Rice County Drug Formulary
Emergency Medical Services

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Adenocard/Adenosine

Class

An endogenous nucleoside

Effect

1. Slows conduction time through the AV node and other atrial tissue
2. Possibly by slowing phase 0 of the action potential
3. Creates a bi-directional block in the slow-conducting region of tissue involved in reentrant rhythms thus terminating reentrant rhythms

Uses

PSVT, SVT including WPW

Dosages

Initial Dose: 6mg fast IVP (within 1-2 seconds) followed immediately with 10-20cc saline flush
Subsequent Doses: 2nd/3rd dose of 12mg delivered as above
Max Dose: 30mg

Side Effects

Palpitations, Chest Pain, Hypotension, Dizziness, Paresthesia in arms, Nausea/Vomiting, Dysrhythmia including heart blocks, bradycardia and asystole.

Contraindications

Second or Third Degree AV Block
Other bradycardia's
Sick Sinus Syndrome
Hypersensitivity

Precautions

1. Administer in large vein at most proximal IV port
2. Arrhythmias upon conversion of SVT are very common and usually transient.
3. Antagonized by methylxanthines such as caffeine and theophylline
4. Actions may be inhibited by patients on certain breathing medications, particularly aerosols.
5. Potentiated by dipyridamole
6. Administer with caution in asthma patients.
7. A-fib and A-flutter will be refractory to adenocard
8. Pregnancy risk category: C

Antidote

Treat Symptomatically
Due to extremely short half-life, no antidote is usually required.

Albuterol/Proventil

Class

Beta II agonist

Effect

1. Relaxes smooth muscle of the bronchi, uterus and vascular supply to skeletal muscle
2. Does not pass the blood-brain barrier
3. Increases cyclic AMP levels which are associated with relaxation of bronchial smooth muscle and inhibition of release of mediators from mast cells.

Uses

Bronchial Asthma
Reversible bronchospasm associated with bronchitis and emphysema

Dosage

Adult: 2.5 mg in 3cc NS (0.083% solution) prn every 5 min as needed
Pediatric: 1.75-2.5mg of above solution prn every 5 min as needed

Side Effects:

Tremor, Dizziness, Nervousness, Headache, Insomnia, Tachycardia, HTN, pharyngitis, nasal congestion, nausea, dyspepsia, bronchospasm, cough, bronchitis, wheezing.

Contraindications

Hypersensitivity

Precautions

1. Extreme caution in warranted in patients with cardiovascular disorders, especially coronary insufficiency, arrhythmias and HTN. Use caution if PMH of seizures, hyperthyroidism or diabetes.
2. Do not give at same time of administration of aerosol bronchodilators or epi
3. Use caution if pt is on MAO inhibitors or tricyclic antidepressants
4. Beta-Blocking agents and albuterol may inhibit the effect of each other
5. Pregnancy risk category: C

Antidote

Beta Blockers, be aware of the potential of inducing an asthma attack
Discontinue nebulization
Supportive care treating symptomatically
Avoid sympathomimetics

Amiodarone

Class

Class III Antiarrhythmic

Effect

1. Prolongs Phase 3 of the Action Potential
2. Increases refractory period via sodium and potassium channel effects and slows intracardiac conduction of the cardiac action potential via sodium channel effects
3. Multichannel blocker-Sodium, potassium, calcium channel, noncompetitive Alpha/Beta-Blocker

Uses

Ventricular tachyarrhythmia's including: V-tach and V-Fib

Stable irregular narrow complex tachycardias such as uncontrolled A-Fib with stable BP.

Dosages

Adult Ventricular arrhythmias: Initial bolus of 300mg can be given via IV/IO push with a repeat dose of 150mg after 5 minutes if needed .

Adult Irregular Narrow Complex Tachycardia: Initial dose of 150mg to be administered over 10 minutes. May repeat once if needed. If successfully converted: Administer 1mg/min infused for first six hours.

Pediatric: Initial bolus of 5mg/kg via IV/IO push up to adult dose of 300mg. May be repeated x2 every 5 minutes as needed at 5mg/kg via IV/IO push.

Maintenance Infusion for Post-Arrest: 0.75mg/minute. Accomplish this by mixing 900mg into 500cc NS IV and using 60gtt set, run at 25gtt/min. CONSULT PHYSICIAN FOR PEDIATRIC INFUSIONS.

