressure, mean arterial pressure, cardiac output, or systemic vascular resistance.
- B. Vecuronium can be used to maintain paralysis even if intubation was performed without Succinylcholine.

#### **ADULT DOSING:**

**0.1 mg/kg IV/IO.**

#### **PEDIATRIC DOSING:**

**0.05 – 0.1 mg/kg IV/IO**

