East Central Illinois EMS System

Medication Reference

2024

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ACETAMINOPHEN (Tylenol®)

Class:	Analgesic, Antipyretic
Mechanism of Action:	May work peripherally to block pain impulse generation; may also inhibit prostaglandin synthesis in CNS.
Indications:	Pain Control, Fever Control
Contraindications:	Hypersensitivity, Severe liver disease
Side Effects:	
Adult Dose/Protocols:	Pain Management; Sepsis **1000 mg PO**
Pediatric Dose/ Protocols:	None

ADENOSINE (Adenocard®)

Class:	Antidysrhythmic
Mechanism of Action:	Slows conduction through AV node and interrupts AV reentry pathways, which restore normal sinus symptoms.
Indications:	Conversion of regular, narrow complex tachycardia – stable supraventricular tachycardia (SVT) or regular, monomorphic wide complex tachycardia.
Contraindications:	Hypersensitivity, second or third degree AV Block (except those on pacemakers), sick sinus syndrome, atrial flutter or fibrillation, ventricular tachycardia
Side Effects:	Headache, dizziness, dyspnea, bronchospasm, dysrhythmias, palpitations, hypotension, chest pain, facial flushing, cardiac arrest, nausea, metallic taste, pain in the head or neck, paresthesia, diaphoresis
Adult Dose/Protocols:	Tachycardia (with a Pulse)-Narrow Complex-Regular Rhythm; Tachycardia (with a Pulse) - Wide Complex (regular rhythm and monomorphic) **6 mg rapid IV/IO** followed by a 10 mL NS flush. If no change in rhythm after 1-2 minutes, 12 mg rapid IV/IO followed by a 10 mL NS flush. If no change in rhythm after 1-2 minutes, repeat at 12 mg rapid IV/IO followed by a 10 mL NS flush.
Pediatric Dose/ Protocols:	Tachycardia (with a Pulse)-Narrow Complex; Tachycardia (with a Pulse) - Wide Complex (regular rhythm and monomorphic) **0.1 mg/kg (max 6 mg) rapid IV/IO** followed by a rapid NS flush. If no change in rhythm, give 0.2 mg/kg rapid IV/IO followed by a rapid NS flush.

ALBUTEROL /IPRATROPIUM (DuoNeb®)

Class:	**Albuterol**: Sympathomimetic; bronchodilator **Ipratropium**: Anticholinergic; bronchodilator
Mechanism of Action:	**Albuterol**: Selective beta-2 agonist that stimulates adrenergic receptors of the sypathomimetic nervous system. Results in smooth-muscle relaxation in the bronchial tree and peripheral vasculature. **Ipratropium**: Inhibits interaction of acetylcholine at receptor sites of bronchial smooth muscle, resulting in decreased cyclic guanosine monophosphate and bronchodilation.
Indications:	Persistent bronchospasm, COPD exacerbation
Contraindications:	Hypersensitivity to albuterol, ipratropium, atropine, alkaloids, peanuts.
Side Effects:	Headache, fatigue, dizziness, nervousness, tremors, tachycardia, hypertension, dysrhythmias, palpitations, chest pain, dry mouth, nausea, vomiting
Adult Dose/Protocol:	Allergic Reaction / Anaphylaxis; Bronchospasm / Asthma / COPD; Respiratory Distress—Tracheostomy **DuoNeb** (albuterol sulfate 3.0 mg and ipratropium bromide 0.5 mg) **by nebulizer**. May repeat x2 if needed for continued symptomatic relief
Pediatric Dose/Protocol:	Allergic Reaction / Anaphylaxis; Respiratory Distress—Lower Airway; Respiratory Distress—Tracheostomy **DuoNeb** (albuterol sulfate 3.0 mg and ipratropium bromide 0.5 mg) **by nebulizer**. May repeat x2 if needed for continued symptomatic relief

AMIODARONE (Pacerone®, Cordarone®)

Class:	Antidysrhythmic (Class III)
Mechanism of Action:	Blocks sodium, potassium, and calcium channels; prolongs the action potential and repolarization; decreases AV conduction and sinoatrial (SA) node function.
Indications:	Management of regular wide complex tachycardia in stable patients, irregular wide complex tachycardia in stable patients, and as antidysrhythmic for the management of ventricular fibrillation (VF) and pulseless ventricular tachycardia (VT).
Contraindications:	Hypersensitivity, severe sinus node dysfunction, second or third degree heart block or bradycardia causing syncope (except with functioning artificial pacemaker), cardiogenic shock
Side Effects:	Dizziness, fatigue, malaise, tremor, ataxia, lack of coordination, ARDS, pulmonary edema, cough, progressive dyspnea, heart failure, bradycardia, hypotension, worsening of dysrhythmias, prolonged QT interval, nausea, vomiting, burning at IV site, Stevens-Johnson syndrome
Adult Dose/Protocols:	Tachycardia (with a Pulse)-Wide Complex **150 mg IV/IO** over 10 minutes. May repeat in 10 minutes as needed. Cardiac Arrest-(VFib / Pulseless V-tach) **300 mg IV/IO**; may repeat at 150 mg IV/IO in 5 minutes if needed.
Pediatric Dose/ Protocols:	Tachycardia (with a Pulse)-Wide Complex **5 mg/kg (max 150 mg) IV/IO** over 20-60 minutes. Cardiac Arrest-(VFib / Pulseless V-tach) **5 mg/kg IV/IO** (max 300mg). May repeat x2 at 5 mg/kg IV/IO every 5 minutes if needed. (Max total dose 15 mg/kg).

