



PRE-HOSPITAL PATIENT CARE PROTOCOL MEDICATION REFERENCE

Section VI

**BASIC LIFE SUPPORT/ADVANCED LIFE SUPPORT
MEDICATIONS REFERENCE**

APPROVED AUGUST, 2022

Stafford County Fire and Rescue Department
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Adenosine

Mechanism of Action

Slow conduction through the AV node, thereby terminating reentry tachydysrhythmias such as SVT and restoring normal sinus rhythm.

Indications/Dosage

Adult Tachycardia/SVT: 6 mg, second dose 12 mg

Pediatric Tachycardia/SVT: 0.1 mg/kg, (max first dose is 6mg), second dose 0.2 mg/kg, (max second dose is 12 mg)

Concentration

6 mg/2 ml Vial

Route of Administration

Rapid IV/IO bolus (administered over a 1-2 second period) followed by 20 ml saline flush.

Contraindications

Second- or third-degree block

Precautions

Higher doses of adenosine are likely to be needed for patients receiving theophylline

Lower doses (3 mg or less) should be used in patients receiving Persantin

Extra caution should be used in patients receiving Tegretol, which could potentiate AV block
adenosine

Side Effects

Facial flushing, coughing, dyspnea

Chest discomfort (may simulate angina)

Marked slowing of the heart rate (transient asystole may occur)

Albuterol (Proventil)

Mechanism of Action

Relaxes bronchial smooth muscle, and decreases airway resistance; suppresses the release of histamine.

Indications/Dosage

Respiratory Distress/Asthma/COPD/Croup/Reactive Airway: 2.5 mg, may repeat up 3 times
Pediatric < 2 years of age: 1.5 mg diluted with 2 cc Normal Saline.

[BLS Clinician Approved Medication/Procedure](#)

Chemical Extrication and/or Crush Syndrome:

If ECG indicates moderate to severe hyperkalemia (slow, weak pulse, prolonged PR interval, widen QRS, peaked T-Waves) administer 100 mEq Sodium Bicarbonate, 1 g Calcium, and 10-20mg (4-8 bullets) nebulized Albuterol over 15-20 minute. See Injury-Multisystem Protocol for additional directions.

Concentration

Albuterol 2.5 mg/3 cc Bullet

Route of Administration

Nebulized:

Contraindications

Hypersensitivity to the drug
Tachydysrhythmias

Precautions

Patients with underlying CAD or preexisting arrhythmias are at greater risk of myocardial ischemia and arrhythmias.

Use caution in patients receiving MAO inhibitors (Deprenyl, Seliginine, Eldepryl, Parnate, and Iproniazid) or TCAs (Amitriptyline, Desipramine).

Maybe ineffective in patients taking beta-blockers.

Side Effects

Palpitations/tachycardia
Muscle tremors
Nausea
Dizziness.
Hypokalemia in patients using cardiac glycosides (Digoxin) and diuretics.

Amiodarone

Mechanism of Action

Blocks sodium channels and exerts a non-competitive antisympathetic action. Produces a negative chronotropic effect in nodal tissues. Blocks potassium channels, which contributes to the slowing of conduction and prolongation of refractoriness. Its vasodilatory action can decrease cardiac workload and consequently myocardial oxygen consumption.

Indications/Dosage

Adult Cardiac Arrest: 1st Dose: 300 mg, 2nd Dose: 150 mg

Pediatric Cardiac Arrest: 5 mg/kg, may repeat two times for refractory VF/pulseless VT

Adult Stable Wide-QRS Tachycardia/VT: 150 mg over 10 minutes, repeat as needed if VT recurs. Follow with a maintenance infusion of 1 mg/min (see 4.1 Amiodarone Infusion)

Concentration

900 mg/18 cc Vial (protect from light)

Route of Administration

IV/IO

Contraindications

Cardiogenic shock, marked sinus bradycardia, second, or third-degree AV block.

Precautions

May worsen existing or precipitate new dysrhythmias, including torsades de pointes, and VF.

Use with beta-blocking agents could increase the risk of hypotension and bradycardia.

Amiodarone inhibits atrioventricular conduction and decreases myocardial contractility, increasing the risk of AV block with Verapamil or Diltiazem or hypotension with any calcium channel blocker. Use caution in pregnancy and with nursing mothers.

Side Effects

Fever

Bradycardia,

CHF

Cardiac Arrest

Hypotension

VT

Nausea

Amiodarone Infusion

Mechanism of Action

Blocks sodium channels and exerts a non-competitive antisympathetic action. Produces a negative chronotropic effect in nodal tissues. Blocks potassium channels, which contributes to the slowing of conduction and prolongation of refractoriness. Its vasodilatory action can decrease cardiac workload and consequently myocardial oxygen consumption.

Indications/Dosage

Adult Stable Wide-QRS Tachycardia: Amiodarone 150mg over 10 minutes

Adult Cardiac Arrest with ROSC: If VT or VF during their cardiac arrest and are having ventricular ectopy in ROSC begin Amiodarone 150mg over 10 minutes.

Directions

Add Amiodarone 150 mg (3 cc) to 100 cc D5W = 1.5mg/cc.
150mg over 10 minutes = 150 qts/min using a 15 qts/cc administration set
DO NOT MIX WITH NORMAL SALINE

Concentration

900 mg/18 cc Vial (50mg/cc) (protect from light)

Route of Administration

IV

Contraindications

Cardiogenic shock, marked sinus bradycardia, second, or third-degree AV block.

Precautions

May worsen existing or precipitate new dysrhythmias, including torsades de pointes, and VF.

Use with beta-blocking agents could increase the risk of hypotension and bradycardia.

Amiodarone inhibits atrioventricular conduction and decreases myocardial contractility, increasing the risk of AV block with Verapamil or Diltiazem or of hypotension with any calcium channel blocker.

