

Tab 400

EMS Drug Formulary



Lucas County Emergency Medical Services
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EMS personnel must be familiar with a number of drugs and other agents in their routine work. What follows is a description of drugs or agents used by LCEMS personnel. While indication, contraindication, drug doses, and other relevant information are included in this formulary for information purposes, EMS personnel should refer to specific treatment protocols regarding use of any of these drugs or agents.

Drugs are categorized according to their level of risk to the fetus. The categories are interpreted as follows:

- **Category A:** controlled studies fail to demonstrate a risk to the fetus in the first trimester, and there is no evidence of risk in later trimesters; the possibility of fetal harm appears to be remote.
- **Category B:** either animal reproductive studies have not demonstrated a fetal risk but there are no controlled studies in women or animal reproductive studies have shown an adverse effect that was not confirmed in controlled studies on women in the first trimester and there is no evidence of risk in later trimesters.
- **Category C:** either studies in animals have revealed adverse effects on the fetus and there are no controlled studies in women or studies in women and animals are not available. Drugs in this category should be given only if the potential benefit justifies the risk to the fetus.
- **Category D:** there is positive evidence of human fetal risk, but the benefits for pregnant women may be acceptable despite the risk, as in life-threatening diseases for which safer drugs cannot be used or are ineffective.
- **Category X:** studies in animals and humans have demonstrated fetal abnormalities, there is evidence of fetal risk based on human experience, or both; the risk of using the drug in pregnant women clearly outweighs any possible benefit. The drug is contraindicated in women who are or may become pregnant.

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Acetaminophen



TRADE NAMES: TYLENOL®

Class

- Analgesic, antipyretic

Therapeutic Effects

- May work peripherally to block pain impulse generation; may also inhibit prostaglandin synthesis in the central nervous system.

Indications

- Pain control, fever control

Contraindications

- Hypersensitivity
- Severe acute liver disease

Side Effects

- Nausea / vomiting
- Loss of appetite
- Abdominal pain

How Supplied

- To be determined

Dosage and Administration

- **Adult:**
 - § 650mg PO
- **Pediatrics:**
 - § Pediatric dosing pending

Duration of Action

- Onset: 0.5-1.0 hours
- Duration: 3-8 hours

Pregnancy Safety: Category B

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Acetaminophen (Tylenol)
01/2023



TRADE NAMES: ADENOCARD®

Class

- Endogenous nucleoside

Mechanism of Action

- Slows conduction time through the A-V node
- Interruption of reentry pathways through the A-V node
- Restoration of NSR in patients with PSVT

Indications

- Conversion to sinus rhythm of paroxysmal supraventricular tachycardia (PSVT), including that associated with accessory bypass tracts (Wolff-Parkinson-White Syndrome)
- Conversion to sinus rhythm of Wide Complex Tachycardia of unknown etiology

Contraindications

- Second- or third-degree A-V block
- Wolfe-Parkinson-White Syndrome (WPW)
- Sinus node disease, such as sick sinus syndrome or symptomatic bradycardia
- Polymorphic or irregular wide complex tachycardia
- Known hypersensitivity to Adenosine

Adverse Reactions (may include):

- Facial flushing, lightheadedness, paraesthesia, headache, diaphoresis, palpitations, chest pain, hypotension, shortness of breath, nausea, metallic taste, transient periods of bradycardia, transient periods of ventricular ectopy, hyperventilation, burning sensation.

Drug Interactions

- Effects of Adenosine are antagonized by methylxanthines such as caffeine and Theophylline; larger doses may be required
- Adenosine effects are potentiated by dipyridamole; smaller doses may be effective

How Supplied

- 6mg/2mL vial (3mg/mL)

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Adenosine (Adenocard)
02/2022



Dosage and Administration

- **Adult**

- § **Initial Dose:** 6mg rapid IV bolus over a 1-3 second period. A 20mL saline flush should follow.
- § **Repeat Administration:** If the first dose does not result in elimination of the SVT within 1-2 minutes, 12mg should be given as a rapid IV bolus. This 12mg dose may be repeated a second time if required.

- **Pediatrics**

- § **Initial Dose:** 0.1mg/Kg (not to exceed 6mg) as a rapid IV bolus over a 1-2 second period. A 5mL saline flush should follow.
- § **Repeat Administration:** If the first dose does not result in elimination of the SVT within 1-2 minutes, 0.2mg/Kg (not to exceed 12mg) should be given as a rapid IV bolus.
- § Reference **Handtevy** Dosing Chart for age-specific dosing

Doses greater than 12mg are not recommended for adult and pediatric patients.

Duration of Action

- Onset 5-20 seconds
- Duration: 10 seconds

Special Considerations

- The onset of the effect is generally within less than one minute. Reported adverse experiences are predictable, short-lived and easily tolerated.

Protocol References:

- **Tab 800 (Cardiac Protocols)**
 - § Section N: Supraventricular Tachycardia
 - § Section Q: Ventricular Tachycardia / Wide Complex with Pulse
- **Tab 1100 (Pediatric Protocols)**
 - § Section T: Pediatric Tachycardia



TRADE NAMES: PROVENTIL[®], VENTOLIN[®]

Class

- Sympathomimetic, bronchodilator

Mechanism of Action

- Selective β_2 agonist which stimulates adrenergic receptors of the sympathomimetic nervous system, resulting in smooth muscle relaxation in the bronchial tree and peripheral vasculature.
- Little action of β_1 receptors in cardiac muscle

Indications

- Patients with signs or symptoms of respiratory distress (see Respiratory Distress Protocol)
- Treatment of bronchospasm in patients with reversible obstructive airway disease (COPD / Asthma)

Contraindications

- Hypersensitivity to any of the contents of the inhalation solution
- Cardiac insufficiency

Adverse Reactions

- Restlessness, tremors, dizziness, palpitations, tachycardia, nervousness, peripheral vasodilation, nausea, vomiting, hyperglycemia, increased blood pressure and paradoxical bronchospasm
- Synergistic with other sympathomimetics

Drug Interactions

- Tricyclic antidepressants and MAOIs may potentiate effects on vasculature – use with caution
- Beta-blockers are antagonistic
- May potentiate Hypokalemia caused by diuretics

How Supplied

- 2.5mg/3mL vial inhalation solution
- Metered Dose Inhaler (MDI) – Provisional Supply



Dosage and Administration

• Adult

- § Administer 2.5mg inhalation solution via nebulizer
- § Second and subsequent doses may be given as necessary for continued assessment of bronchospasm

NOTE: For continued auscultated wheezes after initial nebulized therapy, continue aerosol treatment with Albuterol (1 unit dose) mixed with Atrovent (1 unit dose). ***This combination therapy is only to be administered once.***

• Pediatrics

- § Administer 2.5mg inhalation solution via nebulizer (>18 months of age)
- § A second dose may be given as necessary for continued assessment of bronchospasm
- § Refer to ***Handtevy*** dosing guide for specific age group dosing.

Ø **Albuterol MDI:** Alternative to aerosolized Albuterol in setting of concern for respiratory droplet spread by aerosol. (1-2 puffs with spacer chamber; Repeat X 1 PRN)

Duration of Action

- Onset: 5-15 minutes
- Peak effect: 60-90 minutes
- Duration: 3-6 hours

Special Considerations

- Pregnancy safety: has been used in pregnant women for many years without apparent ill consequence
- Antagonized by beta-blockers
- May precipitate angina pectoris and dysrhythmias
- Should only be administered by inhalation methodology in pre-hospital management of respiratory distress

Albuterol Sulfate



Protocol References:

- **Tab 900 (Medical Emergency Protocols)**
 - § Section T: Respiratory Distress

- **Tab 1100 (Pediatric Protocols)**
 - § Section R: Pediatric Respiratory Distress



TRADE NAMES: CORDARONE®

Class

- Antidysrhythmic

Mechanism of Action

- Prolongation of action potential
- Slows electrical conduction, electrical impulse generation from sinoatrial node, and conduction through accessory pathways.
- Calcium channel block effects

Indications

- Patients with **absent vital signs** and either ventricular fibrillation or ventricular tachycardia on the cardiac monitor
- Suppression of ventricular fibrillation refractory to defibrillation
- Suppression of pulseless ventricular tachycardia refractory to defibrillation

Contraindications

- Cardiac arrest possibly due to hypothermia
- Second- or third-degree heart block
- Medication-induced ventricular dysrhythmias
- Hypotension (cardiogenic shock)
- Sinus Bradycardia or arrest or block
- Accelerated idioventricular rhythm
- Idioventricular escape rhythms
- Ventricular conduction defects
- Known hypersensitivity to oral or IV forms

Adverse Reactions

- Hypotension, bradycardia, PEA, CHF
- Prolonged QT interval
- Nausea, fever, abnormal liver function test, thrombocytopenia
- Pulmonary fibrosis, ARDS



Drug Interactions

- Incompatible with sodium bicarbonate – causes precipitate
- Compatible with Bretylium, Dopamine, Dobutamine, Isoproterenol, Lidocaine, Nitroglycerine, Norepinephrine, Phenylephrine, potassium solutions, Procainamide
- Fentanyl may cause hypotension, bradycardia, and decreased cardiac output
- Caution with beta-blockers – may cause hypotension and bradycardia
- Caution with calcium channel blockers – additive effects of A-V conduction/myocardial contractility, increased risk of hypotension

How Supplied

- 150mg/3mL ampule
- 150mg/3mL pre-filled syringe

Dosage and Administration

- **Adult**
 - § 300mg slow IV/IO push – initial dose
 - § 150mg slow IV/IO push – second dose if refractory or VF/VT returns
 - § Maximum IV/IO dose: 450mg
- **Pediatric**
 - § Pulseless arrest: 5mg/Kg slow IV/IO push
 - § Pediatric tachycardia (probable VT): 5mg/Kg over 20 minutes (MC order)
 - § Reference **Handtevy** Dosing Chart for age-specific dosing

Duration of Action

- Onset: within 5-15 minutes
- Peak effect: variable
- Duration: variable

Special Considerations

- Pregnancy safety: Category C
- Maintain at room temperature and protect from light in storage. Light protection not required during administration
- Hypotension usually responsive to slowing infusion rate
- Administer cautiously in patients with CHF or poor systolic function
- May be especially effective in high-risk patients with recent acute MI

Tab 400
Amiodarone (Cordarone)
02/2022

Amiodarone



Protocol References:

- **Tab 800 (Cardiac Protocols)**
 - § Section D: Cardiac Arrest
 - § Section P: Ventricular Fibrillation / Pulseless Ventricular Tachycardia

- **Tab 1100 (Pediatric Protocols)**
 - § Section Q: Pediatric Pulseless Arrest
 - § Section T: Pediatric Tachycardia

**TRADE NAMES: Not Applicable****Class**

- Platelet inhibitor, anti-inflammatory agent

Mechanism of Action

- Prostaglandin inhibition, prevents platelet aggregation

Indications

- Chest pain suggestive of acute MI
- Patient with previous cardiac history presenting with chest pain consistent with cardiac ischemia.

Contraindications

- Hypersensitivity to ASA or nonsteroidal anti-inflammatory drugs (NSAIDs)
- Gastrointestinal bleeding

Adverse Reactions

- Heart burn
- GI bleeding
- Nausea, vomiting
- Wheezing in allergic patients
- Prolonged bleeding

Drug Interactions

- None

How Supplied

- 81mg chewable tablet

Dosage and Administration

- **Adult**
§ 324mg PO

Duration of Action

- Onset: 30-45 minutes
- Peak effect: variable
- Duration: life of platelet (7-10 days)

Aspirin



Special Considerations

- Pregnancy safety: category D
- Not recommended in pediatric population

Protocol References:

- **Tab 800 (Cardiac Protocols)**
 - § Section F: Chest Pain / Acute Coronary Syndromes

**TRADE NAMES: Not Applicable****Class**

- Anticholinergic agent, parasympatholytic

Mechanism of Action

- Parasympatholytic: inhibits action of acetylcholine at postganglionic parasympathetic neuroeffector sites
- Increases heart rate in life-threatening bradydysrhythmias
- Competitively blocks the state of acetylcholine excess associated with organophosphate and nerve gas poisoning

Indications

- Hemodynamically significant bradycardia
- Organophosphate poisoning
- Nerve gas exposure

Contraindications

- Tachycardia
- Hypersensitivity
- Unstable cardiovascular status in acute hemorrhage
- Relative Contraindications (weigh risk/benefit):
 - § AV Block at His-Purkinje level (wide QRS complex)
 - § Suspected acute myocardial infarction or ischemia with wide QRS complex
 - § Narrow-angle Glaucoma

Adverse Reactions

- Headache, dizziness, palpitations, nausea and vomiting
- Tachycardia, dysrhythmias, Anticholinergic effects (blurred vision, dry mouth, urinary retention)
- Paradoxical bradycardia when pushed slowly or at low doses
- Flushed, hot dry skin

Drug Interactions

- Potential adverse effects when administered with digoxin, cholinergics, physostigmine
- Effects enhanced by antihistamines, procainamide, quinidine, antipsychotics, benzodiazepines and antidepressants.