ASPIRIN

Class:	Platelet inhibitor, anti-inflammatory agent
Mechanism of Action:	Inhibits synthesis of prostaglandin by cyclooxygenase; inhibits platelet aggregation; has antipyretic and analgesic activity.
Indications:	Antiplatelet agent for the care of patients suspected of suffering from an acute coronary syndrome.
Contraindications:	Hypersensitivity. Relatively contraindicated in patients with active ulcer disease or asthma.
Side Effects:	Bronchospasm, anaphylaxis, wheezing in allergic patients, prolonged bleeding, GI bleeding, epigastric distress, nausea, vomiting, heartburn, Reye syndrome
Adult Dose/Protocols:	Chest Pain/Acute Coronary Syndrome/STEMI **325 mg PO or 81 mg x 4 PO**; chewable, non-enteric-coated aspirin preferred.
Pediatric Dose/ Protocols:	None

ATROPINE SULFATE

Class:	Anticholinergic agent
Mechanism of Action:	Inhibits action of acetylcholine at parasympathetic sites in smooth muscle, CNS and secretory glands. Increases cardiac output and dries secretions.
Indications:	Hemodynamically unstable bradycardia, organophosphate poisoning, nerve agent exposure, RSI in pediatrics, beta-blocker or calcium channel blocker overdose.
Contraindications:	Tachycardia, hypersensitivity, unstable cardiovascular status in acute hemorrhage with myocardial ischemia, narrow-angle glaucoma, hypothermic bradycardia
Side Effects:	Drowsiness, confusion, headache, tachycardia, palpitations, dysrhythmias, nausea, vomiting, pupil dilation, dry mouth/nose/skin, blurred vision, urinary retention, constipation, flushed, hot, dry skin; paradoxical bradycardia when pushed too slowly or when given at low doses
Adult Dose/Protocols:	<u>Bradycardia</u> **1 mg IV/IO** every 3-5 minutes, as long as symptomatic bradycardia persists, to a total dose of 3 mg. <u>Acetylcholinesterase Inhibitors</u> **2 mg IV or IM**; repeat at 2-4 mg IV q 3-5 minutes until symptoms of SLUDGE subside, most importantly secretions.

Medication Continues

ATROPINE SULFATE

Pediatric Dose/ Protocols:

Bradycardia

0.02 mg/kg IV/IO for increased vagal tone or primary AV block (minimum single dose: 0.1 mg; maximum single dose: 0.5 mg); May be repeated once in 3-5 minutes.

Acetylcholinesterase Inhibitors

	MILD / MODERATE (0.05 mg/kg IM)	**SEVERE (0.1 mg/kg IM)**
Infant 0-6 Months (< 7 kg)	0.25 mg IM	0.5 mg IM
Infant 7 mo - 2 yrs (7-13 kg)	0.5 mg IM	1 mg IM
Child 3-7 yrs (14-25 kg)	1 mg IM	2 mg IM
Child 8-14 yrs (26-50 kg)	2 mg IM	4 mg IM
Adolescent > 14 yrs (> 51 kg)	2 mg IM	4 mg IM

BENZOCAINE SPRAY (Cetacaine®, Hurricaine Spray®)

Class:	Topical anesthetic.
Mechanism of Action:	Stabilizes neuronal membrane, which blocks the initiation and conduction of nerve impulses.
Indications:	Used as a topical anesthetic to facilitate passage of diagnostic and treatment devices. Suppressed the pharyngeal and tracheal gag reflex.
Contraindications:	Hypersensitivity.
Side Effects:	Methemoglobinemia has been reported on extremely rare occasions following the use of benzocaine.
Adult Dose/Protocols:	Medication Assisted Intubation 1 - 2 second spray; may repeat once after 30 seconds, if needed.
Pediatric Dose/ Protocols:	None.

DEXAMETHASONE (Decadron®)

Class:	Corticosteroid, anti-inflammatory drugs
Mechanism of Action:	Potent glucocorticoid with minimal to no mineralocorticoid activity. Decreases inflammation by suppressing migration of polymorphonuclear leukocytes (PMNs) and reducing capillary permeability; stabilizes cell and lysosomal membranes, increases surfactant synthesis, increases serum vitamin A concentration, and inhibits prostaglandin and proinflammatory cytokines; suppresses lymphocyte proliferation through direct cytolysis, inhibits mitosis, breaks down granulocyte aggregates, and improves pulmonary microcirculation.
Indications:	Used in the management of croup and bronchospasm as well as the management of patients suffering allergic reactions.
Contraindications:	Hypersensitivity.
Side Effects:	GI upset, dizziness, hyperglycemia, restlessness
Adult Dose/Protocols:	Allergic Reaction / Anaphylaxis; Bronchospasm / Asthma / COPD **0.6 mg/kg IV/IM (maximum 10 mg)**
Pediatric Dose/ Protocols:	Allergic Reaction / Anaphylaxis; Respiratory Distress-Lower Airway **0.6 mg/kg IV/IM (maximum 10 mg)**

DEXTROSE

Class:	Carbohydrate, antihypoglycemic
Mechanism of Action:	Rapidly increases serum glucose levels. Short term osmotic diuresis.
Indications:	Hypoglycemia, altered level of consciousness, coma of unknown origin, seizure of unknown origin, status epilepticus
Contraindications:	Intracranial hemorrhage
Side Effects:	Extravasation leads to tissue necrosis. Cerebral hemorrhage, cerebral ischemia, pulmonary edema, warmth, pain, burning from IV infusion, hyperglycemia.
Adult Dose/Protocol:	Altered Mental Status; Diabetic Emergencies **DEXTROSE 10% (D10) 25 grams**; administer in **50 mL (5g)** IV aliquots. **DEXTROSE 50% (D50) 25 grams IV**
Pediatric Dose/Protocol:	Altered Mental Status; Diabetic Emergencies **DEXTROSE 10% (D10) 5 mL/kg IV**

DILTIAZEM (Cardizem®)