Use caution in pregnancy and with nursing mothers.

Side Effects

Adverse reactions include fever, bradycardia, CHF, cardiac arrest, hypotension, ventricular tachycardia, nausea, and abnormal liver function.

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Aspirin

Mechanism of Action

Aspirin is an anti-inflammatory and a platelet function inhibitor. It has both analgesic and antipyretic properties.

Indication/Dosage

Chest pain consistent with AMI: Four (4) 81 mg chewable tablets if the patient has not taken > 160 mg of Aspirin in the preceding four hours.

BLS Clinician Approved Medication/Procedure

Concentration

Aspirin 81 mg Chew Tablets

Route of Administration

PO

Contraindications

Active ulcer disease

Asthma

Precautions

Do not exceed 324 mg concurrent to patient's intake

Use caution in patients with bleeding disorders. Anticoagulants increase the risk of bleeding.

Side Effects

Tinnitus

Nausea

GI distress

Dyspepsia

GI bleeding

Atropine

Mechanism of Action

Atropine produces antispasmodic, antisecretory, and cardiovascular effects by blockage of acetylcholine at cholinergic receptor sites. Atropine inhibits the effects of the parasympathetic nervous system. It is a positive chronotropic with little inotropic effects.

Indications/Dosage

Adult Bradycardia: 1 mg bolus, repeat every 3-5 minutes, max. 3 mg

Pediatric Bradycardia: 0.02 mg/kg. may repeat once, min. dose is 0.1 mg and max. single dose is 0.5 mg.

Adult Organophosphate Poisoning: 2 mg IV/IO/IM q 5 minutes to max. dose of 6 mg. (If Mark I or DuoDote Auto-Injectors are not available)

Pediatric Organophosphate Poisoning: 0.04 mg/kg

Concentration

1 mg/10 cc Prefilled Syringe

Route of Administration

IV/IO

Contraindications

None in the emergency setting.

Precautions

Use caution in patients with acute MI, second-degree (Mobitz type II), or third-degree AV block. Atropine is ineffective for heart transplant patients.

Side Effects

May precipitate tachydysrhythmias, dysphasia, erythema, flushing, headache, hypotension, mydriasis, vertigo, and xerostomia.

Atrovent (Ipratropium Bromide)

Mechanism of Action

Is an anticholinergic (parasympatholytic) agent, which causes localized bronchodilation, is indicated for relief of bronchospasm associated with asthma and COPD, including chronic bronchitis and emphysema that is unresponsive to treatment with Albuterol alone.

Indications/Dosage

Respiratory Distress/Asthma/COPD/Croup/Reactive Airway: 0.5mg

BLS Clinician Approved Medication/Procedure

Concentration

Albuterol 0.5mg/2.5 cc Bullet

Route of Administration

Nebulized

Contraindications

Hypersensitivity to atropine or its derivatives.

Precautions

None when co-administered with Albuterol

Side Effects

Respiratory: Bronchitis, Sinusitis, exacerbation of symptoms.

CNS: Nervousness, dizziness, headache.

Cardiovascular: Palpitations.

GI: Nausea, vomiting, GI distress.

Other: Tremor, dry mouth, blurred vision.

Calcium Chloride

Mechanism of Action

Causes a significant increase in the myocardial contractile force and appears to increase ventricular automaticity

Indications/Dosage

Adult Cardiac Arrest due to Hyperkalemia or Calcium Channel Blocker Overdose: 1 g, administer IV/IO slow over 5 minutes*

Pediatric Cardiac Arrest-due to Hyperkalemia: 20 mg/kg, max dose 1 g.*

*Only used in cardiac arrest when hyperkalemia is suspected as the cause of the cardiac arrest.

Chemical Extrication and/or Crush Syndrome:

If EKG indicates moderate to severe hyperkalemia (slow, weak pulse, prolonged PR interval, widen QRS, peaked T-Waves) administer 100 mEq Sodium Bicarbonate, 1 g Calcium and 10-20mg nebulized Albuterol over 15-20minute. See Injury-Multisystem Protocol for additional directions.

Calcium should not be given in the same IV line with Sodium Bicarb or Blood Products.

Concentration

1 g/10 cc Syringe

Route of Administration

IV/IO: Administer IV/IO slow over 5 minutes.

Contraindications

None when used to treat magnesium sulfate or calcium channel blocker overdose.

Standard contraindications for calcium chloride include VF, digitalis toxicity, and hypercalcemia.

Precautions

Not compatible with sodium bicarbonate, do not administer in the same IV/IO line.

Side Effects

Bradycardia

Peripheral vasodilatation

Local tissue necrosis with IV infiltration

Hypotension

Metallic taste

Dextrose 10% (D10)

Mechanism of Action

Increases circulating blood sugar levels.

Indications/Dosage

Adult AMS and BGL < 60: Administer 100 cc, repeat after 2 minutes if symptoms not resolved

Pediatric AMS and BGL < 60: 5 cc/kg

Neonatal (< 30 days) BGL < 60: 2 cc/kg

Advanced Practice Clinician Only: Crush Syndrome: Contact Online Medical Control

Concentration

10% (D10) 25 gm/250 cc Bag

Route of Administration

IV/IO

Contraindications

May be detrimental to patients with cerebral ischemia, causing cerebral edema.

May precipitate severe neurological symptoms of Wernicke's encephalopathy in alcoholics.

Precautions

Obtain baseline glucose level. Ensure IV site is patent prior to administration. Flush vein after administration.

Side Effects

Tissue necrosis if infiltration occurs.