How Supplied

- 1mg/10mL prefilled syringe
- 2.1mg DuoDote Auto-Injector (mixed with 600mg Pralidoxime Chloride)

Dosage and Administration

Bradycardias

- **Adult**
 - § 1.0mg IV bolus q 3-5 minutes PRN to maximum total dose of 3mg
- **Pediatric**
 - § 0.02mg/Kg IV/IO (dose range of 0.1mg – 1 mg) may be repeated once
 - § Reference **Handtevy** Dosing chart for age-specific dosing

Toxic Ingestion / Organophosphate / Nerve Agent Exposure

- **Adult**
 - § 2mg IV/IM q 5 minutes PRN
- **Pediatric**
 - 0.02mg/Kg IV/IO (dose range of 0.1mg – 1 mg)
 - Nerve agent exposure:
 - § <2 years of age - 0.5mg Atropine IM (repeated every 5 minutes PRN)
 - § 2-10 years of age – 1.0mg Atropine IM (repeated every 5 minutes PRN)

Duration of Action

- Onset: immediate
- Peak effect: rapid 1-2 minutes
- Duration: 2-6 hours

Special Considerations

- Pregnancy safety: category C
- Moderate doses dilate pupils
- Much higher doses (2-4mg PRN) may be required to reverse effects of organophosphates and nerve gas agents



Protocol References:

- **Tab 100 (Operations)**
 - § Section V: Hazardous Materials / WMD

- **Tab 500 (Medical Procedures / Equipment)**
 - § Section O: Intramuscular Medication Administration

- **Tab 800 (Cardiac Protocols)**
 - § Section C: Bradycardia

- **Tab 900 (Medical Emergency Protocols)**
 - § Section R: Overdose / Toxic Ingestion

- **Tab 1100 (Pediatric Protocols)**
 - § Section E: Pediatric Bradycardia
 - § Section N: Pediatric Overdose / Toxic Ingestion



TRADE NAMES: Not Applicable

Class

- Electrolyte and water

Mechanism of Action

- Increase cardiac contractile state and ventricular automaticity
- Is useful in reversing cardiac arrhythmias due to hyperkalemia (often seen in renal dialysis patients)

Indications

- Calcium channel blocker toxicity
- Treatment of hypocalcaemia in conditions requiring prompt increase in plasma calcium
- During cardiac resuscitation to combat hyperkalemia as the precipitant to cardiac arrest
- To treat adverse effects caused by calcium channel blocker overdose
- Hypotension secondary to diltiazem administration

Contraindications

- Cardiac resuscitation in presence of ventricular fibrillation or in patients with existing digitalis toxicity

Adverse Reactions

- Rapid injection may cause the patient to complain of tingling sensations, a calcium taste, a sense of oppression or “heat wave”
- Injections of calcium chloride are accompanied by peripheral vasodilation as well as a local “burning” sensation and there may be a moderate fall in blood pressure

Drug Interactions

- May potentiate digitalis toxicity

How Supplied

- 1Gm/10mL prefilled syringe



Dosage and Administration

- **Adult**
 - § **Cardiac Arrest:** Evidence of ESRD (end-stage renal disease) with suspected hyperkalemia – 1Gm slow IO/IV push.
 - § **Supraventricular Tachycardia:** If adverse reaction to Cardizem infusion (hypotension, bradycardia, heart block) 1Gm over 5 minutes.
 - § **Atrial Fibrillation / Flutter:** If adverse reaction to Cardizem infusion (hypotension, bradycardia, heart block) 1Gm over 5 minutes.
 - § **Overdose / Toxic Ingestion (calcium channel blocker overdose):** 20mg/Kg slow IO/IV.

- **Pediatric**
 - § **Overdose / Toxic Ingestion:** 20mg/Kg slow IO/IV
 - § Refer to **Handtevy** Dosing Chart for age-specific dosing

Special Considerations

- Pregnancy safety: category C
- Use with caution in digitalized patients
- Inject slowly into large vein to help prevent irritation and cardiac syncope

Protocol References:

- **Tab 800 (Cardiac Protocols)**
 - § Section B: Atrial Fibrillation / Flutter
 - § Section D: Cardiac Arrest
 - § Section N: Supraventricular Tachycardia

- **Tab 900 (Medical Emergency Protocols)**
 - § Section R: Overdose / Toxic Ingestion

- **Tab 1100 (Pediatric Protocols)**
 - § Section N: Pediatric Overdose / Toxic Ingestion

**TRADE NAMES: CAPOTEN®****Class**

- Specific competitive inhibitor of angiotensin I-converting enzyme (ACE), the enzyme responsible for the conversion of angiotensin I to angiotensin II

Mechanism of Action

- Beneficial effects in hypertension and heart failure result primarily from suppression of the rennin-angiotensin-aldosterone system
- Afterload reduction
- Arterial vasodilation

Indications

- Hypertension
- Hypertension associated with acute pulmonary edema

Contraindications

- Patients who are hypersensitive to Captopril or any other ACE Inhibitors

Adverse Reactions

- Rash, fever, taste impairment, angioedema, cough, hypotension

Drug Interactions

- Hypotension-patients on other Diuretic therapy

How Supplied

- 25mg tablets

Dosage and Administration

- **Adult**
 - § 25mg tablet sublingual (SL) for hypertension
- **Pediatric**
 - § Not recommended for use in pediatrics



Duration of Action

- Onset: within 15 minutes
- Peak effect: variable
- Duration: variable

Special Considerations

- When used in pregnancy during the second and third trimesters, ACE inhibitors can cause injury and even death to the developing fetus
- Wetting the tablet prior to SL administration will help absorption

Protocol References:

- **Tab 800 (Cardiac Protocols)**
 - § Section K: Pulmonary Edema
- **Tab 900 (Medical Emergency Protocols)**
 - § Section N: Hypertensive Emergency



TRADE NAMES: CIPRO

Class

- Synthetic broad spectrum antimicrobial agent
- Fluoroquinolone

Mechanism of Action

- Ciprofloxacin has in vitro activity against a wide range of gram-negative and gram-positive organisms. Ciprofloxacin inhibits bacterial DNA gyrase, an enzyme responsible for counteracting excessive supercoiling of DNA during replication or transcription. The mechanism of action of quinolones, including ciprofloxacin, is different from that of other antimicrobial agents such as beta-lactams, macrolides, tetracyclines, or aminoglycosides; therefore, organisms resistant to these drugs may be susceptible to ciprofloxacin. There is no known cross-resistance between ciprofloxacin and other classes of antimicrobials.

Indications

- Inhalation anthrax (post-exposure): to reduce the incidence or progression of disease following exposure to aerosolized *Bacillus anthracis*

Contraindications

- Should not be used by persons with a history of hypersensitivity to Cipro, or other quinolones.

Adverse Reactions

- Nausea, diarrhea, vomiting, abdominal pain/discomfort, headache, restlessness, rash.

Drug Interactions

- Concurrent administration with Theophylline may lead to elevated serum concentrations of Theophylline and prolongation of its elimination half-life
- Has shown to interfere with the metabolism of caffeine
- Enhancement of effects of oral anticoagulant Warfarin or its derivatives



How Supplied

- 500mg tablets

Dosage and Administration

- **Adult**

§ The determination of dosage for any particular patient must take into consideration the severity and nature of the infection, the susceptibility of the causative organism, the integrity of the patient's host-defense mechanisms, and the status of renal function and hepatic function

- **Pediatric**

§ The determination of dosage for any particular patient must take into consideration the severity and nature of the infection, the susceptibility of the causative organism, the integrity of the patient's host-defense mechanisms, and the status of renal function and hepatic function

Special Considerations

- Pregnancy safety: category C

Protocol References:

- **Tab 100 (Operations)**

§ Section V: Hazardous Materials / WMD



TRADE NAMES: Not Applicable

Class

- Hypertonic carbohydrate solution

Mechanism of Action

- Rapidly increases serum glucose levels

Indications

- Signs and symptoms consistent with hypoglycemia
- Documented hypoglycemia
- Correction of altered mental status due to low blood sugar (hypoglycemia), seizures and cardiac arrest

Contraindications

- Intracranial hemorrhage
- Increased intracranial pressure
- Known hyperglycemia

Adverse Reactions

- Extravasation leads to tissue necrosis
- Warmth, pain, burning, thrombophlebitis, rhabdomyositis
- May worsen hyperglycemia (high blood sugar)

Drug Interactions

- Sodium bicarbonate
- Coumadin

How Supplied

- 25Gm/50mL prefilled syringe (Dextrose 50%)
- 10Gm of Dextrose 10% (IV Solution – 250mL)



Dosage and Administration

- **Adult**
 - § 10Gm (100mL) of Dextrose 10% IV/IO infusion with macro drip set. (Repeat infusion if BGL remains below 60mg/dl: Max dose is 500mL). **-OR-**
 - § 12.5 Gm (25mL) or Dextrose 50% IV/IO bolus. (May be repeated once if BGL remains below 60mg/dl)
- **Pediatric**
 - § 0.5Gm/Kg (5mL/Kg) of Dextrose 10% (Max dose 10Gm: 100mL). Infusion with macro drip set. Repeat dosing (as necessary) per **On-Line Medical Control**.
 - § **Newborn:** 0.2Gm/Kg (2mL/Kg) of Dextrose 10% (Max dose 15mL). Repeat dosing (as necessary) per **On-Line Medical Control**.

Duration of Action

- Onset: < 1 minute
- Peak effect: variable
- Duration: variable

Special Considerations

- Check blood sugar before administering if available – if not available, do not delay administration if known diabetic with decreased level of consciousness or if clinical suspicion HIGH for hypoglycemia
- Do not administer to patients with known CVA unless hypoglycemia documented

Protocol References:

- **Tab 900 (Medical Emergency Protocols)**
 - § Section E: Altered Mental Status
 - § Section S: Overdose / Toxic Ingestion
 - § Section V: Seizures
 - § Section X: Syncope
 - § Section W: Stroke / CVA
 - § Section BB: Hypo- / Hyperglycemia
- **Tab 1100 (Pediatric Protocols)**
 - § Section D: Altered Mental Status
 - § Section W: Hypo- / Hyperglycemia

Tab 400
Dextrose
11/2022

Diazepam

**TRADE NAMES: VALIUM®****Class**

- Benzodiazepine, sedative-hypnotic, anticonvulsant

Mechanism of Action

- Potentiates effects of inhibitory neurotransmitters
- Raises seizure threshold
- Induces amnesia and sedation

Indications

- Nerve agent exposure

Contraindications

- Focal seizure with no alteration in consciousness
- Hypersensitivity, coma, shock, myasthenia gravis (disease of voluntary muscles)

Adverse Reactions

- Respiratory depression, hypotension, drowsiness, ataxia
- Reflex tachycardia, nausea, confusion, thrombosis and phlebitis

Drug Interactions

- Incompatible with most drugs and fluids
- Caution when used in intoxicated patients – can have additive effect producing further CNS depression

How Supplied

- 10mg/2mL Auto-Injector

Tab 400
Diazepam (Valium)
02/2022



Dosage and Administration

Nerve Agent Exposure

- **Adult**
 - § 10mg auto-injector used in conjunction with DuoDote auto-injector for patient that presents with seizures, apnea, severe respiratory distress, unconsciousness or muscle twitching
- **Pediatric**
 - § 0.2mg/Kg not to exceed 10mg (if available for pediatric dosing)

Duration of Action

- Onset: 1-5 minutes
- Peak effect: 30 minutes-2 hours
- Duration: Variable

Special Considerations

- Pregnancy Safety: category D
- Short duration of anticonvulsant effect
- Consider reducing dose 50% in the elderly patient

Protocol References:

- **Tab 100 (Operations)**
 - § Section V: Hazardous Materials / WMD
- **Tab 500 (Medical Procedures / Equipment)**
 - § Section P: Intramuscular Medication Administration



TRADE NAME: CARDIZEM®

Class

- Calcium channel blocker

Mechanism of Action

- Block the entry of calcium into muscle cells that make up the heart and that surround the arteries.
- Decreases the force of contraction of the heart and its rate of contraction. It also relaxes the muscles surrounding the arteries, allowing the arteries to widen (dilate).
- By dilating arteries, diltiazem reduces the pressure in the arteries into which the heart must pump blood, and, as a result, the heart needs to work less and requires less oxygen. By reducing the heart's need for oxygen, diltiazem relieves or prevents angina. Dilation of the arteries also reduces blood pressure.