Class:	Calcium channel blocker, antidysrhythmic (Class IV)
Mechanism of Action:	Inhibits extracellular calcium ion influx across membranes of myocardial cells and vascular smooth muscle cells, resulting in inhibition of cardiac and vascular smooth muscle contraction and thereby dilating main coronary and systemic arteries; no effect on serum calcium concentrations; substantial inhibitory effects on cardiac conduction system, acting principally at AV node, with some effects at sinus node
Indications:	For management of narrow complex tachycardias and to control the ventricular rate in patients with AF or atrial flutter
Contraindications:	Documented hypersensitivity, Wolff-Parkinson-White syndrome, Lown-Ganong-Levine syndrome, symptomatic severe hypotension (systolic BP < 90 mm Hg), sick sinus syndrome (if no pacemaker), second and third degree heart block (if no pacemaker present), and complete heart block
Side Effects:	Dizziness, weakness, headache, dyspnea, cough, dysrhythmias, heart failure, peripheral edema, bradycardia, hypotension, AV blocks, syncope, VF, VT, cardiac arrest, chest pain, nausea, vomiting, dry mouth
Adult Dose/Protocols:	Tachycardia (with a Pulse)-Narrow Complex-Irregular Rhythm **0.25 mg/kg slow IV/IO** over 2-5 minutes if SBP > 100 mmHg. • ACLS guidelines recommend 15 to 20 mg; max dose 20 mg; • Patients older than 65, recommended initial max dose of 10 mg If A-fib or A-flutter persists after 15 minutes, consider repeat at **0.35 mg/kg slow IV/IO** over 2-5 minutes if SBP > 100 mmHg. • ACLS guidelines recommend 20 to 25 mg; max dose 25 mg; • Patients older than 65, recommended max second dose of 20 mg If responsive to bolus, may start maintenance infusion at 10-15 mg/hr: a. Mix 100 mg in 100 mL 0.9% Normal Saline to give you 1 mg/mL concentration. b. Use 60 gtts IV set and 5-15 gtts/minute is equivalent to 5-15 mg/hr.
Pediatric Dose/ Protocols:	None

DIPHENHYDRAMINE (Benadryl®)

Class:	Antihistamine (H1 blocker)
Mechanism of Action:	Histamine H1-receptor antagonist of effector cells in respiratory tract, blood vessels, and GI smooth muscle.
Indications:	For urticarial and/or pruritis in the management of patients suffering from allergic reaction as well as for the management of patents suffering from dystonia/akasthesia.
Contraindications:	Documented hypersensitivity, use controversial in lower respiratory tract disease (such as acute asthma), premature infants and neonates.
Side Effects:	Drowsiness, sedation, seizures, dizziness, headache, blurred vision, wheezing, thickening of bronchial secretions, palpitations, hypotension, dysrhythmias, dry mouth, diarrhea, nausea, vomiting. Hallucinations, confusion and paradoxical CNS excitation can occur in children.
Adult Dose/Protocols:	Allergic Reaction/Anaphylaxis **50 mg IV/IM/IO/PO**
Pediatric Dose/ Protocols:	Allergic Reaction/Anaphylaxis **1 mg/kg IM/IV/IO** (max dose 50 mg)

DOPAMINE (Intropin®)

Class:	Adrenergic, vasopressor, inotropic agent
Mechanism of Action:	Endogenous catecholamine, acting on both dopaminergic and adrenergic neurons. Low dose stimulates mainly dopaminergic receptors, producing renal and mesenteric vasodilation; higher dose stimulates both beta-1-adrenergic and dopaminergic receptors, producing cardiac stimulation and renal vasodilation; large dose stimulates alpha-adrenergic receptors.
Indications:	Cardiogenic and septic shock, hypotension with low cardiac output states, distributive shock, second-line drug for symptomatic bradycardia.
Contraindications:	Hypersensitivity to dopamine, hypovolemic shock, pheochromocytoma, ventricular fibrillation, uncorrected
Side Effects:	Extravasation may cause tissue necrosis. Headache, anxiety, dyspnea, dysrhythmias, hypotension, hypertension, palpitations, chest pain, increased myocardial oxygen demand, nausea, vomiting
Adult Dose/Protocols:	Bradycardia; CHF / Pulmonary Edema; ROSC; Sepsis; Shock **5 mcg/kg/min** titrated to a SBP of 90-100 mmHg or MAP > 65 mmHg.
Pediatric Dose/ Protocols:	ROSC; Sepsis; Shock **5 mcg/kg/min** titrated to age appropriate SBP.

(See Drip charts on next page)

Medication Continues

DOPAMINE (Intropin®)

Adult Dopamine Drip Chart

Dopamine is provided premixed (400mg in 250mL D5W or 800mg in 500mL D5W). This yields a concentration of 1600mcg/mL.

Dose mcg/kg/min	2	3	4	5	6	7	8	9	10	15	20
Weight Lbs/kg	**Flow rate in ml/hr (In the absence of an IV pump, use 60 drop tubing and ml/hr=drops/min)**										
90 lbs/41 kg	3	5	6	8	9	11	12	14	15	23	31
100 lbs/45 kg	3	5	7	8	10	12	14	15	17	25	34
110 lbs/50 kg	4	6	8	9	11	13	15	17	19	28	38
120 lbs/55 kg	4	6	8	10	12	14	17	19	21	31	41
130 lbs/59 kg	4	7	9	11	13	15	18	20	22	33	44
140 lbs/64 kg	5	7	10	12	14	17	19	22	24	36	48
150 lbs/68 kg	5	8	10	13	15	18	20	23	26	38	51
160 lbs/73 kg	5	8	11	14	16	19	22	25	27	41	55
170 lbs/77 kg	6	9	12	14	17	20	23	26	29	43	58
180 lbs/82 kg	6	9	12	15	18	22	25	28	31	46	62
190 lbs/86 kg	6	10	13	16	19	23	26	29	32	48	65
200 lbs/91 kg	7	10	14	17	20	24	27	31	34	51	68
210 lbs/95 kg	7	11	14	18	21	25	29	32	36	53	71
220 lbs/100 kg	8	11	15	19	23	26	30	34	38	56	75
230 lbs/105 kg	8	12	16	20	24	28	32	35	39	59	79
240 lbs/109 kg	8	12	16	20	25	29	33	37	41	61	82
250 lbs/114 kg	9	13	17	21	26	30	34	38	43	64	86
260 lbs/118 kg	9	13	18	22	27	31	35	40	44	66	89
270 lbs/123 kg	9	14	18	23	28	32	37	42	46	69	92
280 lbs/127 kg	10	14	19	24	29	33	38	43	48	71	95
290 lbs/132 kg	10	15	20	25	30	35	40	45	50	74	99
300 lbs/136 kg	10	15	20	26	31	36	41	46	51	77	102

Medication Continues

DOPAMINE (Intropin®)

Pediatric Dopamine Drip Chart

Dopamine is provided premixed (400mg in 250mL D5W or 800mg in 500mL D5W). This yields a concentration of 1600mcg/mL.