Diltiazem (Cardizem)

Mechanism of Action

Calcium channel blocker. Decreases automaticity in the senatorial (SA) node and prolong refractoriness in the atrioventricular (AV) node. Inhibits the influx of extracellular calcium ions to myocardial and vascular smooth muscle cells; decreases cardiac contractility and inhibits constriction of vascular smooth muscle. In patients with SVT, Diltiazem interrupts reentry in the AV node and restores normal sinus rhythm. Decreases ventricular responses rate in atrial fibrillation and flutter.

Indications

Narrow complex tachycardia arrhythmias with rapid ventricular rate to include Atrial Fibrillation (A-Fib) and Atrial Flutter (AF).

Indications/Dosage

Stable A-Fib/AF (SBP >130): Diltiazem (Cardizem) 0.25 mg/kg IV/IO (max of 20 mg) over 2 minutes.

If patient is >70 years of age, reduce the bolus by ½.

If rate does not slow < 120 bpm within 15 minutes, repeat Diltiazem 0.25 mg/kg IV/IO (max of 20 mg).

Concentration

If SBP is <130 administer Metoprolol (see Medication Reference 27.0)

Route of Administration

IV/IO

Contraindications

Hypotension
Bradycardia
Patients who present in CHF
History of Wolf-Parkinson-White (WPW) Syndrome

Precautions

Calcium channel blockers such as Diltiazem should be used with caution in patients who receive long-term beta-blocker therapy

Side Effects

Hypotension
Bradycardia
Worsening CHF
2nd or 3rd degree AV block

Diphenhydramine (Benadryl)

Mechanism of Action

H1 selective histamine blocker.

Indications/Dosage

Adult Minor Allergic Reaction: 25-50 mg

Pediatric Minor Allergic Reaction: 1 mg/kg, max. dose is 50 mg

Adult Behavior/Patient Restraint: 25 mg

Pediatric Behavior/Patient Restraint: 1 mg/kg, max. single dose is 25 mg.

Dystonic Reaction: 25 mg

Concentration:

50 mg/ 1cc Vial

Route of Administration

IV/IO/IM

Contraindications

Angle-closure glaucoma

Asthma

Precautions

Concurrent ingestion of alcohol or other CNS depressants can produce a synergistic effect that could impair motor skills.

Side Effects

Sedation

Disturbed coordination

Dizziness

Blurred or double vision

Hypertension

Headache

Drowsiness

Tremors

Palpitations

Nausea

Dopamine Infusion

Mechanism of Action

Sympathomimetic which acts directly on alpha- and beta-adrenergic receptors. It has positive inotropic, chronotropic, and dromotropic effects.

Indications/Dosage

Adult ROSC: 5-10 mcg/kg per minute IV infusion.

Adult Allergic Reaction AMS and SBP < 90: 5-20 mcg/kg/min

Adult Bradycardia, Chest Pain SBP < 90: 5-20 mcg/kg/min

Directions

Infusion: Add 400 mg Dopamine to 250 cc D5W or Normal Saline = 1600 mcg/cc.

| Pt Weight | 40kg | 50kg | 60kg | 70kg | 80kg | 90kg | 100kg | 110kg |
|--------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| 2mcg/kg/min | 3qts/min | 4qts/min | 5qts/min | 5qts/min | 6qts/min | 7qts/min | 8qts/min | 8qts/min |
| 5mcg/kg/min | 8qts/min | 9qts/min | 11qts/min | 13qts/min | 15qts/min | 17qts/min | 19qts/min | 21qts/min |
| 10mcg/kg/min | 16qts/min | 18qts/min | 22qts/min | 26qts/min | 30qts/min | 34qts/min | 38qts/min | 42qts/min |
| 20mcg/kg/min | 32qts/min | 36qts/min | 44qts/min | 52qts/min | 60qts/min | 68qts/min | 76qts/min | 84qts/min |

Drops (qts) per minute using a 60 gtt/cc administration set.

Concentration

400 mg/250 cc Bag = 1600 mcg/cc

Route of Administration

IV/IO

Contraindications

Tachydysrhythmias or ventricular fibrillation

Precautions

MAO inhibitors will increase alpha effects.

Side Effects

Ectopic beats, tachycardia, palpitations

Nausea, vomiting

Angina

Headache

Localized tissue necrosis if IV infiltrates

Epinephrine

Mechanism of Action

Potent catecholamine with both alpha and beta properties. Increase myocardial and cerebral blood flow during CPR. Increased contractile force, heart rate, and automaticity.

Indications/Dosage

Adult Allergic Reaction or Respiratory Distress/Asthma/COPD/Croup/Reactive Airway:
0.3 mg IM (1:1,000)

Pediatric Allergic Reaction, Respiratory Distress/Asthma/COPD/Croup/Reactive Airway:
0.01 mg IM (1:1,000), max. dose is 0.3 mg.

Adult Severe Allergic Reaction: 0.3 mg IV (1:10,000)

Adult Cardiac Arrest: 1 mg IV/IO every 3-5 minutes

Pediatric Cardiac Arrest or Bradycardia: 0.01 mg/kg IV/IO, every 3-5 minutes.

Adult Pulmonary Edema/CHF: Epinephrine push pressor 5-20 mcg, q 3-5 minutes

Adult/Pediatric Croup, ARDS, or Status Asthmaticus: 3 cc Racemic Epinephrine 1:10,000 diluted with 3 cc Normal Saline via nebulizer. (adult and pediatric)

Adult Severe Allergic Reaction, Chest Pain, Medical-Hypotension or TBI with SBP <90:
5-20 mcg Epinephrine Push Pressor.