Indications

- Conversion of narrow-complex SVT refractory to Adenocard administration
- Rate-control for symptomatic atrial fibrillation / flutter

Contraindications

- CHF
- SA node or AV conduction disturbances
- Wolff-Parkinson-White Syndrome
- Diltiazem is relatively contraindicated in the presence of sick sinus syndrome, A-V node conduction disturbances, bradycardia, impaired left ventricular function, peripheral artery occlusive disease, COPD and Prinzmetal's angina

Adverse Reactions

- Anorexia, nausea, thirst, nervousness, headache, angina, arrhythmia, A-V block, hypotension, palpitations, syncope

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Diltiazem (Cardizem)
01/2023



Drug Interactions

- Due to the potential for additive effects, caution and careful titration are warranted in patients receiving diltiazem concomitantly with other agents known to affect cardiac contractility and/or conduction. Pharmacologic studies indicate that there may be additive effects in prolonging AV conduction when using beta-blockers or digitalis concomitantly with diltiazem

How Supplied

- 25mg/5mL vial (5mg/mL)

Dosage and Administration

- **Adult**
 - § **Atrial Fibrillation / Flutter:** 0.25mg/Kg (maximum dose 20mg) IV over 2 minutes (Age \geq 60 give 10mg then repeat 10mg in 5 min. if SBP \geq 100). If needed for further rate control, in 15 minutes 0.35mg/Kg (maximum dose 25mg) IV over 2 minutes (Age \geq 60 give 15mg then repeat 10mg in 5 min. if SBP \geq 100).
 - § **Supraventricular Tachycardia:** if refractory to Adenocard administration, 0.25mg/Kg (maximum dose 20mg) IV over 2 minutes. If needed for further rate control, in 15 minutes 0.35mg/Kg (maximum dose 25mg) IV over 2 minutes
- **Pediatric**
 - § Not recommended for use in pediatrics

Duration of Action

- Onset: within 3-5 minutes
- Peak effect: variable
- Duration: 4-10 hours

Special Considerations

- Pregnancy safety: category C
- May cause CHF in patients on beta blocker therapy
- Development of bradycardia, hypotension or heart block during administration

Tab 400
Diltiazem (Cardizem)
01/2023

Diltiazem



Protocol References:

- **Tab 800 (Cardiac Protocols)**
 - § Section B: Atrial Fibrillation / Flutter
 - § Section N: Supraventricular Tachycardia

Tab 400
Diltiazem (Cardizem)
01/2023

Diphenhydramine Hydrochloride



TRADE NAME: BENADRYL®

Class

- Antihistamine, anticholinergic

Mechanism of Action

- Blocks cellular histamine receptors
- Decreases vasodilation
- Decreases motion sickness
- Reverses extrapyramidal reactions

Indications

- Symptomatic relief of allergies, allergic reactions, anaphylaxis, acute dystonic reactions due to phenothiazines

Contraindications

- Glaucoma, hypertension, narrow angle glaucoma, infants
- Patients taking monoamine oxidase inhibitors

Adverse Reactions

- Sedation, hypotension, seizures, visual disturbances, vomiting, urinary retention, palpitations, dysrhythmias, dry mouth and throat
- Paradoxical CNS excitation in children

Drug Interactions

- Potentiates effects of alcohol and other anticholinergics
- MAOIs prolong anticholinergic effects of diphenhydramine

How Supplied

- 50mg/1mL vial

Tab 400
Diphenhydramine Hydrochloride (Benadryl)
02/2022

Diphenhydramine Hydrochloride



Dosage and Administration

- **Adult**
 - § 25-50mg IM/IV
- **Pediatric**
 - § 1mg/Kg IM/IV
 - § Reference **Handtevy** Dosing chart for age-specific dosing

Duration of Action

- Onset: 15-30 minutes
- Peak effect: 1 – 4 hours
- Duration: 2-10 hours

Special Considerations

- If used in anaphylaxis, often used in conjunction with epinephrine and steroids

Protocol References:

- **Tab 900 (Medical Emergency Protocols)**
 - § Section D: Allergic Reaction
- **Tab 1100 (Pediatric Protocols)**
 - § Section C: Pediatric Allergic Reaction

Dopamine Hydrochloride



TRADE NAME: INTROPIN®

Class

- Phenethylamine which functions as a neurotransmitter

Mechanism of Action

- Dopamine stimulates dopaminergic receptors at lower doses producing renal and mesenteric vasodilation while at higher doses stimulate both dopaminergic and β -adrenergic receptors producing cardiac stimulation and renal vasodilation. It increases heart rate and force of contraction. At low infusion rates vasodilatation occurs in the renal, mesenteric, coronary and cerebral beds. At higher rates vasoconstriction in skeletal muscles and a rise in BP.

Indications

(Patients non-responsive or contraindications to Push-Dose Pressor Epi)

- Acute heart failure (Cardiogenic Shock)
- Hemodynamically unstable hypotension (Septic Shock / Anaphylactic Shock)
- Bradycardia with low cardiac output
- Hypovolemic shock (after sufficient volume replacement)

Contraindications

- Pheochromocytoma
- Uncorrected tachyarrhythmias
- Uncorrected hypovolemia
- Ventricular fibrillation
- Hypersensitivity

Adverse Reactions

- Nausea, vomiting, tachycardia, ectopic beats, palpitations, anginal pain, hypotension, vasoconstriction, bradycardia, hypertension, dyspnea, headache, widened QRS complexes, azotaemia

Drug Interactions

- MAO inhibitors prolong and increase dopamine effects.
- Ergots potentiate vasoconstriction action of dopamine.
- Alpha-blockers unmask dopamine's beta action.

Tab 400
Dopamine Hydrochloride
11/2022

Dopamine Hydrochloride



How Supplied

- 400mg/10mL vial (40mg/mL)

Dosage and Administration

• Adult

§ 5-20mcg/Kg/min: Mix 400mg of Dopamine in 250mL of D5W (1600mcg/mL). With mini-drip setting on administration set (60gtt), start Dopamine drip at 5mcg/Kg/min and titrate up to a maximum of 20mcg/Kg/min or until a perfusing heart rate and blood pressure is achieved.

• Pediatric

§ 5-20mcg/Kg/min: Mix 400mg of Dopamine in 250mL of D5W (1600mcg/mL). With mini-drip setting on administration set (60gtt), start Dopamine drip at 5mcg/Kg/min and titrate up to a maximum of 20mcg/Kg/min or until a perfusing heart rate and blood pressure is achieved.

§ Refer to **Handtevy** Dosing Chart for age-specific dosing

Duration of Action

- Onset: within 2-4 minutes
- Duration: 10-15 minutes

Special Considerations

- Pregnancy safety: category C
- Infuse in large vein to prevent extravasation
- Must calculate appropriate weight-based dose
- Titration of medication to desired effect



Dopamine Hydrochloride



Protocol References:

- Consideration for Dopamine infusion absent response from Push-Dose Pressor Epinephrine (1:100,000) **or**;
- Concern for adverse cardiac affects in elderly patient or cardiovascular dysfunction (i.e., Tachycardia, HTN, cardiac ischemia)

Tab 400
Dopamine Hydrochloride
11/2022



Doxycycline (Doxycycline Hyclate)



TRADE NAMES: Not Applicable

Class

- A broad-spectrum antibiotic

Mechanism of Action

- Doxycycline is an antimicrobial drug

Indications

- Brucellosis
- Fever (of suspected biological agent)
- Pneumonic Plague
- Typhoidal Tularemia
- Anthrax exposure

Contraindications

- This drug is contraindicated in persons who have shown hypersensitivity to any of the tetracyclines.

Adverse Reactions

- Anorexia, nausea, vomiting, diarrhea, glossitis, dysphagia, enterocolitis, rash

Drug Interactions

- Avoid giving with penicillin
- Anticoagulant therapy
- May render oral contraceptives less effective

How Supplied

- 100mg tablets

Tab 400
Doxycycline
02/2022

Doxycycline (Doxycycline Hyclate)



Dosage and Administration

- **Adult**

- § The determination of dosage for any particular patient must take into consideration the severity and nature of the infection, the susceptibility of the causative organism, the integrity of the patient's host-defense mechanisms, and the status of renal function and hepatic function

- **Pediatric**

- § The determination of dosage for any particular patient must take into consideration the severity and nature of the infection, the susceptibility of the causative organism, the integrity of the patient's host-defense mechanisms, and the status of renal function and hepatic function

Special Considerations

- Pregnancy safety: category D
- Patients taking Doxycycline should avoid excessive sunlight
- Patients should drink fluids liberally

Protocol References:

- **Tab 100 (Operations)**
 - § Section V: Hazardous Materials / WMD



Class

- DuoDote is a combination of Atropine, a cholinergic muscarinic antagonist, and Pralidoxime Chloride, a cholinesterase reactivator.

Mechanism of Action

- The principal action of Pralidoxime is to reactivate cholinesterase (mainly outside of the central nervous system) which has been inactivated by phosphorylation due to an organophosphate pesticide or related compound. The destruction of accumulated acetylcholine can then proceed and neuromuscular junctions will again function normally. Pralidoxime also slows the process of "aging" of phosphorylated cholinesterase to a non-reactivable form, and detoxifies certain organophosphates by direct chemical reaction. The drug has its most critical effect in relieving paralysis of the muscles of respiration. Because Pralidoxime is less effective in relieving depression of the respiratory center, atropine is always required concomitantly to block the effect of accumulated acetylcholine at this site. Pralidoxime relieves muscarinic signs and symptoms, salivation, bronchospasm, etc., but this action is relatively unimportant since atropine is adequate for this purpose.

Indications

- For the treatment of poisoning by organophosphorus nerve agents as well as organophosphorus insecticides in adults and pediatric patients weighing more than 41Kg (90 pounds).

Contraindications

- Pralidoxime Chloride auto-injector is contraindicated in patients who are hypersensitive to any component of the product.

Adverse Reactions

- **Pralidoxime Chloride:**
 - § Tachycardia, palpitations, PVCs, flutter, fibrillation, asystole, and MI
 - § Use caution in patients with known CV disease or conduction problems
 - § Vision disturbances, dizziness, headache, drowsiness, nausea, increased BP, muscular weakness, dry mouth, emesis, rash, dry skin, hyperventilation, manic behavior

**Adverse Reactions (cont.)****· Atropine:**

- § Heat injury (Atropine may inhibit sweating and lead to hyperthermia)
- § Inspiration of bronchial secretions and formation of dangerous viscid plugs and may exacerbate chronic lung disease.
- § Mouth dryness, blurred vision, dry eyes, photophobia, confusion, headache and dizziness

Drug Interactions

- When used with Atropine, the signs of atropinization may occur earlier

How Supplied

- DuoDote Auto Injector: Delivers 2.1mg Atropine in 0.7mL and 600mg Pralidoxime Chloride in 2mL sequentially through a single needle using the two-chambered BinaJect® drug delivery system.

Dosage and Administration**· Adult**

- § Dyspnea, vomiting or diarrhea: DuoDote Auto-Injector 2-PAM CL / Atropine IM
- § Seizures, apnea, severe respiratory distress, unconsciousness, muscle twitching: (3 DuoDote Auto-Injectors) 2-PAM CL used in conjunction with Atropine and Valium IM

· Pediatric

- § Safety and effectiveness of DuoDote in pediatric patients has not been fully established. DuoDote is indicated for pediatric patients weighing more than 41Kg (90 pounds).

