Adenosine
Adenocard

Class

Anti-arrhythmic

Action

Slows conduction through AV node and interrupts AV reentry pathways, which restore normal sinus symptoms. Slows the electrical conduction rate through the AV node.

Indications

SVT refractory to vagal maneuvers

Contraindications

2nd or 3rd degree heart blocks
Hypersensitivity
(Adenosine is NOT effective in converting A-Flutter, A-Fibrillation, or V-Tach to a sinus rhythm)

Dosage

6 mg rapid IVP (immediately followed by 20 mL saline flush),
can repeat once at 12 mg.

Half-life of adenosine is approximately 5 seconds. Because of its rapid onset of action and very short half-life, the administration of adenosine is sometimes referred to as chemical cardioversion.

Onset and Duration

Onset: 1-2 seconds
Duration: 12 seconds

Pollak, Andrew N., Bob Elling, and Barbara Aehlert. "Emergency Medications." *Nancy Caroline's Emergency Care in the Streets*. Burlington, MA: Jones & Bartlett Learning, 2018. N. pag. Print.

"National Model EMS Clinical Guidelines." *The National Association of State EMS Officials*. NAEMSO, Aug. 2016. Web. 20 July 2017.

Albuterol
Proventil

Class

Sympathomimetic or Sympathetic Agonist

Action

Selective beta2-agonist for adrenergic receptors

Relaxes smooth muscles of the bronchial tree (bronchodilator) and peripheral vasculature by stimulating adrenergic receptors of the sympathetic nervous system

Indications

Bronchial Asthma
Reversible bronchospasm associated with chronic bronchitis and emphysema

Contraindications

Hypersensitivity, Cardiac dysrhythmias associated with tachycardia

Dosage

Metered Dose Inhaler: 1-2 inhalations (90-180 mcg);

2.5 mg (0.5 mL of 0.5% solution) diluted to 3 mL with 0.9% NS (0.083% solution); administered over 5-15 minutes

Onset and Duration

Onset: 5-15 minutes
Duration: 3-4 hours

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Amiodarone
Cordarone

Class

Class III Anti-arrhythmic

Action

Class III antidysrhythmic agent, which inhibits adrenergic stimulation; affects sodium, potassium, and calcium channels; markedly prolongs action potential and repolarization; decreases AV conduction and sinus node function

Indications

Recurring V-Fib.
Hemodynamically unstable V-Tach in patient's refractory to other therapy. Refractory SVT in conjunction with electrical cardioversion

Contraindications

Bradycardia
Hypersensitivity
Hypotension (cardiogenic shock)
Pulmonary edema

Dosage

Pulseless arrest: 300 mg IVP, repeat 150 mg in 3-5 minutes

Ventricular Tachycardia: 150 mg IV over 10 min (15mg/min) Repeat as needed up to 2.2 g/24 hr

Onset and Duration

Onset: Immediate
Duration: 30-45 minutes

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Atropine Sulfate

Class

Parasympatholytic (Anti-cholinergic agent)

Action

Competitively inhibits action of acetylcholinesterase on autonomic effectors innervated by postganglionic nerves
(Increases heart rate)

Indications

Hemodynamically significant Bradycardia
Organophosphate poisoning
Nerve Agent Toxicity

Contraindications

None in emergency setting

Dosage

Symptomatic Bradycardia:
0.5 mg IVP (1.0 mg ET if IV not available) q 3-5 min up to 3 mg

Organophosphate poisoning or Nerve agent toxicity:
2-5 mg IVP Initial Dose
Repeat 5-15min until Atropine effects are noticed

Onset and Duration

Onset: Immediate
Duration: 2-6 hours

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Calcium Chloride

Class

Antidotes, other; calcium salts

Action

Bone mineral component; cofactor in enzymatic reactions, essential for neurotransmission, muscle contraction, and many signal transduction pathways

Indications

Calcium channel blocker overdose, Hyperkalemia, Hypocalcemia, Hypermagnesemia

Contraindications

Hypercalcemia, documented hypersensitivity, life-threatening cardiac arrhythmias may occur in known or suspected severe hypokalemia

WARNING: There is a risk for digitalis toxicity. Be cautious of peripheral IV use as significant tissue necrosis at injection site may occur

Dosage

Adult:
Calcium Channel Blocker Overdose and Hyperkalemia – 500 – 1000mg Slow IV/IO

Pediatric:
Calcium Channel Blocker Overdose and Hyperkalemia – 20 mg/kg Slow IV/IO
Max 1000mg dose

Onset and Duration

Onset: 1-3 min
Duration: 20-30 minutes

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Diltiazem
Cardizem

Class

Calcium Channel Blocker

Action

Slows conduction and increases refractoriness in the atrioventricular nodes. It dilates coronary and peripheral arteries and arterioles, thus increasing circulation to the heart and reducing peripheral vascular resistance