Adult TBI (Unresponsive or presenting with GCS at or <12):
5-20 mcg Epinephrine Push Pressor. Titrate for MAP > 65

Directions:

Epinephrine Push Pressor: Mix 1 cc (1:10,000) Epinephrine in 9 cc of Normal Saline (10 mcg/cc), administer 0.5-2 cc every 2-5 minutes = 5-20 mcg

Concentration

1 mg/10 cc (1:10,000) Pre-Filled Syringe

1 mg/1 cc (1:1,000) Ampule

Route of Administration

IV/IM/IO/Nebulized

Contraindications

None with cardiac arrest or anaphylaxis

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Precautions

Patients over 60 years of age, use with caution

Patients with heart rate > 120, use with caution

May precipitate angina or myocardial infarction in cardiac patients.

Protect from light and flush the line between sodium bicarbonate and epinephrine

CVD

Side Effects

Anxiety

Tremors

Palpitations/Tachycardia

Headache

Epinephrine Infusion

Mechanism of Action

Potent catecholamine with both alpha and beta properties. Increase myocardial and cerebral blood flow during CPR. Beta effects tend to be more profound and include increased contractile force, heart rate, and automaticity.

Indications/Dosage

Adult Allergic Reaction/Anaphylaxis with ALOC and SBP <90: 2-10 mcg/min

Adult Bradycardia: 2-10 mcg/min

Chest Pain, Medical Hypotension with SBP <90: 2-10 mcg/min

Pulmonary Edema/CHF SBP < 100 (MAP < 65): 2-10 mcg/min

Adult TBI: 2-10 mcg/min

Directions

Epinephrine Infusion: Add 1 mg Epinephrine into 250 cc D5W = 4 mcg/cc.

| | | | | |
|--------------|--------------|--------------|---------------|---------------|
| 2 mcg/min | 4 mcg/min | 6 mcg/min | 8 mcg/min | 10 mcg/min |
| 30 q tts/min | 60 q tts/min | 90 q tts/min | 120 q tts/min | 150 q tts/min |

Drops (q tts) per minute using a 60 gtt/cc administration set.

Concentration

1 mg/10 cc (1:10,000) Pre-Filled Syringe

1 mg/1 cc (1:1,000) Ampule

Route of Administration

IV

Contraindications

None with cardiac arrest or anaphylaxis

Patient with coronary artery disease, use with caution

Patients over 60 years of age, use with caution

Patients with a heart rate > 120, use with caution

Precautions

May precipitate angina or myocardial infarction in cardiac patients.

Protect from light and flush the line between sodium bicarbonate and epinephrine

Side Effects

Anxiety

Tremors

Palpitations/Tachycardia

Headache

Etomidate

Continuously monitor capnography, pulse oximetry, and NIBP

Mechanism of Action

Rapid-acting, short-duration, non-barbiturate hypnotic with no analgesic properties. Onset of action up to 1 minute, and duration 3-5 minutes. Etomidate lowers cerebral blood flow and oxygen consumption and has minimal cardiovascular and respiratory effects.

Indications/Dosage

Advanced Practice Clinicians Only

RSI: Induction: 0.3 mg/kg IV/IO.

Brief Procedural Sedation: 0.3 mg/kg (Adult and Pediatric)

Concentration

40 mg/20 cc Vial

Route of Administration

IV/IO

Contraindications

Adrenal insufficiency

Precautions

Use caution in hypotensive patients or those with severe asthma.

Not to be given in prolonged situations with multiple high doses

No more than two or three IV/IO bolus.

Sepsis patients

Fentanyl

Continuously monitor LOC, capnography, pulse oximetry, and NIBP

Mechanism of Action

Interacts with opiate receptors decreasing pain impulse transmission at the spinal cord level and higher in the CNS. Causes peripheral vasodilation and decreases venous return

Indications/Dosage

Chest Pain: 0.5-1.0 mcg/kg, (single max. dose 100 mcg), repeat q15 min until patient is pain free.

Pain Control: 0.5-1.0 mcg/kg, (single max. dose is 100 mcg), may repeat q15 minutes

Chemical Extrication or Crush Syndrome: Adult/Pediatric: 1-1.5 mcg/kg IV

Pediatric: Max. dose is 50 mcg

Adult Burns: 1-2 mcg/kg, q 5 minutes, max. dose 300mcg.

Pediatric Burns: 1-3 mcg/kg, q 5 minutes, max. single dose is 100 mcg

Adult/Pediatric Trauma: Anxiety/Sedation: 2 mcg/kg q15 minutes

Pediatric Trauma: Max. dose is 100mcg

Advanced Practice Clinician Only:

RSI: If unable to achieve adequate sedation with Etomidate alone: Fentanyl 1-2 mcg/kg IV, (max single dose is 250 mcg).

If greater than 300 mcg of Fentanyl is necessary to manage the patient's condition, contact online medical control for additional orders

Concentration:

100 mcg/2 cc Vial

Route of Administration

IV/IM/IN

Contraindications

Known hypersensitivity to Hydromorphone, intracranial lesions associated with increased ICP, depressed ventilatory function (COPD, cor pulmonale, emphysema, and status asthmaticus).

Side Effects

CNS: Sedation, drowsiness, lethargy, anxiety, fear, dysphoria, dizziness, and mood changes.

CV: Circulatory depression, peripheral circulatory collapse, and cardiac arrest have occurred following rapid administration. Orthostatic hypotension and fainting have occurred if a patient stands up following an injection.

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G.I.: Nausea and vomiting, constipation.

Resp: Respiratory depression.

Warnings

The concomitant use of other CNS depressants, including other opioids, sedatives or hypnotics, general anesthetics, phenothiazines, tranquilizers, skeletal muscle relaxants, sedating antihistamines, potent inhibitors of P450 (e.g., erythromycin, ketoconazole, and certain protease inhibitors). Alcoholic beverages may produce increased depressant effects.

Hypoventilation, hypotension, and profound sedation may occur

Furosemide (Lasix)

Mechanism of Action

A diuretic that inhibits sodium and chloride reabsorption in the kidneys. Causes venous dilation.