****NOTE: AEMT's may not administer/monitor maintenance infusions of Amiodarone**

Side Effects:

Interstitial lung disease, hypo/hyperthyroidism, increased liver enzymes, epididymitis, gynecomastia, bluish/grey (dusking) skin.

Contraindications

No contraindications for pulseless arrest patients who are in V-fib or V-Tach.

Allergic/hypersensitivity to Amiodarone

Bradycardias, 2nd Degree and 3rd Degree AV blocks

Neonates

Precautions

Use caution with perfusing arrhythmias in patients with CHF.

Antidote

Stop infusion and treat symptomatically

Aspirin (ASA)

Class

acetylsalicylic acid
Nonsteriodal anti-inflammatory (NSAID)

Effect

1. Analgesic by decreasing sensitivity of peripheral pain receptors, inhibiting the conversion of arachidonic acid and prostaglandins.
2. May interfere with transmission of pain impulses at subcortical brain centers
3. Anti-inflammatory by decreasing capillary permeability
4. Reduces leakage of fluid into surrounding tissues
5. Antipyresis
6. Decreased Platelet aggregation
7. Inhibition of prothrombin formation

Uses

Prophylaxis of thromboembolic complications such as acute chest pain of a cardiac nature.
Analgesic for pain associated with inflammatory states
Fevers
Treatment of inflammatory conditions such as arthritis

Dosages

81-324mg for chest pain associated with suspected cardiac nature.
325-650mg for generalized pain

Side Effects

Gastric distress, heartburn, nausea, wheezing, bleeding problems, GI Bleed, Reye's Syndrome in Children.

Contraindications

Hypersensitivity
Severe GI disorders
Severe anemia or hemophilia
3rd trimester pregnancy

Precautions

Generalized anemia or PMH of bleeding disorders such as GI bleed
Asthma Patients
Pregnancy Risk Category: C, D in third trimester

Antidote

Activated Charcoal and possibly gastric lavage in Emergency Room

Atropine

Class

Anticholinergic also referred to as a parasympatholytic or an antimuscarinic

Effect

Competitive antagonist of acetylcholine at muscarinic receptor sites
Increases heart rate in therapeutic doses

Uses

Symptomatic pulsatile bradycardia
Bradycardic heart blocks with exception to 3rd degree heart block
Organophosphate poisoning

- **D -** Defecation/Diarrhea
- **U -** Urination/Incontinence
- **M -** Miosis (Pupil constriction)
- **B -** Bradycardia, Bronchospasm
- **E -** Emesis (Vomiting)
- **L -** Lacrimation (Eye Watering)
- **S -** Salivation, Seizures, Sweating

Dosages

Adult Symptomatic Pulsatile Bradycardia: 0.5 mg every 3-5 minutes to a max of 3mg
Pediatric Symptomatic Pulsatile Bradycardia: 0.02mg/kg every 3-5 minutes to max of 0.5mg
Organophosphate Poisoning: 2mg every 5 minutes as needed with no max dose.

Side Effects

Dry mouth, pupil dilation, flushed skin, tachycardia, hypertension, blurred vision

Contraindications

Tachycardia
CHF
Hypersensitivity
Relatively contraindicated in 3rd degree heart blocks

Precautions

Still may be considered by some in use of Asystole/PEA as this is old ACLS recommendation
May cause bradycardia (paradoxically) by administering too slowly
Decreases secretion of insulin
Antihistamines, nitrates, antiarrhythmics and tricyclic's may increase side effects

Antidote

Physostigimine

Dextrose

Class

Carbohydrate

Effect

Provides a source of glucose for metabolism, thus increasing blood sugar levels

Uses

Hypoglycemia (Blood sugar less than 60 with signs and symptoms)
Seizures, Unconscious/Unknown patients with known history of diabetes who is absolutely or relatively hypoglycemic

Dosages

Adult: 25 g of 50% solution - IV Slow push through large bore IV
Pediatric: 12.5 g of 25% solution - IV slow push through large bore IV (relative to age/size)
Accomplish 25% solution by wasting 12.5 g (25cc) of 50% solution Dextrose and draw up/mix 25cc of NS.