Dose mcg/kg/min	2	3	4	5	6	7	8	9	10	15	20
Weight Lbs/kg	**Flow rate in ml/hr (In the absence of an IV pump, use 60 drop tubing and ml/hr=drops/min)**										
20 lbs/9 kg	1	1	1	2	2	2	3	3	3	5	7
25 lbs/11 kg	1	1	2	2	2	3	3	4	4	6	8
30 lbs/14 kg	1	2	2	3	3	4	4	5	5	8	11
35 lbs/16 kg	1	2	2	3	4	4	5	5	6	9	12
40 lbs/18 kg	1	2	3	3	4	5	5	6	7	10	14
45 lbs/20 kg	2	2	3	4	5	5	6	7	8	11	15
50l bs/23 kg	2	3	3	4	5	6	7	8	9	13	17
55 lbs/25 kg	2	3	4	5	6	7	8	8	9	14	19
60 lbs/27 kg	2	3	4	5	6	7	8	9	10	15	20
65 lbs/29 kg	2	3	4	5	7	8	9	10	11	16	22
70 lbs/32 kg	2	4	5	6	7	8	10	11	12	18	24
75 lbs/34 kg	3	4	5	6	8	9	10	11	13	19	26
80 lbs/36 kg	3	4	5	7	8	9	11	12	14	20	27
85 lbs/39 kg	3	4	6	7	9	10	12	13	15	22	29
90 lbs/41 kg	3	5	6	8	9	11	12	14	15	23	31

EPINEPHRINE (Adrenalin®)

Class:	Sympathomimetic
Mechanism of Action:	Strong alpha-adrenergic effects, which cause an increase in cardiac output and heart rate, a decrease in renal perfusion and peripheral vascular resistance, and a variable effect on BP, resulting in systemic vasoconstriction and increased vascular permeability. Strong beta-1- and moderate beta-2-adrenergic effects, resulting in bronchial smooth muscle relaxation. Secondary relaxation effect on smooth muscle of stomach, intestine, uterus, and urinary bladder.
Indications:	Cardiac arrest (asystole, PEA, VF and pulseless VT), symptomatic bradycardia as an alternative infusion to dopamine, hypotension from shock other than hypovolemia, allergic reaction, anaphylaxis, asthma.
Contraindications:	None in the emergency setting.
Side Effects:	Nervousness, restlessness, headache, tremor, pulmonary edema, dysrhythmias, chest pain, hypertension, tachycardia, nausea, vomiting
Adult Dose/Protocols:	Cardiac Arrest-(Asystole/PEA); Cardiac Arrest-(V-Fib/Pulseless V-Tach) **1.0 mg (1:10,000) IV/IO** every 3-5 minutes as long as patient remains pulseless Allergic Reaction / Anaphylaxis **0.3 mg (1:1,000) IM** every 5-15 minutes (max 3 doses) Bronchospasm / Asthma / COPD **0.3 mg (1:1,000) IM** Bradycardia; CHF / Pulmonary Edema; ROSC; Sepsis; Shock **PUSH DOSE EPINEPHRINE 1 mL (10 mcg) (1:100,000) IV/IO** every 2-5 minutes to maintain SBP of 90-100 mmHg or MAP > 65 mmHg (Mix 1 mL of Epinephrine 1:10,000 with 9 mL of Normal Saline in a 10 mL syringe resulting in a concentration of 10 mcg/ml)

Medication Continues

EPINEPHRINE (Adrenalin®)

Pediatric Dose/ Protocols:	**Pediatric Dose/Protocols:** Cardiac Arrest-(Asystole/PEA); Bradycardia; Neonatal Resuscitation; Cardiac Arrest-(V-Fib/Pulseless V-Tach) **0.01 mg/kg (1:10,000) IV/IO** every 3-5 minutes as long as patient remains pulseless and/or HR < 60bpm. Allergic Reaction / Anaphylaxis BLS Providers: < 30 kg **0.15 mg (1:1,000) IM** ≥ 30 kg **0.3 mg (1:1,000) IM** ILS/ALS Providers: **0.01 mg/kg (1:1,000) IM** Every 5-15 minutes (max 3 doses) Respiratory Distress-Lower Airway **0.01 mg/kg (1:1,000) IM** (max dose 0.3 mg) Sepsis; Shock **PUSH DOSE EPINEPHRINE 1 mL (10 mcg) (1:100,000) IV/IO** every 2-5 minutes to maintain age appropriate SBP (Mix 1 mL of Epinephrine 1:10,000 with 9 mL of Normal Saline in a 10 mL syringe resulting in a concentration of 10 mcg/ml)

EPINEPHRINE RACEMIC (MicroNefrin®)

Class:	Sympathomimetic
Mechanism of Action:	Stimulates beta-2 receptors in lungs: bronchodilation with relaxation of bronchial smooth muscles. Reduces airway resistance. Useful in treating laryngeal edema; inhibits histamine release.
Indications:	Bronchial asthma, prevention of bronchospasm, croup, laryngeal edema
Contraindications:	Hypertension, underlying cardiovascular disease, epiglottitis
Side Effects:	Headache, anxiety, fear, nervousness, respiratory weakness, palpitations, tachycardia, dysrhythmias, nausea, vomiting
Adult Dose/Protocols:	None
Pediatric Dose/ Protocols:	Respiratory Distress—Upper Airway **0.5 mL of 2.25% solution diluted in 3 mL NS nebulized.**

FENTANYL (Sublimaze®)

Class:	Opioid analgesic; schedule II drug
Mechanism of Action:	Binds to opiate receptors, producing analgesia and euphoria.
Indications:	Pain management, anesthesia adjunct
Contraindications:	Hypersensitivity. Use with caution in traumatic brain injury.
Side Effects:	Confusion, paradoxical excitation, delirium, drowsiness, CNS depression, sedation, respiratory depression, apnea, dyspnea, dysrhythmias, bradycardia, tachycardia, hypotension, syncope, nausea, vomiting, abdominal pain, dehydration, fatigue
Adult Dose/Protocols:	Pain Management **1 mcg/kg IV/IO/IM/IN** (max initial dose 100 mcg); May repeat x 1 after 15 minutes at 0.5 mcg/kg (max second dose 50 mcg). a. IV/IO is a slow push over 2-3 minutes Medication Assisted Intubation **1 mcg/kg IV/IO** (max initial dose 100 mcg); may repeat x 1 after 3-5 minutes at 0.5 mcg/kg (max second dose 50 mcg). Chest Pain **1 mcg/kg slow IV/IO** over 2 minutes (max initial dose 100 mcg).
Pediatric Protocols:	Pain Management **1 mcg/kg IV/IO/IM/IN** (max initial dose 100 mcg); May repeat x 1 after 15 minutes at 0.5 mcg/kg (max second dose 50 mcg). a. IV/IO is a slow push over 2-3 minutes