Indications/Dosage

CHF/Pulmonary Edema: If patient is not prescribed Lasix: 0.5 mg/kg IV. If patient is prescribed Lasix, consider 1.0 mg/kg (max single dose of 40 mg).

Concentration

100 mg/10 cc Syringe/Vial

Route of Administration

IV/IO

Contraindications

Patients who are allergic to sulfonamides or thiazides.

Precautions

Should be limited to life-threatening situations in pregnant patients
Use caution in patients in end-stage renal disease

Side Effects

Potassium depletion with accompanying dysrhythmias
Vertigo
Visual/auditory disturbances
Nausea and vomiting
Dehydration and electrolyte depletion can result

Glucagon

Mechanism of Action

Releases stored glycogen from the liver, converting it to glucose.

Indications/Dosage

AMS and BGL < 60: 1 mg IM/SQ

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Concentration

1mg/Vial

Route of Administration

IM/SQ

Contraindications

Known hypersensitivity.

Precautions

Follow with a prompt meal, orange juice, or milk as soon as the patient is Alert.

Mix only with sterile water.

Use caution in patients with liver disease or failure; patients may have little glycogen stored.

Side Effects

Nausea

Hypoglycemia

Hyperglycemia

Vomiting

Hydroxobalamin (Cyanokit) Infusion

Carried by EMS2

Mechanism of Action

Binds directly to cyanide ions creating cyanocobalamin which is excreted in the urine.

Indications/Dosage

Moderate to severe signs/symptoms of cyanide toxicity in the setting of significant smoke inhalation or other known cyanide exposure.

Adult: 5 g, repeat once if patient does not improve

Pediatric: 70 mg/kg, max. dose is 5 g, repeat once if patient does not improve

Concentration

5 g/Vial-Dry Concentration: Reconstituted with 200 cc Normal Saline to liquid form.

Directions

Adults: Using the supplied transfer spike, reconstitute 2-100 cc Normal Saline Bags (supplied) into Cyanokit Vial making 5 g/200 cc vial. Gently rotate for 30 seconds to mix. Using the supplied vented 20 drop/ml administration set infuse the Cyanokit 5 g IV over 15 minutes (4 qtts/sec) The Cyanokit is a non-collapsible vial so regular administration sets will not allow the fluid to flow. It is imperative you use the supplied vented 20 gtts/cc administration set with the non-collapsible Cyanokit Vial.

Pediatrics: Using the supplied transfer spike, reconstitute 2-100 cc Normal Saline Bags (supplied) into Cyanokit Vial making 5 g/200 cc vial. Gently rotate for 30 seconds to mix.

Draw up the desired weight-based dose/ volume (see below) from the vial and return it to the empty bag of saline and infuse with the supplied 20 gtts/cc administration set.

| Weight | 5 kg | 10 kg | 15 kg | 20 kg | 25 kg | 30 kg | 35 kg |
|-------------|----------------|----------------|----------------|----------------|-----------------|-----------------|-----------------|
| Total | 14 cc | 28 cc | 42 cc | 56 cc | 70 cc | 84 cc | 98 cc |
| 20 qtts set | 20 qtts/min | 40 qtts/min | 60 qtts/min | 80 gtts/min | 100 qtts/min | 120 qtts/min | 130 qtts/min |

Route of Administration

IV/IO

Contraindications

Known hypersensitivity.

Precautions

May redden or discolor injection site, skin, and mucous membranes.

Incompatible with other medications; use a dedicated line

Ketamine

Continuously monitor LOC, capnography, pulse oximetry, and NIBP

Mechanism of Action

Blocks the NDMA Receptors in the brain producing dissociative anesthesia.

Indications/Dosage

Behavior/Patient Chemical Restraint: 2 mg/kg IM, repeat x1 q10 minutes, or 1-2 mg/kg IV (adult and pediatric). Pediatric maximum dose: 200 mg IM and 100 mg IV

Burns, Pain Control: 0.25-0.5 mg/kg; repeat x1 q10 minutes if needed (Adult and Pediatric)

Chemical Extrication or Crush Syndrome: 1-2 mg/kg IV or 2-4 mg/kg IM (pediatric dose the same, max dose 50 mg IV or 100 mg IM). Closely monitor for respiratory depression

Advanced Practice Clinician Only:

RSI: If unable to achieve adequate sedation with Etomidate alone: 2 mg/kg IV

Concentration

500 mg/10 cc Vial (50 mg/cc)

Route of Administration

IV/IO/IM

Contraindications

Hypersensitivity
Severe Hypertensive Crisis

Side Effects

May increase the effects of other sedatives, such as benzodiazepines
Closely monitor for respiratory depression
Confusion
Hallucinations
Hypertension
Tachycardia

Ketorolac (Toradol)

Mechanism of Action

Nonsteroidal anti-inflammatory; also exhibits peripherally acting nonnarcotic analgesic activity by inhibiting prostaglandin synthesis.

Indications/Dosage

Adult Pain Management: 30 mg if <65, no history of renal failure, no suspected active bleeding and no need for surgical intervention.

Pediatric Pain Management: 0.5 mg/kg (max dose 30 mg)

Concentration

30 mg/ 1cc Vial

Route of Administration

IV/IO/IM

Contraindications

Patients meeting trauma triage criteria

Patients with suspected intracranial hemorrhage

Ketorolac is only for patients > 2 years and < 65 years of age

Patients with allergies to ASA or other NSAIDs.

Active bleeding

Bleeding disorders

Renal failure/Dialysis.

Active peptic ulcer disease.

Pregnancy

Precautions

Patients with liver disease; a patient who may have had recent surgery; patients possibly needing surgery for current complaint. May increase bleeding time when administering to patients taking anticoagulants. Effects of lithium and methotrexate may be increased.