Duration of Action

- Onset: approximately 10 minutes
- Duration: dose dependent

Special Considerations

- Pregnancy safety: category C
- Caution in patients taking Aminophylline, Caffeine, Theophylline



DuoDote Auto-Injector®



Protocol References:

- **Tab 100 (Operations)**
 - § Section V: Hazardous Materials / WMD

Tab 400
DuoDote Auto-Injector®
02/2022

Epinephrine (0.1mg/mL and 1mg/mL)



TRADE NAME: ADRENALIN®

Class

- Sympathomimetic

Mechanism of Action

- Direct acting alpha and beta agonist
 - § **Alpha:** bronchial, cutaneous, renal and visceral arteriolar vasoconstriction
 - § **Beta 1:** positive inotropic and chronotropic actions, increases automaticity
 - § **Beta 2:** bronchial smooth muscle relaxation and dilation of skeletal vasculature
- Blocks histamine release

Indications

- Patient with absent vital signs and either ventricular fibrillation or ventricular tachycardia on the monitor
- Cardiac arrest patient presenting in Asystole on cardiac monitor but does not meet standard criteria for determination of death
- Patient with cardiac electrical activity on the cardiac monitor but absent vital signs or evidence of spontaneous circulation (PEA)
- Cardiac arrest, Asystole, PEA, VF unresponsive to initial defibrillation
- Anaphylaxis, acute allergic reactions
- Respiratory stridor (suspected croup)
- Asthma
- Hemodynamically unstable bradycardia
- Sepsis / Septic Shock
- Hypotension / Shock (Non-Trauma)
- Cardiogenic Shock

Contraindications

- Cardiac arrest due to hypothermia
- Hypertension, pulmonary edema/CHF, coronary insufficiency, hypovolemic shock
- Narrow angle (congestive) glaucoma – relative contraindication

Epinephrine (0.1mg/mL and 1mg/mL)



Adverse Reactions

- Hypertension, dysrhythmias, pulmonary edema/congestive heart failure, anxiety, psychomotor agitation, nausea, angina, headache, restlessness
- Overdose or inadvertent IV injection of epinephrine may cause CNS hemorrhage resulting from the sharp rise in BP.

Drug Interactions

- Potentiates other sympathomimetics
- Deactivated by alkaline solutions
- MAOIs and Bretylium may potentiate effects of epinephrine

How Supplied

- 1mg/10mL prefilled syringe (0.1mg/mL)
- 1mg/1mL ampul (1mg/mL)

Dosage and Administration

Cardiac Arrest

- **Adult**
 - § 1mg Epinephrine (0.1mg/mL) IV/IO q 10 minutes (Maximum 4mg).
- **Pediatric**
 - § 0.01mg/Kg Epinephrine (0.1mg/mL) IV/IO q 3-5 minutes PRN.
 - § Reference **Handtevy** Dosing Chart for age-specific dosing

Allergy / Anaphylaxis

- **Adult**
 - § **Allergy:** 0.5mg Epinephrine (1mg/mL) IM
 - § **Anaphylaxis:** Epinephrine 1:100,000 (1mL/min IV/IO)
- **Pediatric**
 - § **Allergy:** 0.01mg/Kg Epinephrine (1mg/mL) IM: (max 0.5mg)
 - § **Anaphylaxis:** Epinephrine 1:100,000 (1mL/min IV/IO)
 - § Reference **Handtevy** Dosing Chart for age-specific dosing

Epinephrine (0.1mg/mL and 1mg/mL)



Respiratory Distress

- **Adult**
 - § **Wheezes:** 0.5mg Epinephrine (1mg/mL) IM
 - § **Stridor:** 0.5mg Epinephrine (1mg/mL) nebulized or 0.5mg (1mg/mL) IM

- **Pediatric**
 - § **Wheezes (<18mos):** 1mg Epinephrine (1mg/mL) nebulized with 2mL NS
 - § **Wheezes (>18mos):** 0.01mg/Kg Epinephrine IM (max dose 0.5mg)
 - § **Stridor/Croup:** 1mg Epinephrine (1mg/mL) nebulized with 2mL NS
 - § Reference *Handtevy* Dosing Chart for age-specific dosing

Bradycardia / Sepsis / Hypotension / Post Resuscitation Care

- **Adult**
 - § Push-Dose Pressor Epinephrine 1:100,000 (1mL/min IV / IO)

- **Pediatric**
 - § Push-Dose Pressor Epinephrine 1:100,000 (1mL/min IV / IO)

Duration of Action

- Onset: immediate
- Peak effect: minutes
- Duration: 5-10 minutes

Special Considerations

- Pregnancy safety: category C
- Syncope in asthmatic children
- Increases myocardial work effort and oxygen consumption

Epinephrine (0.1mg/mL and 1mg/mL)



Protocol References:

- **Tab 500 (Medical Procedures / Equipment)**
 - § Section L: Endotracheal Medication Administration
 - § Section O: Intramuscular Medication Administration

- **Tab 800 (Cardiac Protocols)**
 - § Section A: Asystole
 - § Section C: Bradycardia
 - § Section D: Cardiac Arrest
 - § Section G: Discontinuation of Prehospital Resuscitation
 - § Section J: Post-Resuscitation Care: Adult
 - § Section L: Pulseless Electrical Activity (PEA)
 - § Section P: Ventricular Fibrillation / Pulseless VT

- **Tab 900 (Medical Emergency Protocols)**
 - § Section D: Allergic Reaction
 - § Section Q: Hypotension / Shock (Non-Trauma)
 - § Section T: Respiratory Distress
 - § Section CC: Sepsis / Septic Shock

- **Tab 1100 (Pediatric Protocols)**
 - § Section C: Pediatric Allergic Reaction
 - § Section E: Pediatric Bradycardia
 - § Section Q: Pediatric Pulseless Arrest
 - § Section R: Pediatric Respiratory Distress



TRADE NAME: AMIDATE®

Class

- Hypnotic, sedative

Mechanism of Action

- Non-barbiturate hypnotic and sedative without analgesic activity; has minimal effects on myocardial activity, BP and respirations

Indications

- Sedation for post-resuscitative care with documented patient movement (i.e., gasping, shivering, seizure activity)
- Maintenance of secured advanced airway

Contraindications

- Hypersensitivity

Adverse Reactions

- Hypotension (Systolic BP <90)
- Transient clonic jerking of skeletal muscle (too rapid infusion)
- Laryngospasm
- Allergic reactions (rare)

Drug Interactions

- None well documented

How Supplied

- 40mg/20mL vial (2mg/mL)
- 20mg/10mL vial (2mg/mL)



Dosage and Administration

- **Adult**
 - § 20mg slow IV/IO push

Duration of Action

- Onset: usually within 1 minute
- Duration: 3-5 minutes

Special Considerations

- Pregnancy safety: category C
- Rapid IV infusion can cause skeletal muscle fasciculation
- Re-dosing per MC contact with continued patient movement/activity during therapeutic hypothermia

Protocol References:

- **Tab 800 (Cardiac Protocols)**
 - § Section J: Post-Resuscitation Care



TRADE NAME(S): ACTIQ®, DURAGESIC®, SUBLIMAZE®

Class

- Narcotic analgesic

Mechanism of Action

- Fentanyl is a potent opioid analgesic that increases pain threshold, alters pain reception and inhibits ascending pain pathways by binding to stereospecific receptors within the CNS.

Indications

- Used as a narcotic analgesic for pain management
- Used as a sedative during cardiac arrest post-resuscitation care
- Maintenance of secured advanced airway

Contraindications

- Known intolerance or hypersensitivity

Adverse Reactions

- Somnolence, respiratory depression, muscle rigidity, bradycardia, seizures, diaphoresis, hypotension, apnea, dizziness, blurred vision, nausea, vomiting

Drug Interactions

- Depressant effects may be enhanced by other CNS depressants (e.g. alcohol, anaesthetics, anxiolytics, hypnotics, TCAs and antipsychotics). Ammonium chloride may increase excretion of Fentanyl. Phenothiazines may increase hypotensive effect of opioid analgesics.

How Supplied

- 100mcg/2mL Carpuject (50mcg/mL)
- 100mcg/2mL Ampule (50mcg/mL)



Dosage and Administration

- **Adult (ACS / Burns / Musculoskeletal Trauma)**
 - § 50-100mcg IV/IO/IM/IN (1mcg/Kg)
 - § Maximum initial dose 100mcg
 - § May repeat ½ dose every 5 min PRN: Maximum of 300mcg
- **Adult (Post-Resuscitation Care)**
 - § 50mcg for sedation prior to Etomidate and Norcuron dosing
- **Pediatric**
 - § 1mcg/Kg IV/IO/IM/IN (dose not to exceed 50mcg)
 - § Reference **Handtevy** Dosing Chart for age-specific dosing

Duration of Action

- Onset: rapid
- Peak effect: variable
- Duration: short

Special Considerations

- Pregnancy safety: category C
- Head injury; increased intracranial pressure; intracranial lesions; renal or hepatic impairment; neonates; opioid-nontolerant patients.
- Increased risk of respiratory depression in elderly, debilitated patients, patient with hypoxia or hypercapnia.
- Hypothyroidism, prostatic hyperplasia, inflammatory bowel disorders, bradycardia or bradyarrhythmias.
- Rapid IV infusion may cause skeletal muscle and chest wall rigidity, impaired ventilation or respiratory distress/arrest.
- Prolonged use may cause tolerance, psychological and physical dependence.
- Abrupt withdrawal after prolonged admin may lead to withdrawal symptoms.



Protocol References:

- **Tab 500 (Medical Procedures / Equipment)**
 - § Section P: Intranasal (IN) Medication Administration

- **Tab 800 (Cardiac Protocols)**
 - § Section J: Post-Resuscitation Care

- **Tab 900 (Medical Emergency Protocols)**
 - § Section T: Pain Management

- **Tab 1100 (Pediatric Protocols)**
 - § Section O: Pediatric Pain Management



TRADE NAME: GLUCAGEN®

Class

- Hyperglycemic agent, pancreatic hormone, insulin antagonist

Mechanism of Action

- Increases blood glucose by stimulating glycogenesis (converts liver glycogen to glucose)
- Unknown mechanism of stabilizing cardiac rhythm in beta- or calcium-channel blocker overdose
- Minimal positive inotrope and chronotrope
- Decreases GI motility and secretions – smooth muscle relaxant

Indications

- Signs and symptoms consistent with hypoglycemia
- Documented hypoglycemia
- Altered level of consciousness when hypoglycemia is suspected
- May be used as inotropic or chronotropic agent in beta- or calcium-channel blocker overdose

Contraindications

- Hyperglycemia
- Hypersensitivity
- Known Pheochromocytoma (adrenal tumor that secretes excess epinephrine)

Adverse Reactions

- Nausea and vomiting (occasional)
- Tachycardia, hypertension

Drug Interactions

- Incompatible in solution with most other substances
- No significant drug interactions with other emergency medications



How Supplied

- 1mg (1IU) vial (must be reconstituted)

Dosage and Administration

- **Adult**
 - § 1mg IN/IM (requires reconstitution)
 - § For beta-blocker overdose administer IV
- **Pediatric**
 - § 0.1mg/Kg IM / IN (requires reconstitution)
 - § For beta-blocker overdose administer IV
 - § Reference **Handtevy** Dosing Chart for age-specific dosing

Duration of Action

- Onset: 1 minute
- Peak effect: 30 minutes
- Duration: variable (generally 9-17 minutes)

Special Considerations

- Pregnancy safety: category C
- Ineffective if glycogen stores depleted (chronic alcohol related liver disease)
- Should always be used in conjunction with 50% Dextrose whenever possible

Protocol References:

- **Tab 500 (Medical Procedures / Equipment)**
 - § Section P: Intramuscular Medication Administration
 - § Section Q: Intranasal (IN) Medication Administration
- **Tab 800 (Cardiac Protocols)**
 - § Section D: Cardiac Arrest
 - § Section L: Pulseless Electrical Activity (PEA)



Protocol References (cont.):

- **Tab 900 (Medical Emergency Protocols)**
 - § Section E: Altered Mental Status
 - § Section S: Overdose / Toxic Ingestion
 - § Section V: Seizures
 - § Section X: Syncope
 - § Section BB: Hypo- / Hyperglycemia

- **Tab 1100 (Pediatric Protocols)**
 - § Section D: Pediatric Altered Mental Status
 - § Section N: Pediatric Overdose / Toxic Ingestion
 - § Section W: Pediatric Hypo- / Hyperglycemia



TRADE NAME: GLUTOSE®

Class

- Hyperglycemic agent

Mechanism of Action

- Provides quickly absorbed glucose to increase blood glucose levels

Indications

- Conscious patients with suspected signs and symptoms consistent with hypoglycemia
- Documented hypoglycemia

Contraindications

- Decreased level of consciousness, absent gag reflex, nausea, vomiting

Adverse Reactions

- Nausea, vomiting

Drug Interactions

- None

How Supplied

- Oral Glucose gel (15Gm/tube)

Dosage and Administration

- **Adult**
§ 1 tube (repeat PRN)
- **Pediatric**
§ < 3 years of age: Not indicated
§ > 3 years of age: 1 tube (repeat PRN)

Duration of Action

- Onset: immediate
- Peak effect: variable
- Duration: variable

Tab 400
Glucose
02/2022

Glucose



Special Considerations

- As noted in “indications” section

Protocol References:

- **Tab 900 (Medical Emergency Protocols)**
 - § Section BB: Hypo- / Hyperglycemia
- **Tab 1100 (Pediatric Protocols)**
 - § Section W: Pediatric Hypo- / Hyperglycemia

**TRADE NAMES: DILAUDID®****Class**

- Opium derivative narcotic analgesic
- Semi-synthetic derivative of Morphine and it resembles Morphine pharmacology
- 7-10 times more potent than Morphine

Mechanism of Action

- Potent analgesia without hypnotic effects
- Metabolized in liver and excreted in urine (may be excreted in breast milk)

Indications

- Moderate to severe, acute or chronic pain

Contraindications

- Acute bronchial asthma or status asthmaticus
- Respiratory depression / upper airway obstruction
- Diarrhea caused by poisoning until toxic material is eliminated
- Pulmonary edema caused by respiratory irritants
- Undiagnosed abdominal pain
- Not recommended for use during labor and delivery
- Hypersensitivity to opiates

Precautions

- Elderly / debilitated
- Impaired hepatic / renal function
- Increased ICP / head injury
- Signs of acute abdominal conditions may be masked
- Patients receiving other narcotic analgesics.
- Pregnancy Category C

Side Effects

- Respiratory depression
- Sedation / drowsiness
- Orthostatic hypotension
- Nausea / Vomiting

Tab 400
Hydromorphone HCL (Dilaudid)
02/2022

Dilaudid (Hydromorphone HCL)



Adverse Reactions

- Sedation, drowsiness, mental clouding, dizziness,
- Impairment of mental and physical performance
- Anxiety
- Convulsion
- Fear
- Miosis
- Dysphoria
- Mood changes
- Respiratory depression

How Supplied

- 1mg/1mL Carpuject

Overdosage

- Respiratory depression
- Pinpoint pupils
- Extreme somnolence
- Stupor, Coma
- Bradycardia, hypotension
- Treatment: **Naloxone (Narcan)**

Dosage and Administration

- **Adult**
 - § 1-2mg IM/IV/IO
 - § Maximum cumulative dose (per protocol): 4mg
 - § When administering IV, injection should be given very slowly (over 2-5 minutes)
- **Pediatric**
 - § 0.015mg/Kg IM/IV/IO
 - § Maximum dose (per protocol): 2mg
 - § Minimum age = 5 years or 20Kg
 - § Refer to **Handtevy** Dosing Chart form specific age group

Duration of Action

- Onset: 15 minutes
- Peak effect: 30-60 minutes
- Duration: 2-3 hours

Tab 400
Hydromorphone HCL (Dilaudid)
02/2022



TRADE NAME: CYANOKIT®

Class

- Antidote; Synthetic form of Vitamin B12

Mechanism of Action

Cyanide is an extremely 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 the inhibition of cytochrome oxidase resulting in arrest of cellular respiration. Specifically, cyanide binds rapidly with cytochrome a₃, a component of the cytochrome c oxidase complex in mitochondria. Inhibition of cytochrome a₃ prevents the cell from using oxygen and forces anaerobic metabolism, resulting in lactate production, cellular hypoxia and metabolic acidosis. In massive acute cyanide poisoning, the mechanism of toxicity may involve other enzyme systems as well. Signs and symptoms of acute systemic cyanide poisoning may develop rapidly within minutes, depending on the route and extent of cyanide exposure.

The action of Cyanokit in the treatment of cyanide poisoning is based on its ability to bind cyanide ions. Each Hydroxocobalamin molecule can bind one cyanide ion by substituting it for the hydroxo ligand linked to the trivalent cobalt ion, to form cyanocobalamin, which is then excreted in the urine.

Indications

- Cyanokit is indicated for the treatment of known or suspected cyanide poisoning.

Contraindications

- None

Adverse Reactions

- Most common adverse reactions (>5%) include transient chromaturia, erythema, rash, increased blood pressure, nausea, headache, and injection site reactions.

Drug Interactions

- No formal drug interaction studies have been conducted with Cyanokit.

Tab 400
Hydroxocobalamin (Cyanokit®)
02/2022



How Supplied

- Cyanokit (Hydroxocobalamin for injection) 5Gm for intravenous infusion consists of 1 vial containing 5Gm lyophilized Hydroxocobalamin dark red crystalline powder for injection. After reconstitution, the vial contains Hydroxocobalamin for injection, 25mg/mL. Administration of the entire 5Gm vial constitutes a complete starting dose.

Dosage and Administration

- **Adult**
 - § The starting dose of Cyanokit is 5Gm, administered by intravenous infusion over 15 minutes. One 5Gm vial is a complete starting dose.
 - § The recommended diluent is 0.9% Sodium Chloride injection.
 - § Diluent is not included with Cyanokit
- **Pediatric**
 - § Calculate dose at 75mg/Kg
 - § Leaving total dose to be administered in vial, use Burette IV tubing to fill chamber to desired dose
 - § Infuse over 15 minutes.

Warnings and Precautions

- Use caution in the management of patients with known anaphylactic reactions to Hydroxocobalamin or Cyanocobalamin. Consideration should be given to use alternative therapies, if available.
- Allergic reactions may include: anaphylaxis, chest tightness, edema, urticaria, pruritus, dyspnea, and rash.
- Blood pressure increase: Substantial increases in blood pressure may occur following Cyanokit therapy.

Special Considerations

- Pregnancy: Based on animal studies, may cause fetal harm; however, treatment of maternal/fetal cyanide poisoning may be lifesaving.
- No safety and efficacy studies have been performed in pediatric patients.



Protocol References:

- **Tab 900 (Medical Emergencies)**
 - § Section S: Overdose / Toxic Ingestion
 - § Section AA: Cyanide Exposure / Cyanokit

- **Tab 1100 (Pediatric Emergencies)**
 - § Section N: Pediatric Overdose / Toxic Ingestion



TRADE NAME(S): ADVIL[®], MOTRIN[®]

Class

- Non-steroidal anti-inflammatory (NSAID), antipyretic, analgesic

Therapeutic Effects

- Inhibits synthesis of prostaglandins in body tissues by inhibiting at least 2 cyclo-oxygenase (COX) isoenzymes, COX-1 and COX-2. May inhibit chemotaxis, alter lymphocyte activity, decrease proinflammatory cytokine activity, and inhibit neutrophil aggregation; these effects may contribute to anti-inflammatory activity.

Indications

- For the management of pain or as an antipyretic

Contraindications

- Aspirin allergy
- Perioperative pain in setting of coronary artery bypass graft (CABG) surgery
- Preterm infants with untreated proven or suspected infection
- Bleeding with active intracranial hemorrhage or GI bleed
- History of stomach / GI ulcers (possible relative contraindication)
- Thrombocytopenia
- Coagulation defects
- Proven or necrotizing enterocolitis
- Significant renal impairment
- Congenital heart disease where patency of the patent ductus arteriosus (PDA) is necessary for pulmonary or systemic blood flow

Side Effects

- Gastric irritation or bleeding

How Supplied

- To be determined

Ibuprofen



Dosage and Administration

- **Adult**
 - § 400mg PO
- **Pediatric**
 - § Pediatric Dosing Pending

Duration of Action

- Onset: 1 to 2 hours (peak)
- Duration: 6-8 hours

Special Considerations

- Pregnancy safety: category C

**TRADE NAME: ATROVENT®****Class**

- Anticholinergic (parasympatholytic), bronchodilator

Mechanism of Action

- Anticholinergic (parasympatholytic) agent which appears to inhibit vagally-mediated reflexes by antagonizing the action of acetylcholine, the transmitter agent released at the neuromuscular junctions in the lung.
- Inhibits ACTH receptor sites on bronchial smooth muscle
- Dries respiratory tract secretions

Indications

- Patients with signs or symptoms of respiratory distress (see Respiratory Distress Protocol)
- Atrovent inhalation aerosol is indicated as a bronchodilator for treatment of bronchospasm associated with chronic obstructive pulmonary disease, including chronic bronchitis and emphysema

Contraindications

- Hypersensitivity to any of the contents of the inhalation solution
- Hypersensitivity to atropine or its derivatives

Adverse Reactions

- Headache, influenza-like symptoms, dizziness, dry mouth, nausea, coughing, blurred vision, palpitations, nervousness

Drug Interactions

- Has been used concomitantly with other drugs, including sympathomimetic bronchodilators, methylxanthines, oral and inhaled steroids, that may be used in the treatment of COPD
- There is some potential for additive interaction with concomitantly used anticholinergic medications. Caution is therefore advised in the co-administration of Atrovent with other anticholinergic-containing drugs



How Supplied

- 0.5mg/2.5mL (500mcg - 0.02%) unit dose vial inhalation solution

Dosage and Administration

· Adult

§ Patients requiring treatment, and on home Atrovent (Ipratropium Bromide) may have nebulized Atrovent (0.5mg) initiated in lieu of Albuterol for their first treatment.

§ Second and subsequent doses may be given as necessary for continued assessment of bronchospasm

ü **NOTE:** For continued auscultated wheezes after initial nebulized therapy, continue aerosol treatment with Albuterol (1 unit dose) mixed with Atrovent (1 unit dose). ***This combination therapy is only to be administered once.***

· Pediatrics

§ Not recommended for pediatric use

Duration of Action

- Onset: 1-3 minutes
- Peak effect: 1.5-2 hours
- Duration: 4 hours

Special Considerations

- Pregnancy safety: category B

Protocol References:

- **Tab 900 (Medical Emergency Protocols)**
 - § Section T: Respiratory Distress



TRADE NAME(S): KETANEST®, KETASET®, KETALAR®

Class

- Sedative-hypnotic; analgesic

Mechanism of Action

- A rapid-acting, non-barbiturate, sedative-hypnotic analgesic agent characterized by normal pharyngeal-laryngeal reflexes, normal or enhanced skeletal muscle tone, and possible cardiovascular and respiratory stimulation. It may occasionally produce transient respiratory depression.

Indications

- Patient in Excited Delirium when there is a threat to crew or self
- Management of moderate to severe pain

Contraindications

- Ketamine is contraindicated in those in whom a significant elevation of blood pressure would constitute a serious hazard and in those who have shown hypersensitivity to the drug.

Adverse Reactions

- **Cardiovascular:** blood pressure and pulse rate are frequently elevated following administration of Ketamine alone. However, hypotension and bradycardia have been observed. Arrhythmia has also occurred.
- **Respiration:** Although respiration is frequently stimulated, severe depression of respiration or apnea may occur following rapid intravenous administration or high doses of Ketamine. Laryngospasms and other forms of airway obstruction have occurred during Ketamine anesthesia.
- **Eye:** Diplopia and nystagmus have been noted following Ketamine administration. It also may cause a slight elevation in intraocular pressure measurement.
- **Neurological:** In some patients, enhanced skeletal muscle tone may be manifested by tonic and clonic movements sometimes resembling seizures.
- **Gastrointestinal:** Anorexia, nausea and vomiting have been observed; however, this is not usually severe and allows the great majority of patients to take liquids by mouth shortly after regaining consciousness.
- **General:** Anaphylaxis, local pain and exanthema at the injection site have infrequently been reported. Transient erythema and/or morbilliform rash have also been reported.

Tab 400
Ketamine HCL
01/2023



Drug Interactions

- Prolonged recovery time may occur if barbiturates and/or narcotics are used concurrently with Ketamine.

How Supplied

- **Ketamine HCL Concentrate 100mg/mL** (For IM / IN use)
- **Ketamine HCL 50mg/mL** (For IV/ IO use)
- Color of solution may vary from colorless to slightly yellowish and may darken upon prolonged exposure to light. This darkening does not affect potency. Do not use if precipitate appears.
- Protect from light

Dosage and Administration

Excited Delirium / Agitation:

- **Adult**
 - § 4mg/Kg IM / IN (Maximum dose of 400mg)
- **Pediatric**
 - § ***On-Line Medical Control*** Contact required for any dosing recommendations

Analgesic Therapy:

- **Adult (Burns / Musculoskeletal Trauma / Non-Traumatic Pain Management)**
 - § 0.25mg/Kg in 50mL D5W IV/IO over 10 minutes
 - § Maximum 30mg
 - § Additional dosing authorized by ***On-Line Medical Control***
- **Pediatric**
 - § ***On-Line Medical Control*** Contact required for any dosing recommendations

Duration of Action

- Onset: 45-60 seconds (IM)
- Duration: 12-25min (IM)



Special Considerations

- Elevation of blood pressure begins shortly after injection, reaches maximum within a few minutes and usually returns to pre-anesthetic values within 15 minutes after injection.
- Use with caution in the chronic alcoholic and the acutely alcohol intoxicated patient.
- Ketamine is a Class III controlled substance medication.