GLUCAGON (GlucaGen®)

Class:	Hypoglycemia antidotes, glucose-elevating agents, other antidotes (e.g. beta-blocker or calcium channel blocker overdose).
Mechanism of Action:	Insulin antagonist. Stimulates cAMP synthesis to accelerate hepatic glycogenolysis and gluconeogenesis. Glucagon also relaxes smooth muscles of GI tract.
Indications:	For the management of hypoglycemic patients as well as patients suffering symptomatic bradycardia after beta blocker or calcium channel blocker overdose.
Contraindications:	Hypersensitivity, hyperglycemia
Side Effects:	Dizziness, headache, hypertension, tachycardia, nausea, vomiting, rebound hypoglycemia
Adult Dose/Protocols:	Altered Mental Status; Diabetic Emergencies; **1 mg IM/IN** Poisoning and Overdose (Beta Blocker and Calcium Channel Blocker) **2mg IV/IM**
Pediatric Dose/ Protocols:	Altered Mental Status; Diabetic Emergencies < 20 kg: **0.5 mg IM/IN** > 20 kg: **1 mg IM/IN** Poisoning and Overdose • 25-40 kg**—1 mg IV/IO** • < 25 kg**—0.5 mg IV/IO**

KETAMINE (Ketalar®)

Class:	Sedative, analgesic dissociative anesthetic
Mechanism of Action:	Produces dissociative anesthesia. Blocks s N-methyl D-aspartate (NMDA) receptor.
Indications:	Excited delirium, pain management, procedural sedation
Contraindications:	Hypersensitivity, conditions where hypertension would be hazardous to the patient's care. Use with caution in patients with history of Schizophrenia.
Side Effects:	Hypertension, dysrhythmia, bronchodilation, respiratory depression, laryngospasm. Emergence reactions (Hallucinations, Delirium)
Adult Dose/Protocols:	Agitated or Violent Patient/Behavioral Emergencies **IM: 4 mg/kg** (Maximum dose 400mg) **IV: 2 mg/kg** (Maximum dose 400mg) Pain Management **IV/IO: 0.2 mg/kg IV/IO Infusion (max 25 mg)** in 100 mL NS given over 10-15 min.
Pediatric Dose/ Protocols:	Pain Management **IV/IO: 0.2 mg/kg IV/IO Infusion (max 25 mg)** in 100 mL NS given over 10-15 min

KETOROLAC (Toradol®)

Class:	Non-steroidal anti-inflammatory drug (NSAID)
Mechanism of Action:	Potent analgesic that does not possess any sedative or anxiolytic activities by inhibiting prostaglandin synthesis.
Indications:	Short-term management of moderate to severe pain.
Contraindications:	Patients with NSAID allergy, aspirin-sensitive asthma, renal insufficiency, pregnancy, known peptic ulcer disease, known or suspected GI bleed, known or suspected intracranial bleed, severe head injury or patients with high risk of bleeding.
Side Effects:	Drowsiness, dizziness, headache, sedation, bronchospasm, dyspnea, edema, vasodilation, hypotension, hypertension, GI bleeding, diarrhea, dyspepsia, nausea
Adult Dose/Protocols:	Pain Management **30 mg IM** or **15 mg IV** (no repeat dose)
Pediatric Dose/ Protocols:	None

LIDOCAINE (Xylocaine®)

Class:	Antidysrhythmic (Class Ib), anesthetic
Mechanism of Action:	Cardiac: Decreases automaticity by slowing the rate of spontaneous phase 4 depolarization. Local anesthetic: Inhibits transport of ions across the neuronal membrane, blocking conduction of normal nerve impulses.
Indications:	Alternate to amiodarone in cardiac arrest from VT, VF, Stable wide-complex tachycardia (poly-or monomorphic) with normal baseline QT interval. Also used as a local anesthetic for various procedures, including intubation and IO infusion.
Contraindications:	Hypersensitivity to lidocaine or amide-type local anesthetic, Adams-Stokes syndrome, SA/AV/intraventricular heart block in the absence of artificial pacemaker. CHF, cardiogenic shock, second and third degree heart block (if no pacemaker is present), Wolff-Parkinson-White Syndrome
Side Effects:	Anxiety, drowsiness, confusion, seizures, slurred speech, respiratory arrest, hypotension, bradycardia, dysrhythmias, cardiac arrest, AV block, nausea, vomiting
Adult Dose/Protocols:	Tachycardia (with a Pulse)-Wide Complex; Cardiac Arrest-(VFib / Pulseless V-tach) **1.5 mg/kg IV/IO**; may repeat every 3-5 minutes x 2 at 0.75 mg/kg to maximum of 3 mg/kg. If tachycardia resolves with bolus, administer maintenance infusion at 2-4 mg/min. Intraosseous Access-Responsive to pain **40 mg IO** over 120 seconds
Pediatric Dose/ Protocols:	Tachycardia (with a Pulse)-Wide Complex **1 mg/kg IV/IO.** Cardiac Arrest-(VFib / Pulseless V-tach) **1 mg/kg IV/IO**. Maintenance infusion at 20-50 mcg/kg/min. Intraosseous Access-Responsive to pain **0.5 mg/kg mg IO** over 120 seconds (max 40 mg)

(See drip charts on next page)

Medication Continues

LIDOCAINE (Xylocaine®)

Lidocaine Drip Chart

Lidocaine is provided premixed (2000 mg in 250 mL D5W) which yields a concentration of 8 mg/mL or (1000 mg in 250 mL D5W) which yields a concentration of 4 mg/mL.