Side Effects

Hyperglycemia, Hypokalemia, Tissue necrosis if infiltration occurs, phlebitis

Contraindications

Known or possible intracranial bleed
DKA
Delirium Tremens, Wernicke's Syndrome, Korsakoff's Syndrome

Precautions

Administer slowly in large bore IV
Do not give via IM and stop immediately if infiltration occurs
Flush vein well following administration
If pt is chronic alcoholic, Thiamin should also be administered.

Antidote

Insulin

Diphenhydramine (Benadryl)

Class

Antihistamine

Effect

Opposes the action of histamine on the capillary bed by binding with histamine receptor sites
May inhibit MAST cell damage preventing more histamine release
Has associated sedative effects
Has anticholinergic effect thus drying secretions and mucous membranes

Uses

Allergic Reactions
Anaphylaxis given with Epi
Antidote for phenothiazine extrapyramidal side effects
Sedation

Dosages

Adult Dose: 10-50 mg via IV/IO or IM
Pediatric Dose: 1.0-2.0 mg/kg via IV/IO slow push over 5 minutes

Side Effects

Sedation, Thickened bronchial secretions, vertigo, disturbed coordination, confusion, headache, hypotension, palpitations, tachycardia, photosensitivity, nausea/vomiting

Contraindications

Newborn or premature infants
Nursing mothers
Patients on MAO inhibitors
Hypersensitivity

Precautions

Can increase effects of epinephrine
Has additive effects with other CNS depressants
May cause paradoxical excitation in children
Causes thickening bronchial secretions in pt's with asthma
Potentiates the effects of anticholinergic drugs
Incompatible with several drugs and should not be mixed when giving IV
Use caution in patients with history of: Bronchial asthma, Hyperthyroidism, Increased intraocular pressure, cardiovascular disease, HTN, lower respiratory disease

Antidote

Vasopressors for hypotension

Dobutamine

Class

Sympathomimetic

Effect

Beta 1 stimulant

Produces positive inotropic and some dromotropic effects increasing cardiac output

- Has minimal effect on heart rate
- Has minimal effect on Alpha and Beta 2 receptors
- Has no effect on dopaminergic receptors

Uses

CHF

Cardiogenic Shock (When increased heart rate is not wanted)

Dosages

Pediatric and Adult: 2.5-20.0 mcg/kg/min via IV Drip

- Titrate to hemodynamic effect
  - Reported that doses as high as 40.0 mcg/kg/min has been needed to achieve hemodynamic stability.

Side Effects

Mild increase in heart rate, mild hypotension, increase in ventricular ectopy, dyspnea, tachycardia, HTN, Anginal Pain

Contraindications

Hypersensitivity

Idiopathic hypertrophic sub-aortic stenosis

Precautions

Monitor heart rate and blood pressure continuously to prevent adverse reactions.

Dobutamine is ineffective in the presence of beta-blockers

Presser effects of Dobutamine can be enhanced with concomitant use of MAO inhibitors, tricyclic antidepressants, and other sympathomimetic medications.

Use in hypovolemic states only after adequate fluid resuscitation

Has no effect on dopaminergic receptors

Antidote

Discontinue or reduce infusion rate

Do not use beta blockers due to Dobutamine short half-life

Dopamine

Class

Sympathomimetic

Effect

Dopaminergic - Vascular dilation in renal, coronary and mesenteric arteries.

Beta - Positive inotropic and dromotropic effects on the myocardium with little chronotropic effects leading to minimal increase in myocardial oxygen consumption.

Alpha 1 - Vasoconstriction everywhere Alpha 1 receptors are present except in skeletal muscles

Alpha 2- Stimulation leads to effects of sympathetic nervous system by release of norepinephrine from presynaptic nerve endings.

Uses

Hemodynamic imbalance associated with cardiogenic shock including cardiac arrest.
Renal Failure
Shocks where vasopressors are indicated
Bradycardia

Dosages

Dopaminergic Effects - 1.0-2.0 mcg/kg/min
Dopaminergic/Beta Effects - 5.0-10.0 mcg/kg/min
Beta/Alpha Effects - 10.0-20.0 mcg/kg/min
For cardiac/unstable hemodynamics: Start at 5.0 mcg/kg/min and titrate to effect.
Pediatric dosing is same as adult.