Protocol References:

- **Tab 100 (Operations Section)**
 - § Section W: Controlled Substance Program Policy
- **Tab 500 (Medical Procedures / Equipment)**
 - § Section P: Intramuscular Medication Administration
 - § Section Q: Intranasal (IN) Medication Administration
- **Tab 900 (Medical Emergency Protocols)**
 - § Section F: Behavioral / Agitated Delirium
 - § Section T: Pain Management

**TRADE NAME: TORADOL®****Class**

- Non-steroidal anti-inflammatory (NSAID)

Therapeutic Effects

- Inhibits synthesis of prostaglandins in body tissues by inhibiting at least 2 cyclooxygenase (COX) isoenzymes, COX-1 and COX-2. May inhibit chemotaxis, alter lymphocyte activity, decrease proinflammatory cytokine activity, and inhibit neutrophil aggregation; these effects may contribute to anti-inflammatory activity.

Indications

- For the management of moderately severe pain

Contraindications

- Allergy to Aspirin, Ketorolac, or other NSAIDs;
- Women who are in active labor or are breastfeeding;
- Significant renal impairment particularly when associated with volume depletion;
- Previous or current GI bleeding;
- Intracranial bleeding;
- Coagulation defects;
- Patients with a high risk of bleeding

Side Effects

- Nausea / vomiting
- Diarrhea
- Heartburn
- Headache
- Dizziness
- Constipation



How Supplied

- 30mg/1mL vial, injectable

Dosage and Administration

- **Adult (Musculoskeletal Trauma / Non-Traumatic Pain Management)**
 - § 30mg IM in adults who are not pregnant
 - § 15mg IV in adults who are not pregnant
- **Pediatric**
 - § ***On-Line Medical Control*** contact is required for any dosing recommendations

Duration of Action

- Onset: Approximately 30 minutes (Both IV and IM)
- Duration: 4-6 hours

Special Considerations

- Pregnancy safety: category C

Protocol References:

- **Tab 900: Medical Emergencies**
 - § Section T: Pain Management
- **Tab 1100: Pediatric Protocols**
 - § Section O: Pediatric Pain Management



TRADE NAME: Not Applicable

Class

- Lidocaine HCL 2% Jelly is a sterile, aqueous product that contains a local anesthetic agent and is administered topically

Mechanism of Action

- Lidocaine stabilizes the neuronal membrane by inhibiting the ionic fluxes required for the initiation and conduction of impulses, thereby effecting local anesthetic action

Indications

- Topical (local) anaesthetic for introduction of nasal airways (NPA) / intubation

Contraindications

- Known history of hypersensitivity to local anesthetics of the amide type or components of Lidocaine HCL 2% Jelly

Adverse Reactions

- Similar in nature to those observed in other amide local anesthetic agents.

How Supplied

- Lidocaine Hydrochloride Jelly 2% - 5mL tube

Dosage and Administration

- Apply a moderate amount of jelly to the external surface of the NPA / ET tube shortly before use. Care should be taken to avoid introducing the product into the lumen of the tube. Do not use the jelly to lubricate endotracheal stylettes.

Duration of Action

- Onset: 3 – 5 minutes

Special Considerations

- Pregnancy safety: category B

Tab 400
Lidocaine HCL Jelly 2%
02/2022



TRADE NAME: Not Applicable

Class

- Anticonvulsant, electrolyte

Mechanism of Action

- Reduction of acetylcholine released by nerve impulses, resulting in anticonvulsant effects and central nervous system depression and blocking peripheral neuromuscular transmission
- Antagonizes calcium and blocks calcium channels in bronchial and vascular smooth muscle
- Antihypertensive actions

Indications

- Treatment and prevention of hypomagnesemia
- Seizure prevention in severe pre-eclampsia or eclampsia
- Short-term treatment torsade de pointes
- Respiratory distress (Asthma/COPD)

Contraindications

- Heart block, serious renal impairment, myocardial damage, hepatitis, Addison's disease

Adverse Reactions

- Hypotension and Asystole may occur with rapid administration
- Depressed CNS, diarrhea, flushing, somnolence,
- Cardiac conduction affected
- Respiratory paralysis

Drug Interactions

- Increased effect: Nifedipine decreased blood pressure and increased neuromuscular blockade
- Increased toxicity: Aminoglycosides increased neuromuscular blockade; CNS depressants increased CNS depression; neuromuscular antagonists, pulmonary edema

Tab 400
Magnesium Sulfate
02/2022



How Supplied

- 5Gm/10mL vial (0.5Gm/mL)

Dosage and Administration

Cardiac Arrest (Torsades de Pointes)

- **Adult**
 - § 2Gm IV/IO push
- **Pediatric**
 - § No current protocol recommendations for pediatrics

Seizures (Pre-Eclampsia / Eclampsia)

- **Adult**
 - § 4Gm IV drip over 10-20 minutes (4Gm mixed in 50mL bag D5W attached to 60gtt administration set and run wide open)

Respiratory Distress

- **Adult**
 - § 2Gm IV drip over 10-20 minutes (2Gm mixed in 50mL bag D5W attached to 60gtt administration set and run wide open)
- **Pediatric**
 - § No current protocol recommendations for pediatrics

Duration of Action

- Onset: immediate
- Duration: 3-4 hours



Special Considerations

- Pregnancy safety: category A
- Flushing and diaphoresis may occur with administration
- Caution in renal failure patients
- Closely monitor respiratory status and ECG rhythm during administration

Protocol References:

- **Tab 800 (Cardiac Protocols)**
 - § Section D: Cardiac Arrest
- **Tab 900 (Medical Emergency Protocols)**
 - § Section N: Gynecological / Obstetrical Emergency
 - § Section U: Respiratory Distress



TRADE NAME: SOLU-MEDROL®

Class

- Glucocorticoid

Mechanism of Action

- Glucocorticoids cause profound and varied metabolic effects. In addition, they modify the body's immune responses to diverse stimuli.
- Methylprednisolone is a potent anti-inflammatory steroid with greater anti-inflammatory potency than prednisolone and even less tendency than prednisolone to induce sodium and water retention.

Indications

- When oral therapy is not feasible, and the strength, dosage form, and route of administration of the drug reasonably lend the preparation to the treatment of the condition
- Bronchial asthma
- Emphysema (COPD)
- Allergic reaction / Anaphylaxis
- Pulmonary fibrosis

Contraindications

- Solu-Medrol Sterile Powder is contraindicated in systemic fungal infections
- Known hypersensitivity to the product and its constituents
- Psychoses or severe psychoneuroses

Adverse Reactions

- Headache, eye pain, bradycardia, chest pain, seizures, peripheral swelling, dyspnea, exacerbation of depression or suicidal ideation

Drug Interactions

- Convulsions have been reported with concurrent use of methylprednisolone and cyclosporin
- Methylprednisolone may increase the clearance of chronic high dose aspirin.
- Aspirin should be used cautiously in conjunction with corticosteroids in patients suffering from hypoprothrombinemia
- The effect of methylprednisolone on oral anticoagulants is variable.

Tab 400
Methylprednisolone (Solu-Medrol®)
02/2022



How Supplied

- 125mg/2mL Act-O-Vial

Dosage and Administration

- **Adult**
 - § 125mg IV
- **Pediatric**
 - § 1mg/Kg IV
 - § Reference **Handtevy** Dosing Chart for age-specific dosing

Duration of Action

- Onset: 30 minutes – 2 hours
- Peak effect: variable

Special Considerations

- Pregnancy Safety: category C
- Caution in liver disease
- Caution in patients with clotting disorders
- Exacerbation of depression or suicidal ideation

Protocol References:

- **Tab 900 (Medical Emergency Protocols)**
 - § Section D: Allergic Reactions
 - § Section U: Respiratory Distress
- **Tab 1100 (Pediatric Protocols)**
 - § Section C: Pediatric Allergic Reaction
 - § Section R: Pediatric Respiratory Distress

**TRADE NAME: VERSED®****Class**

- Short-acting Benzodiazepine CNS depressant
- Sedative; Hypnotic; Anti-convulsant

Mechanism of Action

- Anxiolytic and sedative properties similar to other benzodiazepines
- Memory impairment

Indications

- Intubated patient with increased level of consciousness in who extubation is not desirable and is either becoming distressed or at risk of destabilizing their airway
- Pain/sedative therapy for electrical cardioversion
- Pain/sedative therapy for transcutaneous pacing
- Seizures
- Anxiolytic

Contraindications

- Known hypersensitivity to Midazolam or other benzodiazepines
- Glaucoma, shock, coma, alcohol intoxication, overdose patient
- Concomitant use with other CNS depressants, barbiturates, alcohol, narcotics

Adverse Reactions

- Hiccups, cough, over-sedation, nausea, vomiting, injection-site pain, headache, blurred vision
- Hypotension, respiratory depression and arrest

Drug Interactions

- Should not be used in patients who have taken CNS depressant

How Supplied

- 2mg/2mL vial (1mg/mL)

Tab 400
Midazolam (Versed®)
02/2022



Dosage and Administration

Cardioversion – TCP / Airway Control:

- **Adult**
 - § 2mg IV/IN/IM may be repeated x 1 PRN by protocol
- **Pediatric**
 - § 0.1mg/Kg IO/IV (0.2mg/Kg IN/IM) with maximum single dose 2mg. May be repeated x 1 PRN by protocol

Seizures

- **Adult**
 - § 2-4mg IV/IN/IM may be repeated x 1 PRN by protocol
- **Pediatric**
 - § 0.1mg/Kg IO/IV (0.2mg/Kg IN/IM) with maximum single dose 2mg. May be repeated x 1 PRN by protocol

Duration of Action

- Onset: 1-3 minutes (dose dependent)
- Peak effect: variable
- Duration: 2-6 hours (dose dependent)

Special Considerations

- Pregnancy Safety: category D
- Requires continuous monitoring of respiratory and cardiac function

Tab 400
Midazolam (Versed®)
02/2022



Protocol References:

- **Tab 500 (Medical Procedures / Equipment)**
 - § Section P: Intramuscular Medication Administration
 - § Section Q: Intranasal (IN) Medication Administration

- **Tab 800 (Cardiac Protocols)**
 - § Section B: Atrial Fibrillation / Flutter
 - § Section C: Bradycardia
 - § Section I: ICE Protocol
 - § Section K: Pulmonary Edema
 - § Section N: Supraventricular Tachycardia
 - § Section Q: Ventricular Tachycardia / Wide Complex with Pulse

- **Tab 900 (Medical Emergency Protocols)**
 - § Section B: Airway, Adult
 - § Section C: Airway, Adult – Failed
 - § Section N: Gynecological / Obstetrical Emergencies
 - § Section T: Pain Management
 - § Section V: Seizures

- **Tab 1100 (Pediatric Protocols)**
 - § Section E: Pediatric Bradycardia
 - § Section S: Pediatric Seizures
 - § Section T: Pediatric Tachycardia



TRADE NAME: Not Applicable

Class

- Opioid analgesic

Mechanism of Action

- Alleviates pain through CNS actions
- Suppresses fear and anxiety centers in the brain
- Depresses brain stem respiratory centers
- Increases peripheral venous capacitance and decreases venous return
- Decreases preload and afterload, decreasing myocardial oxygen demand

Indications

- Chest pain due to acute coronary syndrome
- Pain management

Contraindications

- Undiagnosed head injury
- Undiagnosed abdominal pain
- Known hypersensitivity to morphine or other opiate analgesics
- Clinical evidence of shock or respiratory depression
- Exacerbated COPD, hypotension, suspected hypovolemia, decreased level of consciousness
- Patients who have taken MAOIs within the past 14 days

Adverse Reactions

- Respiratory depression, hypotension, decreased level of consciousness, nausea, vomiting
- Bradycardia, tachycardia, syncope, facial flushing, euphoria, bronchospasm, dry mouth
- Note: caution must be exercised when using morphine in patients with a history of asthma or underlying respiratory disease



Drug Interactions

- Potentiates sedative effects of Phenothiazines
- CNS depressants may potentiate effects of morphine
- MAOIs may cause paradoxical excitation

How Supplied

- 10mg/1mL Carpuject

Dosage and Administration

Chest Pain (ACS / Burns)

- **Adult**
 - § 2-10mg IV (0.1mg/Kg); Maximum 10mg/dose
 - § May repeat every 5 min. PRN: Maximum of 20mg