(In the absence of an IV pump, use 60 drop tubing and mL/hr=drops/min)

Concentration: 8 mg/mL

Order	Flow rate mL/hr
2 mg/min	15 mL/hr
3 mg/min	23 mL/hr
4 mg/min	30 mL/hr

Concentration: 4 mg/mL

Order	Flow rate mL/hr
2 mg/min	30 mL/hr
3 mg/min	45 mL/hr
4 mg/min	60 mL/hr

Medication Continues

LIDOCAINE (Xylocaine®)

Pediatric Lidocaine Drip Chart

Lidocaine is provided premixed (2000 mg in 250 mL D5W) which yields a concentration of 8 mg/mL or (1000 mg in 250 mL D5W) which yields a concentration of 4 mg/mL.

(In the absence of an IV pump, use 60 drop tubing and mL/hr=drops/min)

Concentration: 8 mg / mL

Dose mcg/kg/min	20	25	30	35	40	45	50
Weight (lbs/kg)	**Flow rate in mL/hr**						
10 lbs/5 kg	1	1	1	1	2	2	2
20 lbs/9 kg	1	2	2	2	3	3	3
25 lbs/11 kg	2	2	2	3	3	4	4
30 lbs/14 kg	2	3	3	4	4	5	5
35 lbs/16 kg	2	3	4	4	5	5	6
40 lbs/18 kg	3	3	4	5	5	6	7
45 lbs/20 kg	3	4	5	5	6	7	8
50 lbs/23 kg	3	4	5	6	7	8	9
55 lbs/25 kg	4	5	6	7	8	8	9
60 lbs/27 kg	4	5	6	7	8	9	10
65 lbs/29 kg	4	5	7	8	9	10	11
70 lbs/32 kg	5	6	7	8	10	11	12
75 lbs/34 kg	5	6	8	9	10	11	13
80 lbs/36 kg	5	7	8	9	11	12	14
85 lbs/39 kg	6	7	9	10	12	13	15
90 lbs/41 kg	6	8	9	11	12	14	15

Medication Continues

LIDOCAINE (Xylocaine®)

Pediatric Lidocaine Drip Chart

Lidocaine is provided premixed (2000 mg in 250 mL D5W) which yields a concentration of 8 mg/mL or (1000 mg in 250 mL D5W) which yields a concentration of 4 mg/mL.

(In the absence of an IV pump, use 60 drop tubing and mL/hr=drops/min)

Concentration: 4 mg / mL

Dose mcg/kg/min	20	25	30	35	40	45	50
Weight lbs/kg	**Flow rate in mL/hr**						
10 lbs/5 kg	2	2	2	3	3	3	4
20 lbs/9 kg	3	3	4	5	5	6	7
25 lbs/11 kg	3	4	5	6	7	7	8
30 lbs/14 kg	4	5	6	7	8	9	11
35 lbs/16 kg	5	6	7	8	10	11	12
40 lbs/18 kg	5	7	8	9	11	12	14
45 lbs/20 kg	6	8	9	11	12	14	15
50 lbs/23 kg	7	9	10	12	14	16	17
55 lbs/25 kg	8	9	11	13	15	17	19
60 lbs/27 kg	8	10	12	14	16	18	20
65 lbs/29 kg	9	11	13	15	17	20	22
70 lbs/32 kg	10	12	14	17	19	22	24
75 lbs/34 kg	10	13	15	18	20	23	26
80 lbs/36 kg	11	14	16	19	22	24	27
85 lbs/39 kg	12	15	18	20	23	26	29
90 lbs/41 kg	12	15	18	22	25	28	31

MAGNESIUM SULFATE

Class:	Class V antidysrhythmic, electrolyte
Mechanism of Action:	Depresses CNS, blocks peripheral neuromuscular transmission, produces anticonvulsant effects; decreases amount of acetylcholine released at end-plate by motor nerve impulse. Slows rate of sino-atrial (SA) node impulse formation in myocardium and prolongs conduction time. Promotes movement of calcium, potassium, and sodium in and out of cells and stabilizes excitable membranes.
Indications:	For the management of torsades de pointes or for severe bronchoconstriction with impending respiratory failure, seizure during the third trimester of pregnancy or in the postpartum
Contraindications:	Hypersensitivity, myocardial damage, diabetic coma, heart block, hypermagnesemia, hypercalcemia
Side Effects:	Drowsiness, CNS depression, respiratory depression, respiratory tract paralysis, abnormal ECG, AV block, hypotension, vasodilation, hyporeflexia
Adult Dose/Protocols:	Bronchospasm / Asthma / COPD **2 grams IV in 50 mL NS** over 10-15 minutes. Eclampsia / Pre-Eclampsia **4 grams IV in 50 mL NS** over 10-20 minutes for seizures Tachycardia (with a Pulse)-Wide Complex **2 grams IV/IO** over 10 minutes. Cardiac Arrest-(V-Fib/Pulseless V-Tach) **2 grams IV/IO** over 1-2 minutes.
Pediatric Dose/ Protocols:	Respiratory Distress-Lower Airway **50 mg/kg IV in 50 mL NS** over 10-15 minutes. Maximum dose: 2 grams. Tachycardia (with a Pulse)-Wide Complex **25-50 mg/kg IV/IO** over 10 minutes. Maximum dose: 2 grams Cardiac Arrest-(V-Fib/Pulseless V-Tach) **25-50 mg/kg IV/IO** over 1-2 minutes.

METHYLPREDNISOLONE (SoluMedrol ®)

Class:	Corticosteroid, anti-inflammatory agent
Mechanism of Action:	Highly potent synthetic glucocorticoid that suppresses acute and chronic inflammation; potentiates vascular smooth muscle relaxation by beta-adrenergic agonist.
Indications:	Anaphylaxis, bronchodilator for unresponsive asthma.
Contraindications:	Untreated serious infections, documented hypersensitivity, IM route is contraindicated in idiopathic thrombocytopenic purpura, traumatic brain injury (high doses)
Side Effects:	Depression, euphoria, headache, restlessness, seizure, increased ICP, pulmonary tuberculosis, hypertension, heart failure, nausea, vomiting, peptic ulcer, fluid retention, hypernatremia, hyperkalemia
Adult Dose/Protocols:	Allergic Reaction / Anaphylaxis; Bronchospasm / Asthma / COPD **125 mg IV/IM**.
Pediatric Dose/ Protocols:	Allergic Reaction / Anaphylaxis; Respiratory Distress-Lower Airway **2 mg/kg IV/IM** (Maximum dose 125 mg).