Side Effects

Palpitations, Tachycardia, Hypotension, Dyspnea, HTN, Decreased Urinary Output

Contraindications

Ventricular arrhythmias
Pheochromocytoma

Precautions

Monitor BP continuously

Presser effects may be potentiated by MAO inhibitors, tricyclic antidepressants, sympathomimetics.

Concomitant use of phenytoin and dopamine may cause hypotension, bradycardia and seizures

Antidote

Stop infusion
Beta-Blockers or Alpha-adrenergic blockers
Haldol is a competitive antagonist of the dopaminergic receptors

Epinephrine

Class

Sympathomimetic agent, vasoconstrictor

Effect

Alpha - Peripheral vasoconstriction

Beta - Increases heart rate, myocardial contractility, stroke volume, cardiac output, increases automaticity of pacemaker cells producing atrial and ventricular irritability. Increases conduction velocity of the AV node, Bundle of His, Bundle Branches, and Perkinje Fibers. Relaxes respiratory bronchioles relieving bronchospasm. Increases excitability of myocardial cell membrane to the electrical stimulus. Decreases chemical mediator release (histamine, SRS-A, bradykinin, serotonin) during anaphylactic reaction.

Enhances CPR during cardiac arrest by vasoconstricting, which raises coronary artery perfusion pressure as well as inotropic effect on the myocardium.
Lowers the ventricular fibrillation threshold

Uses

Cardiac Arrest
Anaphylaxis
Asthma
Bradycardia
Hypotension

Dosage

Cardiac Arrest:

Adult- 1.0mg via IV, IO or ET every 3-5 minutes (No max)
Ped Initial Dose- 0.01mg/kg (1:10,000) via IV or IO **OR** 0.1 mg (1:1,000) via ET
Ped Subsequent Dose - 0.1mg/kg via IV/IO (1:1,000)

Anaphylaxis/Asthma:

Adult- 0.3-0.5mg (1:1,000) via SQ **OR** 0.3-0.5mg (1:10,000) via IV for severe cases
Peds- 0.01mg/kg (1:1,000) SC or 0.01mg/kg (1:10,000) via IV for severe cases to max of 0.5mg

Bradycardia refractory to first line therapy

Adult- 1.0-10.0mcg/min titrated to effect without creating exaggerated tachycardia
Peds- 0.01mg/kg (1:10,000) via IV or IO

Epinephrine (continued)

Dosage (con't)

Hypotension

Adult- 1.0-10.0mcg/min titrated to effect without creating exaggerated tachycardia

Peds- 0.1-1.0 mcg/kg/min via IV or IO titrated to effect without creating exaggerated tachycardia.

Side Effects

Palpitations, nervousness, anxiety, nausea, sweating, hypertension, anginal pain, tachycardia, pulmonary edema, CVA

Contraindications

Hypertension
Narrow-angle glaucoma
Labor

Precautions

May be potentiated by other sympathomimetic agents, tricyclic antidepressants, MAO inhibitors and/or antihistamines.
May produce toxic effects when used concomitantly with digitalis, Isuprel, and Inderal
May produce hyperglycemia
Caution with pregnancy: decreases placental blood flow and may cause fetal distress
Sensitive to light and extreme temperatures

Antidote

Treat symptomatically and provide supportive care.
Half life is usually short and no intervention is usually required.

Fentanyl Citrate

Class

Opiate Agonist

Effect

Alters the patient's pain perception of pain and acts as an analgesic by stimulating opiate receptor sites.

Uses

Pain relief in patients experiencing extreme pain due to burns, musculoskeletal injuries or other cases where pain relief is needed.
Cardiac chest pain where Morphine is contraindicated.

Dosage

Adult- 25mcg via slow IVP every 5 minutes as needed to max of 100mcg

OR

50mcg via IN (MAD) with half dose given per nostril. May repeat x1 in 5 minutes to max of 100mcg.

Peds- 0.5mcg/kg via slow IVP up to 25mcg

OR

1.0mcg/kg via IN (MAD) with half dose given per nostril. Max of 25mcg. May consider repeating with physician order.