Side Effects

Anaphylaxis from hypersensitivity

Edema

Sedation

Bleeding Disorders

Rash

Nausea

Headache

Lidocaine

Mechanism of Action

Ability to decrease automaticity in ventricular myocardium and slows conduction velocity in reentrant pathways of ischemic tissue. The drug also appears to raise the fibrillation threshold.

Indications/Dosage

Adult Cardiac Arrest: (instead of Amiodarone): First Dose: 1-1.5mg/kg, Second Dose: 0.5-.075mg/kg

Adult Cardiac Arrest with ROSC: If VT or VF during cardiac arrest and after ROSC are having ventricular ectopy: Lidocaine loading dose of 1-1.5 mg/kg (max dose 100 mg) followed by a Lidocaine Infusion (see Medication Reference 23.5 Lidocaine Infusion).

IO Insertion: Adult: 20-40 mg
Pediatrics: 0.5 mg/kg

Concentration

100 mg/5 cc Prefilled Syringe

Route of Administration

IV/IO

Contraindications

Second-degree type II and third-degree heart blocks
PVCs caused by bradycardia
Idioventricular rhythm
Sensitivity to Lidocaine or other “caine” medications
VT post cocaine usage or in Hyperkalemia

Precautions

Depresses the CNS at doses above 3 mg/kg.

Side Effects

Hypotension
Conduction disturbances
Bradycardia
Tremors
Confusion
Seizures

Lidocaine Infusion

Mechanism of Action

Ability to decrease automaticity in ventricular myocardium and slows conduction velocity in reentrant pathways of ischemic tissue.

Indications

Arrest with ROSC: If VT or VF during cardiac arrest and after ROSC are having ventricular ectopy: Lidocaine loading dose of 1-1.5 mg/kg (max dose 100 mg) followed by a Lidocaine Infusion.

Dosage

1-4 mg/min

Directions

2 g/500cc (4 mg/cc)

| | | | |
|-------------|-------------|-------------|-------------|
| 1 mg/min | 2 mg/min | 3 mg/min | 4 mg/min |
| 15 qtts/min | 30 qtts/min | 45 qtts/min | 60 qtts/min |

Drops (qtts) per minute based on a 60 gtt/cc administration set.

Concentration

2 g/500 cc premixed bag

Route of Administration

IV/IO

Contraindications

Second-degree type II and third-degree heart blocks
PVCs caused by bradycardia
Idioventricular rhythm
Sensitivity to Lidocaine or other “caine” medications
VT post cocaine usage or in Hyperkalemia

Side Effects

Hypotension
Conduction disturbances
Bradycardia
Tremors
Confusion
Seizures

Magnesium Sulfate

Mechanism of Action

Smooth muscle relaxant, an electrolyte replacement for low magnesium (hypomagnesemia)

Indications/Dosage

Adult Cardiac Arrest- Torsades de Pointes: 1-2 g

Pediatric Cardiac Arrest- Torsades de Pointes: 25-50 mg/kg, max. dose is 2 g

Adult/Pediatric Asthma: 50 mg/kg IV, repeat in 10 minutes at 30 mg/kg. Not to exceed 2.5 g (adult) and 2 g (pediatric).

Concentration

5 g/10 cc Syringe/Vial

Route of Administration

IV/IO/: Give slow when administering IV.

Contraindications

AV Block or recent myocardial infarction

Shock

Dialysis patients and those with Renal disease

Severe hypertension

Hypocalcemia

Precautions

Continuous monitor EKG and vital signs.

Calcium Chloride can be used as an antidote for signs of magnesium toxicity (flushed skin, diaphoresis, hypotension, flaccid paralysis, hypothermia, respiratory depression/paralysis, cardiac and CNS depression)

Side Effects

Flushing

Bradycardia

Decreased deep tendon reflexes

Hypothermia

Rash/Itching

Sweating

Arrhythmias

Drowsiness

Hypotension

Magnesium Sulfate Infusion

Mechanism of Action

Smooth muscle relaxant, an electrolyte replacement for low magnesium (Hypomagnesemia)

Indications/Dosage

Asthma: If no response to Albuterol consider Magnesium Sulfate: 50 mg/kg IV over 10-20 min, may repeat 30 mg/kg x1 q10 minutes. Do not exceed 2.5 g total.

Pediatric dose: 50 mg/kg – max dose 2 g

Eclampsia: 2-4 g Infusion IV/IO over 20 min. **Requires Online Medical Control for EMT-I**

Directions

Asthma Infusion: Add Magnesium Sulfate 2 g (4 cc) to 100 cc Normal Saline = 20 mg/cc.
2 g over 10 minutes = 150 qts/min using a 15 qts/cc administration set

Eclampsia Infusion: Add Magnesium Sulfate 4 g (8 cc) to 100 cc Normal Saline = 40mg/cc.
2 g over 20 minutes = 38 qts/min using a 15 qts/cc administration set
4 g over 20 minutes = 76 qts/min using a 15 qts/cc administration set

Concentration

5 g/10 cc Syringe/Vial

Route of Administration

IV Infusion

Contraindications

AV Block or recent myocardial infarction

Shock

Dialysis patients and those with Renal disease

Severe hypertension

Hypocalcemia

Precautions

Calcium Chloride can be used as an antidote for signs of magnesium toxicity (flushed skin, diaphoresis, hypotension, flaccid paralysis, hypothermia, respiratory depression/paralysis, cardiac and CNS depression)

Side Effects

Flushing

Bradycardia

Decreased deep tendon reflexes

Hypothermia

Rash/Itching

Methylprednisolone (Solu-Medrol)

Mechanism of Action

Intermediate-acting corticosteroid related to the natural hormones secreted by the adrenal cortex. Targets cells and causes many complex reactions responsible for its anti-inflammatory and immunosuppressive effects.