Indications

PSVT (atrial fibrillation, atrial flutter, and PSVT refractory to Adenosine) and to increase coronary artery perfusion in angina

Contraindications

Sick Sinus Syndrome, 2nd or 3rd degree heart blocks, systolic BP <90 diastolic BP < 60, wide complex tach and WPW

Dosage

0.25 mg/kg over 2 min, may repeat as needed with 0.35 mg/kg followed by a drip of 5 to 10 mg/hr not to exceed 15 mg/hr over 24 hours

Onset and Duration

Onset: 2-5 Minutes
Duration: 1-3 Hours

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Dextrose 50%

D-50

Class

Carbohydrate

Action

Principal form of glucose (sugar) used by the body to create energy

Indications

Increase sugar levels in documented hypoglycemia

Contraindications

Hyperglycemia, anuria, diabetic coma, intracranial or intraspinal hemorrhage, dehydrated patients with delirium, glucose-galactose malabsorption syndrome, and documented hypersensitivity

Dosage

25 g IV/IO
Peds dose 2 mL/kg IV/IO of 25% Solution

Onset and Duration

Onset: Less than 1 minute
Duration: Variable

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Diazepam

(Valium, Diastat, AcuDial)

Class

Benzodiazepine

Action

Acts on the limbic, thalamic, and hypothalamic regions of the CNS to potentiate the effects of inhibitory neurotransmitters inducing a calming effect

Indications

Used to stop seizures by raising the seizure threshold, used in conscious pts during cardioversion or TCP to induce sedation and to sedate agitated or violent patients

Contraindications

Hypersensitivity
Shock
Severe Respiratory Depression

Dosage

Adult: 5-10 mg IV/IO, may be repeated, max dose 30mg

Peds: 0.2-0.5 mg/kg IV/IO
(Rectal Dose 0.5 mg/kg)
(0-4 years old max dose of 5mg ** 5 and older max dose of 10mg)

Onset and duration

Onset: 1-5min (IV)
Duration: 15 min- 1 hour
Both figures are dose and route dependant.

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Diphenhydramine
Benadryl

Class

Antihistamine – first generation

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

Dosage

Adult: 25-50 mg IV/IO/IM
Pediatric: 1-2 mg/kg IV/IO/IM

Onset and Duration

Onset: 15-30 Minutes
Duration: 3-12 horus

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Dopamine
Intropin

Class

Sympathomimetic

Action

Increases cardiac contractility
Causes peripheral vasoconstriction

Indications

Hemodynamically significant hypotension in the absence of hypovolemia

Contraindications

Tachycardia and Ventricular Fibrillation
Hypovolemic shock in which fluid resuscitation has not occurred.

Dosage

Adult and Pediatric: 2-20 mcg/kg/min, titrated to patient response.

Onset and Duration

Onset: 1-4 minutes
Duration: Effects cease almost immediately after infusion is disconnected

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Epinephrine
Adrenalin

Class

Sympathomimetic

Action

Stimulates alpha, beta 1, and beta 2 receptors

Indications

For use in the management of patients suffering anaphylaxis, shock, cardiac arrest, bradycardia, or in the nebulized form for croup/bronchiolitis and IM form for refractory acute asthma

Contraindications

Hypersensitivity, coronary insufficiency and Hypovolemic shock

Dosage

1:1,000 is 1mg in 1ml
1:10,000 is 1 mg in 10 ml

Adult Cardiac Arrest: 1mg (1:10,000) IV/IO
Pediatric Cardiac Arrest: 0.01 mg/kg (1:10,000) IV/IO

Adult Allergic Reaction: 0.3 mg (1:1000) IM
Pediatric Allergic Reaction: 0.15 (1:1000) IM

Typical initial IV Infusion rate: 0.1 - 1 mcg/min - Titrate to effect
(To mix the infusion add 1mg of Epi 1:1000 to a 500 ml bag of D5W to yield a 2mcg/ml concentration)

Onset and Duration

Onset: Immediate
Duration: Minutes

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Furosemide

Lasix

Class

Loop Diuretic

Action

Rapid acting potent diuretic and antihypertensive that inhibits sodium reabsorption in the proximal tubule and loop of Henle. Its vasodilating effects reduce venous return and cardiac workload