Side Effects

Decreased respiratory drive, hypotension, myocardial depression

Contraindications

Trauma- (Head, spinal, thoracic/abdominal, other significant trauma such as multi-systems) with exception of burns without inhalation injury.
System- Respiratory distress/compromise (COPD/asthma), Cardiac dysrhythmias, altered LOC, Third trimester pregnancy, hypotension/suspected shock, Age less than 12 months old.
Drugs - Drug/ETOH intoxication, hypersensitivity, allergy to opiates/Fentanyl

Precautions

Can cause decreased respiratory drive so SpO2 and respiration status should be monitored closely.
Hypotension and cardiac depression may occur so vitals should be monitored closely.

Antidote

Narcan: 2mg via IVP

Furosemide (Lasix)

Class

Loop Diuretic

Effects

Peripheral vasodilator producing venous pooling
Maintains renal medullary peritubular capillary blood flow
Inhibits reabsorption of sodium and chloride in proximal and distal tubules and the Loop of Henle

Uses

CHF, Acute Pulmonary Edema, Acute Cerebral Edema, Acute Renal Failure, Stimulate urinary output in shock states following adequate volume replacement, fluid overload, HTN

Dosages

20-80mg slow IVP

Side Effects

Electrolyte imbalance
Hyperchloremic acidosis
HTN

Contraindications

None known

Precautions

EKG and Vital Signs should be closely monitored
Reassess lung sounds frequently

Antidote

Fluid therapy
Treat symptomatically

Glucagon

Class

Naturally occurring hormone

Effect

Increases blood sugar levels
Stimulates lipolysis
Catabolizes proteins
Large amounts of glucagon exert a positive cardiotonic effect

Uses

Hypoglycemia
Sometimes used in hospital settings as an antidote for Beta-Blocker overdose

Dosage

Adult- 1.0mg via IM in large muscle
Peds- >6y/o give 1.0mg via IM in large muscle
<6y/o give 0.5mg via IM in large muscle

Side Effects

Nausea, vomiting, hyperglycemia, hypokalemia, dysrhythmias

Contraindications

Pheochromocytoma, hypersensitivity

Precautions

Patients who are IDDM will not respond quickly to glucagon and you must allow time for the medication to work.
May potentiate action of oral anticoagulants

Antidote

Insulin

Lidocaine

Class

Class 1 antiarrhythmic

Effect

Depresses the automaticity of the ventricular pacemaker
Abolishment of PVC's by action above
Elevates ventricular threshold
Abolishment of re-entrant ventricular arrhythmias by reducing non-uniformity of repolarization in the Perkinje Fibers
Increases electrical stimulation threshold of the ventricles during diastole
Local anesthetic effects

Uses

Ventricular arrhythmia's secondary to ischemia if supraventricular rate is above 60
Unifocal PVC's (6-8/min), Multifocal PVC's, R on T phenomenon, Couplet PVC's, Salvos, Bigeminy, V-Tach, V-Fib
Prophylactically in AMI

Dosage

Adult/Ped- V-Fib/V-Tach: 1.0-1.5mg/kg may repeat to max of 3mg/kg
Suppression of Ectopy: 1.0mg/kg followed by infusion of 2mg/min
Maintenance Infusion: 2-4mg/min for ROSC who where converted using Lidocain

Side Effects

Confusion, tremors, lethargy, slurred speech, muscle twitching, convulsion, hypotension, seizures, bradycardia, further arrhythmias, tinnitus, vision disturbances, anaphylaxis, diaphoresis, sensation of cold.

Contraindications

Hypersensitivity, Stokes-Adams Syndrome, Wolff-Parkinson-White Syndrome, Severe heart blocks, bradycardia involving ventricular escape rhythms

Precautions

Those with CHF, liver disease, low cardiac output states and diseased or abnormal sinus node.
Monitor EKG and Vitals closely

Antidote

Discontinue administration
Treat seizures with anticonvulsants

Magnesium

Class

Electrolyte

Effect

Decreases release of acetylcholine from motor nerve endings
Increases magnesium levels

Uses

Seizures associated with eclampsia
Seizure prevention in patients with eclampsia/pre-eclampsia
Torsade's
V-Fib refractory to other treatment
Refractory V-fib that has been associated with low magnesium levels

Dosages

Ventricular dysrhythmias and eclampsia

1.0-4.0g of a 10% solution over 3 minutes via IV/IO or IM

Pre-Eclampsia

6g over 20 minutes, then 2g/hr until contractions are less than once every 10 minutes, then reduce to 1g/hr.