Indications/Dosage

Severe Allergic Reaction, Respiratory Distress/Asthma/COPD/Croup/Reactive Airway: 125 mg
Pediatric Severe Allergic Reaction, Respiratory Distress/Asthma/COPD/Croup/Reactive Airway: 2 mg/kg IV, max. dose is 125 mg

Concentration

125 mg/2 cc Vial

Route of Administration

IV/IO/IM

Contraindication

Known hypersensitivity

Precautions

Only a single dose should be given in the prehospital setting.
Long-term steroid therapy can cause GI bleeding and prolonged wound care.
Pregnancy

Side Effects

Seizures
Vertigo
CHF
Hypertension
Palpitations/Tachycardia
Nausea/Vomiting/ Diarrhea
Headache
Abdominal distension
GI hemorrhage

Midazolam (Versed)

Continuously monitor LOC, capnography, pulse oximetry, and NIBP

Mechanism of Action

Binds to benzodiazepine receptor and enhances effects of the brain chemical (neurotransmitter) GABA. Benzodiazepines act at the level of the limbic, thalamic and hypothalamic regions of the CNS to produce short-acting CNS depression (including sedation, skeletal muscle relaxation, and anticonvulsant activity)

Indications/Dosage

Procedural Sedation or Anxiety Management: 0.02 mg/kg, max. single dose is 5 mg. Repeat one time after 10 minutes, if needed.

Pediatric dose: 0.1mg/kg, max. dose 5mg

Adult Chemical Restraint: 2-5 mg

Adult Seizure: 2-5 mg, repeat q 5 minutes.

Pediatric Seizure: 0.1 mg/kg, up to a max. single dose of 2mg, may repeat once after 5 minutes.

Eclampsia with Seizure: 2mg IV/IN, may repeat once after 5 minutes

Adult Multisystem Trauma: Sedation: 2-5 mg

Pediatric Multisystem Trauma: Sedation: 0.1 mg/kg, max. dose of 2 mg

Advanced Practice Clinician Only: POST RSI Sedation: 0.1 mg/kg, max. single dose is 10 mg.

Concentration

5mg /5 cc Vial

Route of Administration

IV/IO/IM/IN

Contraindication

Acute-angle glaucoma

Precautions

Patients with asthma, COPD, etc., are more susceptible to respiratory depression.

Effects are enhanced by other CNS depressants

Slowly metabolized in the elderly

Pregnancy

Hepatic Dysfunction

Renal insufficiency

History of drug addiction

Stafford County Fire and Rescue Department
Medication Reference

Parkinson's disease

Side Effects

Respiratory depression

May cause Hypotension

Nausea/vomiting

Metoprolol (Lopressor)

Mechanism of Action

Beta blocker, Class II Antiarrhythmic. It selectively blocks beta-1 receptors subsequently causing a decrease in heart rate, contractility, conductivity, and automaticity. This commonly causes a decrease in blood pressure and heart rate by reducing the workload on the heart, reducing the electrical conduction through the AV node, and reducing the rate of electrical signal generation at the SA node.

Indications

Narrow complex tachycardia with rapid ventricular rate to include Atrial Fibrillation (A-Fib) and Atrial Flutter (AF).

Indications/Dosage

Unstable Adult A-Fib/AF (SBP < 130): Metoprolol (Lopressor) 5 mg slow IV/IO push, repeat every 5 minutes to a max. dose of 15 mg to achieve a desired heart rate of less than 120.

Concentration

5 mg/5 cc Vial

Route of Administration

IV/IO

Contraindications

Bradycardia
Hypotension: <90mm Hg
Recent cocaine use
High degree heart blocks (2nd and 3rd)
Allergy to beta-blockers

Precautions

If patient is >70 years of age, reduce the bolus by ½.
Pregnancy

Side Effects

Hypotension
Shortness of Breath
Nausea
Worsening of AV block

Narcan

Mechanism of Action

A competitive opioid antagonist is a specific opioid antidote.

Indications/Dosage

Adult Opioid OD (with unconscious **and** has insufficient respiratory effort): 0.5 mg, q 2-5 minutes titrated for effective respiratory function.

BLS Clinician Approved Medication/Procedure: May administer 1 Narcan pre-filled syringe: IN/IM.

Pediatric Opioid OD (with unconscious and has insufficient respiratory effort): 0.1 mg/kg, max. dose of 2 mg, titrated effective respiratory function

*Not to be routinely used in cardiac arrest unless opioid overdose is suspected.

Concentration

2 mg/2 cc Prefilled Syringe

Route of Administration

IV/IO/IN/Nebulized

Contraindications

Hypersensitivity to the drug.
Adequate respiratory effort

Precautions

Abrupt withdrawal effects.

Side Effects

Nausea and vomiting
Acute Pulmonary Edema
Excitation for abrupt reversal of narcotic depression

Nitroglycerin (Nitro-Nitrostat-Nitropaste)

Mechanism of Action

Vascular smooth muscle relaxation leads to venous, coronary, and arterial vasodilatation, thus decreasing the workload on the heart.

Indications/Dosage

Chest Pain: 1 SL 0.4 mg tablet/ spray, (may repeat in 5 minutes for a total three doses) **or** one-inch of Nitro Paste. **BLS Clinician Approved Medication/Procedure**

Pulmonary Edema/CHF: If SBP > 175 mmHg and Heart Rate > 60 bpm, administer Nitro 0.4 mg SL **and** one-inch Nitropaste to the upper body or upper arm using a paper dose-measuring applicator. If respiratory distress persists and SBP > 175 mmHg, repeat q 5 minutes as long as respiratory distress persists and SBP remains > 175 mmHg

Concentration

0.4 mg SL Tablets (Bottle)
2% 1g Ointment (Nitropaste)

Route of Administration

SL/Transdermal

Contraindications

Hypotension
Hypersensitivity to nitrates
Patients with increased ICP (head trauma)
Right-Sided Infarct
Viagra, or similar erectile dysfunction medication, taken within the past 24 hours

Precautions

Hypotension may develop
Chronic pain management patients
Use Nitropaste for CPAP-dependent patients.