Pain Management

- **Adult (Musculoskeletal Trauma)**
 - § 2-5mg IV/IO/IM (0.1mg/Kg)
 - § Maximum 10mg/dose
 - § May repeat dose every 5 min. PRN: Maximum of 20mg
- **Pediatric**
 - § 0.1mg/Kg IV/IO/IM (re-dosing per ***On-Line Medical Control*** order)
 - § Maximum initial dose: 5mg
 - § Reference ***Handtevy*** Dosing Chart for age-specific dosing

Duration of Action

- Onset: immediate IV; delayed IM
- Peak effect: 20 minutes
- Duration: 2-7 hours

Special Considerations

- Pregnancy Safety: on basis of historical studies, no known risk of fetal abnormality
- Morphine rapidly crosses the placenta
- Use with caution in geriatric population and those with COPD and asthma
- Vagotonic effect in patient with acute inferior MI (bradycardia, heart block)
- Naloxone should be readily available as antidote

Tab 400
Morphine Sulfate
01/2023

Morphine Sulfate



Protocol References:

- **Tab 500 (Medical Procedures / Equipment)**
 - § Section P: Intramuscular Medication Administration

- **Tab 900 (Medical Emergency Protocols)**
 - § Section T: Pain Management

- **Tab 1100 (Pediatric Protocols)**
 - § Section O: Pediatric Pain Management

**TRADE NAME: NARCAN®****Class**

- Narcotic antagonist

Mechanism of Action

- Competitive inhibition at narcotic receptor sites
- Reverse respiratory depression secondary to depressant drugs
- Completely inhibits the effect of narcotic agents
- No pharmacologic activity at all in the absence of narcotic agents

Indications

- Opiate overdose or decreased level of consciousness due to opiate use
- Complete or partial reversal of CNS and respiratory depression induced by opioids
- Reverses the effect of the following:
 - § Morphine, Heroin, Hydromorphone (Dilaudid), Methadone, Meperidine (Demerol), Fentanyl (Sublimaze), Oxycodone (Percodan), Codeine, Propoxyphene (Darvon), Butorphanol (Stadol), Pentazocine (Talwin), Nalbuphine (Nubain)
- Coma of unknown origin

Contraindications

- Known hypersensitivity

Adverse Reactions

- Withdrawal symptoms in the addicted patient
- Tachycardia, hypertension, dysrhythmias, nausea, vomiting, diaphoresis

Drug Interactions

- Incompatible with bisulfite and alkaline solutions

How Supplied

- 4mg/10mL multi-dose vial (0.4mg/mL)
- 2mg/2mL Luer-Jet prefilled syringe



Dosage and Administration

- **Adult**
 - § 4mg IV / IO / IM / IN

- **Pediatric**
 - § 0.1mg/Kg IV / IO / IM / IN
 - § Reference **Handtevy** Dosing Chart for age-specific dosing

Duration of Action

- Onset: within 2 minutes
- Peak effect: variable
- Duration: 30-80 minutes

Special Considerations

- Pregnancy Safety: safety has not been established
- Seizures without casual relationship have been reported
- May not reverse hypotension
- Use with caution when administering to narcotic addicts (violent behavior, etc.)
- Duration of action may be shorter than the effects of long acting narcotic agents. Frequent monitoring of the patient is required and repeat doses of Naloxone may be necessary

Protocol References:

- **Tab 500 (Medical Procedures / Equipment)**
 - § Section M: Endotracheal Medication Administration
 - § Section P: Intramuscular Medication Administration
 - § Section Q: Intranasal (IN) Medication Administration

- **Tab 800 (Cardiac Protocols)**
 - § Section D: Cardiac Arrest
 - § Section L: Pulseless Electrical Activity (PEA)

Tab 400
Naloxone (Narcan®)
02/2022



Protocol References (cont):

- **Tab 900 (Medical Emergency Protocols)**
 - § Section S: Overdose / Toxic Ingestion

- **Tab 1100 (Pediatric Protocols)**
 - § Section N: Pediatric Overdose / Toxic Ingestion
 - § Section Q: Pediatric Pulseless Arrest



TRADE NAME: Not Applicable

Class

- Vasodilator

Mechanism of Action

- Smooth muscle relaxant acting on vascular, bronchial, uterine and intestinal smooth muscle
- Dilation of arterioles and veins in the periphery, reduces preload and afterload, decreases the workload of the heart and thereby decreases myocardial oxygen demand

Indications

- Adult patients with complaint of chest pain that is suspected to be of ischemic origin
- Patients with ECG evidence of myocardial ischemia
- Hypertension
- Congestive heart failure

Contraindications

- Known or suspected sensitivity to nitroglycerin
- Systolic blood pressure <100mmHg
- Any patient having taken medication for Pulmonary Artery Hypertension (e.g., Adcirca® or Revatio®) or erectile dysfunction (e.g. Viagra®, Levitra®, or Cialis®) within the past 48 hours. Medical consultation is advised.
- Intracranial bleeding or head injury

Adverse Reactions

- Headache, hypotension, syncope, reflex tachycardia, flushing
- Nausea, vomiting, diaphoresis, muscle twitching

Drug Interactions

- Additive effect with other vasodilators
- Incompatible with other drugs when given IV



How Supplied

- 1/150gr sublingual tablets (0.4mg)
- 400mcg Nitrolingual spray (200 metered dose sprays)

Dosage and Administration

Chest Pain / Acute Coronary Syndrome

- **Adult**
 - § 0.4mg SL (tablet or spray) q 5 minutes PRN. Maintain SBP >100

Hypertension

- **Adult**
 - § 0.4mg SL (tablet or spray). Repeat x1 PRN

Pulmonary Edema

- **Adult**
 - § 0.4mg SL (tablet or spray) q 3-5 minutes PRN. Maintain SBP >110

Duration of Action

- Onset: 1-3 minutes
- Peak effect: 5-10 minutes
- Duration: 20-30 minutes

Special Considerations

- Pregnancy Safety: category C
- Hypotension more common in geriatric population
- Decomposes if exposed to light or heat
- Must be kept in airtight containers
- Active ingredient may have stinging/burning effect when administered SL
- Caution with use in Right Ventricular Infarct and Inferior Wall Infarct

Tab 400
Nitroglycerin
02/2022

Nitroglycerin



Protocol References:

- **Tab 800 (Cardiac Protocols)**
 - § Section F: Chest Pain / Acute Coronary Syndromes
 - § Section K: Pulmonary Edema

- **Tab 900 (Medical Emergencies)**
 - § Section O: Hypertensive Emergency



TRADE NAME: ZOFTRAN®

Class

- Serotonin 5-HT₃ receptor antagonist
- Used medically as an antiemetic to treat nausea and vomiting

Mechanism of Action

- Its effects are thought to be on both peripheral and central nerves.
- It reduces the activity of the vagus nerve, which deactivates the vomiting center in the brain.

Indications

- To combat moderate to severe nausea

Contraindications

- Allergy or hypersensitivity to other 5-HT₃ receptor antagonists.
- Known hypersensitivity to the drug.
- Use with caution in patients with hepatic impairment

Adverse Reactions

- Headache
- Lightheadedness
- Dizziness
- Drowsiness
- Tiredness
- Constipation

Drug Interactions

- Profound hypotension and loss of consciousness reported with concomitant use of Apomorphine (Dopamine agonist) – Parkinson's disease.

How Supplied

- 4mg/2mL vial
- 4mg ODT (Oral Disintegrating Tablet)

Tab 400
Ondansetron (Zofran®)
02/2022



Route of Administration

- SL / IV / IN / IM

Dosage and Administration

- **Adult**
 - § 4mg SL / IV / IN / IM
 - § May be repeated x 1 in 5-10 minutes PRN.
- **Pediatrics**
 - § 0.1mg/Kg for children 2-15
 - § Not to exceed normal adult dose of 4mg
 - § Reference Handtevy Dosing Chart for age-specific dosing

Duration of Action

- Onset: Immediate (IV,PO) to 30 minutes (IM)
- Peak effect: variable
- Duration: Half-life is approximately 4 hours.

Special Considerations

- Pregnancy Safety: category B
- The use of Zofran in patient following abdominal surgery or in patients with chemotherapy-induced nausea and vomiting may mask a progressive ileus and/or gastric distension.
- Rarely and predominantly with intravenous Zofran, transient ECG changes including QT interval prolongation have been reported.

Special Notes:

Instructions for Use/Handling of ZOFRAN ODT Tablets –

- § Do not attempt to push Zofran ODT tablets through the foil backing.
- § With dry hands, peel back the foil backing of 1 blister and gently remove tablet.
- § Immediately place Zofran ODT tablet under the tongue where it will dissolve in seconds, then swallow with saliva.
- § Administration with liquid is not necessary.

Bottles/Vials/Unit Dose Packs

- § Protect from light

Tab 400
Ondansetron (Zofran®)
02/2022



Protocol References:

- **Tab 500 (Medical Procedures / Equipment)**
 - § Section Q: Intranasal (IN) Medication Administration

- **Tab 800 (Cardiac Protocols)**
 - § Section F: Chest Pain / Acute Coronary Syndromes

- **Tab 900 (Medical Emergency Protocols)**
 - § Section A: Abdominal Pain
 - § Section Z: Vomiting / Diarrhea

- **Tab 1100 (Pediatric Protocols)**
 - § Section V: Pediatric Vomiting / Diarrhea



TRADE NAME: Not Applicable

Class

- Naturally occurring atmospheric gas

Mechanism of Action

- Increases oxygen content of the blood
- Improves tissue oxygenation
- Decreases energy expended for respirations

Indications

- Confirmed or expected hypoxemia
- Ischemic chest pain
- Respiratory insufficiency
- Prophylactically during transport
- Confirmed or suspected carbon monoxide poisoning
- All other cases of decreased tissue oxygenation
- Decreased level of consciousness

Contraindications

- Not clinically significant

Adverse Reactions

- Decreased level of consciousness and respiratory depression in patients with chronic CO₂ retention
- Retrolental fibroplasias if given in high concentrations to premature infants

Drug Interactions

- None

How Supplied

- Oxygen cylinders of 100% compressed oxygen gas



Dosage and Administration

- **Adult**
 - § Cardiac arrest and carbon monoxide poisoning: 100%
 - § Hypoxemia: 10-15 L via non-rebreather mask
 - § Oxygen support: 1-6 L via nasal cannula

- **Pediatric**
 - § Cardiac arrest and carbon monoxide poisoning: 100%
 - § Hypoxemia: 10-15 L via non-rebreather mask
 - § Oxygen support: 1-6 L via nasal cannula

Duration of Action

- Onset: immediate
- Peak effect: not applicable
- Duration: less than 2 minutes

Special Considerations

- Be familiar with liter flow and each type of delivery device used
- Supports combustion



TRADE NAME: DELTASONE®

Class

- Corticosteroid

Mechanism of Action

- Glucocorticoids are naturally occurring hormones that prevent or suppress inflammation and immune responses when administered at pharmacological doses.

Indications

- Bronchial asthma
- Emphysema (COPD)
- Pulmonary fibrosis

Contraindications

- Peptic ulcer, osteoporosis
- Psychoses or severe psychoneuroses

Adverse Reactions

- Headache, eye pain, bradycardia, chest pain, seizures, peripheral swelling, dyspnea, exacerbation of depression or suicidal ideation

Drug Interactions

- Barbiturates may reduce effects of corticosteroids
- Chronic use of antacids with prednisone may decrease absorption

How Supplied

- 20mg tablets

Tab 400
Prednisone
02/2022

Prednisone



Dosage and Administration

- **Adult**
 - § 40mg PO
- **Pediatric**
 - § 20mg PO

Duration of Action

- Onset: 30-60 minutes
- Peak effect: variable
- Duration: Hours/days

Special Considerations

- Pregnancy Safety: category C
- Caution in liver disease
- Caution in patients with clotting disorders

Protocol References:

- **Tab 900 (Medical Emergency Protocols)**
 - § Section U: Respiratory Distress
- **Tab 1100 (Pediatric Protocols)**
 - § Section R: Pediatric Respiratory Distress



TRADE NAME: PRONESTYL®

Class

- Class IA cardiac antiarrhythmic

Mechanism of Action

- Inhibition of fast sodium channels depressing Phase 0 of the action potential
- Ventricular excitability is depressed and the stimulation threshold of the ventricle is increased during diastole

Indications

- Treatment of documented, sustained ventricular tachycardia
- Used to treat tachyarrhythmias from Wolff-Parkinson-White Syndrome by prolonging the refractory period of the accessory pathway

Contraindications

- May be contraindicated in patients with myasthenia gravis
- Hypersensitivity
- Torsades de Pointes
- Heart block

Adverse Reactions

- Generally dosage (blood level) related
- Anorexia, vomiting, diarrhea
- Weakness, hypotension, negative inotropism
- Widened QRS complex and QT intervals
- Profound hypotension if administered to rapidly

Drug Interactions

- Additive effects on the heart when used in conjunction with other antiarrhythmics



How Supplied

- 1Gm/2mL vial (500mg/mL)

Dosage and Administration

· Adult

- § 20mg/min until the arrhythmia is suppressed, hypotension ensues, the QRS complex is prolonged by 50% from its original duration, or a total of 17mg/Kg of the drug has been given. Mix 1Gm Procainamide in a 50mL bag of D5W (20mg/mL). With (60gtt) administration set, run at 60gtts/min to achieve 20mg/min.