MIDAZOLAM (Versed®)

Class:	Anticonvulsants, other; antianxiety agent; anxiolytics; benzodiazepines
Mechanism of Action:	Binds receptors at several sites within the CNS, including the limbic system and reticular formation; effects may be mediated through gabba-aminobutyric acid (GABA) receptor system; increase in neuronal membrane permeability to chloride ions enhances the inhibitory effects of GABA; the shift in chloride ions causes hyperpolarization (less excitability) and stabilization of the neuronal membrane.
Indications:	For the management of seizures, uncontrolled shivering in hypothermia, and for the management of agitated or violent patients suffering behavioral emergencies.
Contraindications:	Documented hypersensitivity, severe respiratory depression, sleep apnea
Side Effects:	Headache, somnolence, respiratory depression, respiratory arrest, apnea, hypotension, cardiac arrest, nausea, vomiting, pain at the injection site
Adult Dose/Protocols:	Agitated or Violent Patient/Behavioral Emergencies **IV/IM/IN: 5 mg**; May repeat after max onset up to a maximum total dose of 10 mg. *Onset IV: 3-5 min; IM: 10-15 min; IN: 3-5 min* Bradycardia; Tachycardia-Narrow Complex (Regular); Tachycardia-Narrow Complex (Irregular); Tachycardia-Wide Complex **2.5 mg IV/IO** Medication Assisted Intubation *Intubation:* **0.1 mg/kg IV/IO** (maximum 10 mg) *Post-Intubation* **0.05 mg/kg IV/IO** every 3-5 minutes as needed (total max10mg) ROSC-Targeted Temp Mgmt; Environmental Hyperthermia **2.5 mg IV/IO/IN.** may repeat once in 5 minutes **5 mg IM**, may repeat once in 10 minutes

Medication Continues

MIDAZOLAM (Versed®)

Adult Dose/Protocols:	Seizure **IV/IO: 0.1 mg/kg IV** over 2 minutes (maximum dose 5 mg); may repeat x 1 after 5 minutes if seizure persists. **IM: 0.2 mg/kg IM** (maximum dose 10 mg) **IN: 0.2 mg/kg IN** (maximum dose 10 mg; max 1 ml per nostril) (**Must use 10mg/2ml concentration**)
Pediatric Dose/ Protocols:	Agitated or Violent Patient/Behavioral Emergencies **IV/IM/IN: 0.1 mg/kg**; (maximum dose 5 mg) *Onset: IV: 3-5 min; IM: 10-15 min; IN: 3-5 min* Bradycardia; Tachycardia-Narrow Complex; Tachycardia-Wide Complex **0.1 mg/kg IV/IO/IN** (maximum dose 2mg). Environmental Hyperthermia **0.1 mg/kg IV/IO** (Max 1mg) or **0.2 mg/kg IM/IN** (Max 1mg) Seizure **IV/IO: 0.1 mg/kg** (maximum dose 5 mg); **IM/IN: 0.2 mg/kg** (maximum dose 10 mg; max 1 ml per nostril)

MORPHINE SULFATE

Class:	Opioid analgesic; schedule II drug
Mechanism of Action:	Narcotic agonist-analgesic of opiate receptors; inhibits ascending pain pathways, thus altering response to pain; produces analgesia, respiratory depression, and sedation; suppresses cough by acting centrally in medulla.
Indications:	Management of acute pain.
Contraindications:	Hypersensitivity, hypotension, paralytic ileus.
Side Effects:	CNS depression, respiratory depression, hypotension, nausea, vomiting
Adult Dose/Protocol:	Chest Pain / Acute Coronary Syndrome / STEMI **2 mg slow IV/IO** over 1 minute Pain Management **5 mg slow IV/IO** or **10 mg IM**. May repeat IV/IO dose x 1 after 15 minutes if needed.
Pediatric Dose/Protocol:	Pain Management **0.1 mg/kg IV/IO/IM** (max 5 mg). May repeat IV/IO dose x 1 after 15 minutes if needed.

NALOXONE (Narcan®, EVZIO®)

Class:	Opioid reversal agent
Mechanism of Action:	Competitive inhibition at narcotic receptor sites. Reverses respiratory depression secondary to opiate drugs. Completely inhibits the effect of morphine.
Indications:	Opiate overdose, complete or partial reversal of CNS and respiratory depression induced by opioids, decreased level of consciousness, coma of unknown origin.
Contraindications:	Hypersensitivity . Use with caution in narcotic-dependent patients and neonates of narcotic- addicted mothers.
Side Effects:	Restlessness, seizures, dyspnea, pulmonary edema, tachycardia, hypertension, dysrhythmias, cardiac arrest, nausea, vomiting, withdrawal symptoms in opioid-addicted patients, diaphoresis
Adult Dose/Protocols:	Poisoning and Overdose **IV or IM – 0.4-2 mg**; may repeat every 2-3 minutes **IN – 2-4 mg** (1 mL per nostril maximum). May repeat in 2-3 minutes.
Pediatric Dose/ Protocols:	Poisoning and Overdose **IV, IM, IN – 0.1 mg/kg**; may repeat every 2-3 minutes to a maximum dose of 2 mg • **IN -** 1 mL per nostril maximum. Quick dosing guide: a. Infant / Toddler (age 1-3): **0.5 mg (0.5 mL) per nostril** for a total dose of 1 mg. b. Small Child and Larger (age > 3): **1 mg (1 mL) per nostril** for a total dose of 2 mg.