Side Effects

Headaches due to cerebral vasodilatation
Hypotension
Postural syncope

Ondansetron (Zofran)

Mechanism of Action

Antiemetic, the mechanism by which ondansetron (Zofran) works to control nausea and vomiting is not fully understood; it is believed the antiemetic properties occur as a result of serotonin receptor antagonism.

Indications/Dosage

Adult N/V: 4 mg IV or 4 mg (oral dissolving tablet) ODT, may repeat once after 5 minutes.

Pediatric N/V: 2 mg ODT, may repeat once after 5 minutes.

BLS Clinician Approved Medication/Procedure: ODT

Concentration

4 mg ODT (Bottle)

4 mg/2 cc Vial

Route of Administration

IV/IO/IM

Contraindication

Hypersensitivity to the drug

Side Effects

Drowsiness

Dizziness

Hypotension

Flushing

Musculoskeletal pain

Cardiovascular disturbances

Headache

Constipation

Pralidoxime (2-PAM®), Protopam Chloride®)

As part of a Mark 1 or DuoDote Auto Injector Kit, if equipped

Mechanism of Action

Reactivates acetylcholinesterase that has been deactivated by organophosphorus pesticides and related products. Inactivates acetylcholine at both muscarinic and nicotinic sites in the periphery.

Indications

Organophosphorus toxicity
Used as an adjunct to systemic atropine administration.

Dosage

Administer one Mark I/DuoDote Auto Injector Kit every 5 minutes to a max. dose of three.
BLS Clinician Approved Medication/Procedure

Concentration

600mg Auto Injector

Route of Administration

IM

Contraindications

SEVIN Poisoning (a carbamate insecticide, it increases drug's toxicity)
Use caution in patients with asthma, renal insufficiency, and peptic ulcers.
Mark I/DuoDote Auto Injector Kit are not approved for children less than 14 years of age

Side Effects

CNS: Dizziness, headache, drowsiness, and excitement.
CV: Tachycardia.
EENT: Blurred vision, diplopia, impaired accommodation, laryngospasm
GI: Nausea.
Other: Muscular weakness or rigidity and hyperventilation.

Sodium Bicarbonate 8.4%

Mechanism of Action

Increases plasma bicarbonate, which buffers plasma H⁺ ions and raises blood pH.

Indications/Dosage

Adult Cardiac Arrest: 50-100 mEq

Pediatric Cardiac Arrest: 1-2 mEq/kg, max. dose is 100 mEq

*Only used in cardiac arrest when Tricyclic Antidepressant OD is suspected as the cause of the cardiac arrest.

Chemical Extrication and/or Crush Syndrome:

When an adult has concurrent crush injury and extrication time may be prolonged: Add 100 mEq in 1000 cc Normal Saline and infuse at 100-150 cc/hour. 30 qts/min using a 15 qts/cc administration set = 120 cc/hour.

Chemical Extrication and/or Crush Syndrome:

If EKG indicates moderate to severe hyperkalemia (slow, weak pulse, prolonged PR interval, widen QRS, peaked T-Waves) administer 100 mEq Sodium Bicarbonate, 1 g Calcium and 10-20mg nebulized Albuterol over 15-20minute. See Injury-Multisystem Protocol for additional directions.

Sodium Bicarb should not be given in the same IV line with Calcium or Blood Products.

Concentration

50 mEq/50 cc Prefilled Syringe

Route of Administration

IV/IO

Contraindications

Respiratory or metabolic alkalosis

Precautions

Can cause alkalosis

Sodium Bicarbonate can deactivate Calcium Chloride, Dopamine, and Epinephrine if given together in the same means of access (IO/IV).

Side Effects

Volume overload

Alkalosis

Tranexamic Acid (TXA)

Mechanism of Action

Inhibits plasminogen activation and plasma activity. Helps prevent the breakdown of clots.

Indications/Dosage

Epistaxis: Apply TXA 200 mg to rolled gauze and insert into bleeding nostril, or administer via mucosal atomization device

Hemorrhagic Shock: TXA 2 g slow IV/IO push

Traumatic Cardiac Arrest: If severe hemorrhage is suspected administer TXA 2 g slow IV/IO push

Concentration

1 g/10 cc Vial

Route of Administration

IV/IO

Contraindications

Injuries greater than three (3) hours old

Patients less than twelve (12) years of age

Hypersensitivity to the drug

Precautions

Use caution in patients taking birth control due to an increased risk for blood clots.

Use caution in patients with a history of deep vein thrombosis (DVT), pulmonary embolus, other blood clots, or severe renal failure

Vecuronium (Norcuron)

Continuously monitor LOC, capnography, pulse oximetry, and NIBP

Mechanism of Action

Non-depolarizing neuromuscular blockade agent, paralytic, acts by competing for cholinergic receptors at the motor endplate.

Indications/Dosage

Advanced Practice Clinician Only: RSI: Paralysis 0.1 mg/kg IV/IO

Concentration

10 mg/10 cc Vial: Reconstitute with 10 cc Normal Saline

Route of Administration

IV/IO

Contraindication

Known hypersensitivity to the drug

Precaution

May cause a severe anaphylactic reaction.

Side Effects

Salivation

Premature ventricular contractions

Tachycardia