V-Tach terminated with the use of Procainamide will require a maintenance infusion. Mix 1Gm Procainamide in a 250mL bag of D5W (4mg/mL). With (60gtt) administration set, run at 1-4mg/min:

1mg/min = 15gtts/min

2mg/min = 30gtts/min

3mg/min = 45gtts/min

4mg/min = 60gtts/min

Duration of Action

- Onset: within minutes
- Duration: variable 3-4 hours

Special Considerations

- Pregnancy safety: category C
- Constant monitoring of patient and cardiac monitor
- Stop infusion if noted hypotension
- Stop infusion for prolonged QRS or QT intervals

Protocol References:

- **Tab 800 (Cardiac Protocols)**
 - § Section Q: Ventricular Tachycardia / Wide Complex with Pulse



TRADE NAME: Not Applicable

Class

- Electrolyte

Mechanism of Action

- Intravenous sodium bicarbonate therapy increases plasma bicarbonate, buffers excess hydrogen ion concentration, raises blood pH and reverses the clinical manifestations of acidosis.

Indications

- Treatment of metabolic acidosis which may occur in severe renal disease, uncontrolled diabetes, circulatory insufficiency due to shock or severe dehydration, extracorporeal circulation of blood
- Used in cardiac arrest only after more definitive treatments arrest
- Severe primary lactic acidosis. Sodium bicarbonate is further indicated in the treatment of certain drug intoxications
- Acidosis associated with Tricyclic overdose

Contraindications

- Contraindicated in patients who are losing chloride by vomiting or from continuous gastrointestinal suction, and in patients receiving diuretics known to produce a hypochloremic alkalosis.
- Hypocalcemia
- Hypokalemia

Adverse Reactions

- Metabolic alkalosis, hypoxia, seizures, electrolyte imbalance
- Tissue sloughing at injection site

Drug Interactions

- May precipitate with many medications. Always flush IV line before and after medication administration



How Supplied

- 50mEq/50mL prefilled syringe (1mEq/mL)

Dosage and Administration

Cardiac Arrest

- **Adult**
 - § ESRD patients with suspected hyperkalemia as potential cause of arrest: 50mEq IO/IV push
 - § Tricyclic overdose as potential cause of arrest: 1mEq/Kg
- **Pediatric**
 - § 1mEq/Kg
 - § Reference **Handtevy** Dosing Chart for age-specific dosing

Overdose / Toxic Ingestion

- **Adult**
 - § Tricyclic overdose: 1mEq/Kg IO/IV
- **Pediatric**
 - § Tricyclic overdose: 1mEq/Kg IO/IV
 - § Reference **Handtevy** Dosing Chart for age-specific dosing

Duration of Action

- Onset: 2-10 minutes
- Duration: 30-60 minutes

Special Considerations

- Pregnancy safety: category C
- May precipitate with many medications (i.e., calcium chloride)
- Vasopressors may be deactivated



Protocol References:

- **Tab 800 (Cardiac Protocols)**
 - § Section A: Asystole
 - § Section D: Cardiac Arrest
 - § Section L: Pulseless Electrical Activity (PEA)

- **Tab 900 (Medical Emergency Protocols)**
 - § Section S: Overdose / Toxic Ingestion

- **Tab 1100 (Pediatric Protocols)**
 - § Section N: Pediatric Overdose / Toxic Ingestion
 - § Section Q: Pediatric Pulseless Arrest



TRADE NAME: BRETHINE®

Class

- Beta-adrenergic receptor agonist

Mechanism of Action

- Selective β_2 agonist which stimulates adrenergic receptors of the sympathomimetic nervous system, resulting in smooth muscle relaxation in the bronchial tree and peripheral vasculature
- Causes relaxation of bronchospasm

Indications

- Terbutaline Sulfate injection is indicated for the prevention and reversal of bronchospasm in patients 12 years of age and older with asthma and reversible bronchospasm associated with bronchitis and emphysema.

Contraindications

- Hypersensitivity to sympathomimetic amines or any component for the drug product.
- Patients under 12 years of age

Adverse Reactions

- Tremor, nervousness, dizziness, headache, drowsiness, palpitations, rapid heart rate, shortness of breath, chest discomfort, nausea, vomiting, weakness, flushed feeling, sweating, pain at the injection site, anxiety, muscle cramps and dry mouth.
- Synergistic with other sympathomimetics
- Can produce a clinically significant cardiovascular effect in some patients as measured by pulse rate, blood pressure, and/or symptoms (uncommon).
- May produce ECG changes such as flattening of the T-wave, prolongation of the QTc interval, and ST-segment depression.

Drug Interactions

- Do not use in patients being treated with monoamine oxidase inhibitors or tricyclic antidepressants. The action of terbutaline on the vascular system may be potentiated.



How Supplied

- 1mg/mL vial, injectable solution

Dosage and Administration

- **Adult**
 - § Administer 0.25mg (0.25mL) SQ only.
 - § May be repeated x 2 as necessary q 20 minutes
- **Pediatrics (12-16 years of age)**
 - § Administer 0.01mg/Kg SQ only
 - § May be repeated x 2 as necessary q 20 minutes

Duration of Action

- Onset: 15 minutes
- Peak effect: 30-60 minutes
- Duration: 4 hours

Protocol References:

- **Respiratory Medication Interventions**
 - § Provisional Protocol during COVID-19

Tetracaine (Benzoic Acid)



TRADE NAME: Not Applicable

Class

- Anesthetic, local (ophthalmic)

Mechanism of Action

- After topical application to the eye, local anesthetics penetrate to sensory nerve endings in the corneal tissue.
- These medications block both the initiation and conduction of nerve impulses by decreasing the neuronal membrane's permeability to sodium ions. This reversibly stabilizes the membrane and inhibits depolarization, resulting in the failure of a propagated action potential and subsequent conduction blockade

Indications

- Anesthesia, local—Tetracaine is indicated to produce local anesthesia of short duration for ophthalmic procedures including removal of foreign bodies

Contraindications

- Hypersensitivity
- Penetration of eye globe or rupture

Adverse Reactions

- Infection, stinging, burning, eye redness

Drug Interactions

- Cholinesterase inhibitors (metabolism of Tetracaine may be inhibited, leading to prolonged ocular anesthetic effect and increased risk of toxicity, if administered to a patient receiving therapy with a cholinesterase inhibitor)

How Supplied

- Ophthalmic Solution 0.5% (2mL or 15mL)

Tab 400
Tetracaine
02/2022

Tetracaine (Benzoic Acid)



Dosage and Administration

- **Adult**
 - § 1 to 2 drops to affected eye
- **Pediatric**
 - § 1 to 2 drops to affected eye

Duration of Action

- Onset: Approximately 15 seconds
- Duration: 10 to 20 minutes; average 15 minutes

Special Considerations

- Pregnancy safety: category C
- Mild burning, stinging, redness, or other irritation of eye

Protocol References:

- **None**



TRADE NAME: Not Applicable

Class

- Vitamin (B1)

Mechanism of Action

- Thiamine combines with ATP to form thiamine pyrophosphate coenzyme, a necessary component for carbohydrate metabolism. Most vitamins required by the body are obtained through diet, but certain states, such as alcoholism and malnutrition, may affect the intake, absorption, and use of thiamine. The brain is extremely sensitive to thiamine deficiency

Indications

- Coma of unknown origin (before the administration of Dextrose, or Naloxone)
- Delirium tremens
- Wernicke's encephalopathy
- Anemia from thiamine deficiency

Contraindications

- There are not significant drug interactions with other emergency medications

Adverse Reactions

- Hypotension (from rapid injection or large dose), anxiety, diaphoresis, nausea, vomiting, allergic reaction (usually from IV injection; very rare)

Drug Interactions

- Hypersensitivity
- There are no significant drug interactions with other emergency medications



How Supplied

- 200mg/2mL vial (100mg/mL)

Dosage and Administration

- **Adult**
 - § 100mg IV/IM

Duration of Action

- § Onset: rapid
- § Duration: depends on degree of deficiency

Special Considerations

- Pregnancy safety: category A
- Large IV doses may cause respiratory difficulties
- Anaphylactic reactions have been reported
- It should be given before Dextrose in a comatose patient suspected of alcoholism, malnutrition or Wernicke's Encephalopathy

Protocol References:

- **Tab 500 (Medical Procedures / Equipment)**
 - § Section P: Intramuscular Medication Administration
- **Tab 900 (Medical Emergency Protocols)**
 - § Section E: Altered Mental Status
 - § Section S: Overdose / Toxic Ingestion
 - § Section V: Seizures
 - § Section X: Syncope
 - § Section W: Suspected Stroke

Tranexamic Acid (TXA)



TRADE NAME: CYCLOKAPRON®

Class

- Anti-Fibrinolytic

Mechanism of Action

- Tranexamic Acid (TXA) is a synthetic derivative of the amino acid lysine that inhibits fibrinolysis by blocking the lysine binding sites on plasminogen.

Indications

- Evidence of marked blood loss.
- Sustained tachycardia (>110/min, despite a 500mL bolus of IVFs).
- Sustained hypotension (<90 systolic, despite a 500mL bolus).
- Major trauma with suspicion for pelvic and/or abdominal injury.
- Major arterial bleeding requiring tourniquet.

Contraindications

- Non-hemorrhagic shock
- Non-traumatic shock
- Isolated head injury
- Allergy

Adverse Reactions

- TXA has not been shown to cause significant increase in deep vein thrombosis (DVT), pulmonary embolus, myocardial infarction, or stroke in published trials to date.

Pharmacokinetics

- Onset of action within 4 hours after IV administration, exact time of onset unclear and variable. Delayed effects up to 48 hours consistent with anti-inflammatory actions.

Precautions

- Begin infusion as soon as possible after injury, but no later than 3 hours after injury.
- Do not give through the same IV as Hextend or blood products.
- Do not give IV push – will cause hypotension. Must be given over 10 minutes

Tab 400
Tranexamic Acid (TXA)
02/2022



Tranexamic Acid (TXA)



How Supplied

- 1Gm in 10mL vial

Dosage and Administration

- **Adult**
 - § 1 Gram in 50mL D5W IV as soon as possible, given over 10 minutes.
- **Pediatric**
 - § Currently no pediatric dosing recommendations

Protocol References:

- **Tab 1000 (Trauma)**
 - § Section D: Multi-System Trauma
 - § Section E: Tranexamic Acid (TXA)

Tab 400
Tranexamic Acid (TXA)
02/2022



TRADE NAME: NORCURON®

Class

- Neuromuscular blocker

Mechanism of Action

- Neuromuscular blocker and a non-depolarizing agent that prevents acetylcholine from binding to receptors on the muscle end plate, thus blocking depolarization.

Indications

- Neuromuscular blockade used during post-resuscitative care following cardiac arrest with documented patient movement (i.e., gasping, shivering, seizure activity, or movement)
- Maintenance of secured advanced airway

Contraindications

- Patients with hypersensitivity to bromides

Adverse Reactions

- Transient increase in heart rate
- Prolonged dose related apnea
- Redness, itching, skeletal muscle weakness

Drug Interactions

- Other skeletal muscle relaxants: potentiated neuromuscular blockade

How Supplied

- 10mg (1mg/mL when reconstituted with 10mL sterile water)

Tab 400
Vecuronium Bromide (Norcuron®)
02/2022



Dosage and Administration

- **Adult**
 - § 0.1mg/Kg slow IV/IO (maximum 10mg)

Duration of Action

- Onset: usually within 1 minute
- Peak effect: 3-5 minutes
- Duration: 25-30 minutes

Special Considerations

- Pregnancy safety: category C
- Do not mix with alkaline solutions

Protocol References:

- **Tab 800 (Cardiac Protocols)**
 - § Section J: Post-Resuscitation Care