Indications

CHF and Pulmonary edema

Contraindications

Hypovolemia / Hypotension / dehydration / Electrolyte imbalance

Dosage

40-120 mg slow IV/IO
Peds 1mg/kg slow IV/IO

Onset and Duration

Onset: 5 minutes
Duration: 4-6 hours

There is controversy regarding the use of Lasix in acute pulmonary edema in the prehospital setting, and use is not recommended at this time. Lasix has been widely used in the treatment of CHF and acute pulmonary edema despite limited studies on its effectiveness. Since pulmonary edema is more commonly a problem of volume distribution than overload, administration of furosemide provides no immediate benefit for most patients. There are potential risks of hypokalemia, arrhythmias and increased systemic vascular resistance through enhancement of the Renin Angiotensin System, all of which may be deleterious to the acute CHF patient. Misdiagnosis of CHF and subsequent inducement of inappropriate diuresis can lead to increased morbidity and mortality in patients

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Glucagon
ClucaGen

Class

Hormone

Action

Natural polypeptide hormone produced by alpha cells of the pancreas that breakdown stored glycogen to glucose increasing blood levels of glucose

Unknown mechanism of stabilizing cardiac rhythm in beta blocker overdose

Indications

Increase sugar levels in documented hypoglycemia without IV access

Contraindications

Hypersensitivity

WARNING: Nausea and vomiting are common adverse effects following the administration of glucagon

Dosage

1 mg IM/SC may repeat q 5-20 min
Peds dose 0.03-0.1 mg/kg/dose IM/SC q 20 min (max dose 1.0 mg)

Onset and Duration

Onset: 1 minute
Duration: 5-20 minutes

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Ipratropium
Atrovent

Class

Anticholinergic, Bronchodilator

Action

Anticholinergic (parasympatholytic) agent; inhibits vagally mediated reflexes by antagonizing acetylcholine action; prevents increase in intracellular calcium concentration that is caused by interaction of acetylcholine with muscarinic receptors on bronchial smooth muscle

Indications

For the management of asthma and COPD

Contraindications

Hypersensitivity to ipratropium, atropine, peanuts or derivatives

Dosage

Adult and Pediatric: 250-500 mcg nebulized every 20 min up to 3 times

Onset and Duration

Onset: 1-3 minutes
Duration: 4-6 hours

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Ketoralac
Toradal

Class

Non-steroidal anti-inflammatory drug (NSAID)

Action

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 acute 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

Dosage

Adults: 30-60 mg IM
Pediatrics: Not Recommended

Onset and Duration

Onset: 10 minutes
Duration: 2 - 6 hours

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Lidocaine (Xylocaine)

Class

Class 1b Anti-arrhythmic, local anesthetic

Action

Class 1b antidysrhythmic; combines with fast sodium channels and thereby inhibits recovery after repolarization, resulting in decreasing myocardial excitability and conduction velocity

Lidocaine depresses depolarization and automaticity in the ventricles but has very little effect on the atria.

Indications

For the management of refractory or recurrent ventricular fibrillation or pulseless VT

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

Dosage

Adult:
0.5-1.5 mg/kg IV/IO Max total dose 3mg/kg

Pediatrics:
1 mg/kg IV/IO max total dose 3mg/kg

EZ IO Pain dose: Adult 40mg and Pediatrics 0.5 mg/kg (max 40mg)
Administer over 2 minutes and let dwell in space for 60 seconds

Onset and Duration

Onset: 1-5 Minutes
Duration: Variable

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Magnesium sulfate

MgSO4

Class

Class V antidysrhythmic, electrolyte, Smooth Muscle Relaxant

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 patient

Contraindications

Hypersensitivity, myocardial damage, diabetic coma, heart block, hypermagnesemia, hypercalcemia

Dosage (10% Solution)

Adult:
Seizure 1-4 g over 3 minutes
Cardiac Arrest or Status Asmaticus 1-2 g over 5 - 20 minutes

Pediatric:
Cardiac Arrest or Status Asmaticus 25-50 mg/kg over 10-30 minutes

Dosage

Onset: Seconds Duration: 30 minutes

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Methylprednisolone
Solu-Medrol

Class

Corticosteroid

Action

Intermediate-acting synthetic adrenal Corticosteroid that suppresses acute and chronic inflammation; potentiates vascular smooth muscle relaxation

Indications

For the management of acute bronchospastic disease as well as for adrenal insufficiency

Contraindications

Untreated serious infections, documented hypersensitivity, traumatic brain injury (high doses)

Dosage

125-250 mg IV/IO/IM
Peds dose 1-2 mg/kg/dose IV/IO/IM

Onset and Duration

Onset: 1-2 hours
Duration: 8-24 hours

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Morphine Sulfate

Roxanol

Class

Opioid Analgesic

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
Head injury (increased ICP)
Hypovolemia, hypotension
Depressed respiratory drive

Dosage

Adult: 1-5 mg IV/IO
Pediatrics 0.1 – 0.2 mg/kg IV/IO

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Nitroglycerin (NTG) (Nitrostat)

Class

Nitrate

Action

Peripheral vasodilation (and coronary arteries in high doses), decreases preload and afterload, workload of the heart, and decreases myocardial oxygen demand.