NITROGLYCERIN (Nitrostat®)

Class:	Vasodilator
Mechanism of Action:	Smooth muscle relaxant acting on vasculature, bronchial, uterine, intestinal smooth muscle. Dilation of arterioles and veins in the periphery. Reduces preload and afterload, decreasing workload of the heart and thereby myocardial oxygen demand.
Indications:	Acute angina pectoris, ischemic chest pain, hypertension, heart failure, pulmonary edema.
Contraindications:	Hypotension, hypovolemia, intracranial bleeding or head injury, pericardial tamponade, severe bradycardia or tachycardia, RV infarction, recent use of erectile dysfunction medications (sildenafil (Viagra® – within last 24 hours), tadalafil (Cialis® – within last 48 hours), vardenafil (Levitra® – within last 48 hours).
Side Effects:	Headache, dizziness, weakness, reflex tachycardia, syncope, hypotension, nausea, vomiting, dry mouth, muscle twitching, diaphoresis
Adult Dose/Protocols:	Chest Pain / Acute Coronary Syndrome / STEMI; CHF / Pulmonary Edema *Sublingual:* **0.4 mg SL**; may repeat every 3-5 minutes to maximum of 3 doses as long as chest pain persists and SBP > 90 mmHg *Topical (paste):* **1 inch**
Pediatric Dose/ Protocols:	None

NOREPINEPHRINE (Levophed®)

Class:	Sympathomimetic, vasopressor
Mechanism of Action:	Strong beta-1 and alpha-adrenergic effects and moderate beta-2 effects, which increase cardiac output and heart rate, decrease renal perfusion and peripheral vascular resistance, and cause variable BP effects.
Indications:	Cardiogenic shock unresponsive to fluid resuscitation, significant hypotensive (<70 mm Hg) states, first-line vasopressor in septic shock; IV Pump available.
Contraindications:	Hypersensitivity, hypotension due to blood volume deficit, peripheral vascular thrombosis (except for lifesaving procedures); No IV Pump
Side Effects:	Headache, anxiety, dizziness, restlessness, dyspnea, bradycardia, hypertension, dysrhythmias, chest pain, peripheral cyanosis, cardiac arrest, nausea, vomiting, urinary retention, renal failure, decreased blood flow to the GI tract, kidneys, skeletal muscle, and skin, tissue necrosis from extravasation
Adult Dose/Protocol:	Bradycardia; CHF / Pulmonary Edema; ROSC; Sepsis; Shock **2-30 mcg/min**
Pediatric Dose/Protocol:	Sepsis; Shock **0.05 - 1 mcg/kg/min**

Mixing Instructions: Mix 8mg in 250 mL D5W = 32 mcg/mL

ONDANSETRON (Zofran®, Zofran ODT®)

Class:	Serotonin receptor antagonist, antiemetic
Mechanism of Action:	Blocks action of serotonin, a natural substance that causes nausea and vomiting.
Indications:	Prevention and control of nausea and vomiting.
Contraindications:	Hypersensitivity to ondansetron or other 5-HT3 receptor antagonists.
Side Effects:	Headache, malaise, wheezing, bronchospasm, AF, abnormal ECG, prolonged QT interval, ST segment depression, second-degree AV block, constipation, diarrhea, hives, skin rash
Adult Dose/Protocol:	Nausea / Vomiting **4 mg PO/IV/IM**; may repeat x1 after 15 minutes (max total dose 8 mg).
Pediatric Dose/Protocol:	Nausea / Vomiting > 6 months old: **0.15 mg/kg IV/IM** > 4 years old: **4 mg PO** Maximum total dose: 4 mg

ORAL GLUCOSE (Insta-Glucose®)

Class:	Hyperglycemic, carbohydrate
Mechanism of Action:	After absorption in the GI tract, glucose is distributed to the tissues providing an increase in circulating blood glucose levels.
Indications:	Conscious patients with suspected hypoglycemia.
Contraindications:	Decreased level of consciousness, nausea, vomiting.
Side Effects:	Nausea, vomiting
Adult Dose/Protocols:	Altered Mental Status; Diabetic Emergencies **15 grams PO**
Pediatric Dose/ Protocols:	Altered Mental Status; Diabetic Emergencies **15 grams PO**

SODIUM BICARBONATE

Class:	Systemic hydrogen ion buffer, alkalizing agent
Mechanism of Action:	Increases blood and urinary pH by releasing a bicarbonate ion, which in turn neutralizes hydrogen ion concentrations.
Indications:	Metabolic acidosis during cardiac arrest, tricyclic antidepressant, aspirin and phenobarbital overdose, hyperkalemia, crush injuries.
Contraindications:	Documented hypersensitivity, severe pulmonary edema, known alkalosis, hypernatremia, or hypocalcemia.
Side Effects:	Hypernatremia, metabolic alkalosis, tissue sloughing, cellulitis, necrosis at injection site, seizures, fluid retention, hypokalemia, electrolyte imbalance, tetany, sodium retention, peripheral edema
Adult Dose/Protocols:	Cardiac Arrest-(Asystole / PEA) **50 mEq IV/IO** Crush Injuries **50 mEq in 1000 mL of 0.9% Normal Saline** Poisoning and Overdose (Tricyclic Antidepressants) **1 mEq/kg IV**
Pediatric Dose/ Protocols:	Crush Injuries **1 mEq/kg** (max 50 mEq) Poisoning and Overdose **1 mEq/kg IV**

TRANEXAMIC ACID

Class:	Hemostatic agent, antifibrinolytic, plasminogen inactivator
Mechanism of Action:	Competitive inhibitor of plasminogen activation to plasmin. Inhibits fibrinolysis by displacing plasminogen from fibrin.
Indications:	Blunt or penetrating trauma **<u>less than 3 hours (180 minutes)</u>** from onset with hemodynamic compromise, bleeding. Prefer < 60 minutes from initial traumatic injury. • Hemorrhagic shock ⇒ Hypotension ◊ Adult: SBP < 90 mmHg ◊ Pediatric: SBP < 70 + (age in yrs x 2) mmHg
Contraindications:	Hypersensitivity; Active intravascular clotting
Side Effects:	Rapid infusion may cause hypotension. Nausea, vomiting, diarrhea; Visual abnormalities
Adult Dose/Protocols:	<u>Obstetric and Gynecological Conditions</u>; <u>Shock</u>; **1 gram** over 10 minutes • Mix **1 gram/10mL vial in 50 mL NS** and administer over 10 minutes IV at a wide open rate. *According to the manufacturer, TXA should be given via a dedicated line.*
Pediatric Dose/Protocol:	<u>Shock</u> **15 mg/kg** over 10 minutes (max dose 1 gram) • Mix **15 mg/kg** (1g/10mL concentration) **in 50 mL NS** and administer over 10 minutes IV at a wide open rate. *According to the manufacturer, TXA should be given via a dedicated line.*