Indications

Chest pain associated with AMI
Pulmonary edema

Contraindications

Hypersensitivity to nitrates
Hypovolemia, hypotension (<90),
Head injury, cerebral hemorrhage
Bradycardia or tachycardia
Erectile dysfunction medications within the last 24-48 hours

Dosage

Tablet: 0.4 mg SL q 5 minutes up to 3 doses

Metered spray: 0.4 mg (1 spray) q 5 minutes up to 3 doses

Infusion: 10-20 mcg/min (starting) then titrated to effect

Onset and Duration

Onset: 1-3 minutes
Duration: SL 20-30 minutes and IV 1-10 minutes

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Nitrostat is a smooth muscle relaxant used in the treatment of angina. By increasing the coronary blood flow and perfusing ischemic myocardium, it reverses the effects of angina.

Pain relief usually occurs within 1-2 minutes, and lasts up to 30 minutes.

Do not give to patients who are hypotensive or who have ICP. Do not give to patients in shock.

Head ache is common side effect from dilation of the cerebral vessels.

Nitro deteriorates quite rapidly once the bottle is opened. Also, should be protected from light.

Always monitor blood pressure and other vital signs when giving nitro.

Patients who have recently ingested alcohol might experience severe hypotension.

Sublingual route is preferred in the pre-hospital setting. Careful not to swallow.

Nitro paste is used in patients who require long duration of action, and can be made to be absorbed in various dosages.

Spray delivers 0.4 mg per spray. Each aerosol container contains 200 doses. Should be sprayed under tongue – up to 3 doses over 25 minutes.

Infusion Information

Nitroglycerin infusions will always be delivered via an infusion pump.

PVC tubing will absorb some of the nitroglycerin.

Non-PVC tubing is more rigid than traditional PVC tubing this may result in the infusion pump not adequately occluding the tubing.

Nitroglycerin Infusions are typically started at 10 to 20 mcg/min then titrated to affect.

Initially you should titrate starting at 5mcg/min every 5 minutes if not response is seen at 20mcg/min that increase by increments of 10mcg/min.

Monitor blood pressure carefully and adjust as necessary.

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Norepinephrine
Levophed

Class

Alpha/beta adrenergic agonist

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

As a pressor agent used in the management of shock

Contraindications

Hypersensitivity, hypotension due to blood volume deficit, peripheral vascular thrombosis (except for lifesaving procedures)

WARNING: Norepinephrine is a vesicant and can cause severe tissue damage if extravasation occurs. Do not use in the same IV line as alkaline solutions as these may deactivate it

Dosage

Adult: 0.1-0.5 mcg/kg/min titrated to response
Pediatrics: 0.1-0.2 titrated to patient response

Dilute 4 mg in 250 ml of D5W for a concentration of 16 mcg/ml

Onset and Duration

Onset: 1-3 Minutes
Duration: 5-10 minutes only lasts for 1 minute after infusion stopped.

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Oral Glucose
Insta-Glucose

Class

Carbohydrate

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

Dosage

Adult and Pediatrics: 5-45 grams PO

Onset and Duration

Onset: 10 minutes
Duration: Variable

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Sodium Bicarbonate

Class

Systemic hydrogen ion buffer, alkalizing agent

Action

Increases blood and urinary pH by releasing a bicarbonate ion, which in turn neutralizes hydrogen ion concentrations

Indications

For the management of cardiac arrest in cases in which either hyperkalemia or tricyclic antidepressant (TCA) overdose are suspected as contributory, QRS prolongation in known or suspected TCA overdose

Contraindications

Documented hypersensitivity, severe pulmonary edema, known alkalosis, hypernatremia, or hypocalcemia

Dosage

Adult and Pediatrics: Using an 8.4% solution
1mEq/kg IV, repeat with 0.5 mEq/kg q 10 min

Dilute to 4.2% in small children

Dosage

Onset: Seconds
Duration: 10 minutes

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Tranexamic Acid (TXA) Cyklocapron

Class

Antifibrinolytic agent

Action

Prevents plasminogen activators from binding to a clot, thus blocking plasminogen conversion to plasmin, preventing fibrinolysis

Indications

Significant hemorrhage with prolonged transport or extrication times

Contraindications

Subarachnoid hemorrhage
Increased mortality if given greater than 3 hours from initial injury

Dosage

Adults:
1 gram in 100ml of NS, infused over 10 minutes.
Then 1 gram in 500ml of NS infused over 8 hours.
Pediatrics:
Not Recommended

Onset and Duration

N/A

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