Side Effects

Drowsiness, depressed reflexes, hypotension, respiratory depression, heart blocks

Contraindications

Heart Block, Renal Failure, Recent MI

Precautions

Magnesium toxicity evidenced by decreased reflexes

Antidote

Calcium

Metoprolol

Class

Antihypertensive, anti-anginal, beta blocker

Action

Lowers B/P by effect of Beta Blocker
Reduces elevated renin plasma levels
Blocks Beta 2 adrenergic receptors in bronchial, vascular smooth muscle only at high doses.

Uses

Mild to moderate hypertension
Acute MI to reduce cardiovascular mortality
Angina Pectoris

Dosages

Myocardial Infarction: 5mg IV slow push every 5 min x 3 doses if HR is >110 or BP >150.

Side Effects

Hypotension, bradycardia, CHF, Palpitations, dysrhythmias, cardiac arrest, AV block, Pulmonary Edema, Chest Pain.

Contraindications

Hypersensitivity to beta blockers, cardiogenic shock, heart block (2nd/3rd degree), Sinus bradycardia, bronchial asthma.

Precautions

Pregnancy Risk Category: C, major surgery, lactation, Diabetes, renal/hepatic disease, thyroid disease, COPD, GAD, non-allergic bronchospasm, CHF, geriatric.

Antidote

Non listed, treat symptomatically.

Morphine Sulfate

Class

Schedule II analgesic/Opium derivative

Effect

Combination of actions on CNS, some are stimulating and some are depressant.

Depresses respiratory, cough, and vasomotor center in medulla

Pain and anxiety are relieved by central effect which raises pain threshold, produces euphoria and sedation

Stimulates the vomiting center of the medulla

Stimulates the parasympathetic nervous system resulting in decreased peripheral resistance, increased venous capacitance, venous pooling and decreased venous return to the "right" side of heart.

Constricts respiratory bronchioles but has no effect on pulmonary vascular resistance

May decrease heart rate and myocardial oxygen consumption

Uses

To relieve severe pain such as in AMI, Burns and isolated trauma

CHF and Acute pulmonary edema to relieve anxiety and produce euphoria, to decrease respiratory rate and decrease venous return

Dosages

Adult Dose: 2-10 mg IVP in small increments every 3-4 minutes titrated to effect as long as BP remains >100

Pediatric Dose: 0.1 mg/kg IV slowly or IM (Avoid IM if patient is hypotensive or in shock)

Side Effects

Sedation, euphoria, hypotension, nausea/vomiting, somnolence, convulsions with large doses, bradycardia, respiratory depression.

Contraindications

Hypersensitivity, acute bronchial asthma, upper airway obstruction

Precautions

Monitor EKG, Vitals, and LOC

Extreme caution in patients with COPD and Cor Pulmonle

Correct volume depletion or hypotension before administering it

Use caution in those with bradycardia, heart blocks, pregnancy, possible head injury, intracranial lesions, hypoxia, respiratory depression, hypercapnia, cardiac dysrhythmia

Antidote

Narcan 2.0mg

Naloxone (Narcan)

Class

Narcotic antagonist

Effect

Reverses effects of narcotics by competing for receptor sites
May precipitate withdrawal symptoms in patients dependent on narcotics

Uses

Drug of choice when nature of depressant drug is not known
To reverse effect of narcotic overdose and undesirable side effects of narcotics including: Heroin, Morphine, Meperidine, Codeine, Lomotil, Diluadid, Fentanyl Citrate, Levorphanol, Percodan, talwin, Darvon, Methadone, Nisentil
Coma of unknown cause
Treatment of respiratory depression caused by opiate partial agonists

Doses

Adult Dose: 0.4-2.0 mg IV, ET, IM or SQ fast push
Pediatric Dose: 0.1 mg/kg via IV, ET, IM or SQ fast push

Side Effects

Nausea/Vomiting, Hyperventilation, Hypertension, tachycardia, tremors, acute narcotic withdrawal which are associated with too rapid of narcotic reversal.

Contraindications

Hypersensitivity

Precautions

Combativeness in cases of withdrawal,
Narcan produces no effects of its own
Pregnancy risk category: B

Antidote

None required

Nitroglycerine

Class

Nitrate vasodilator

Effect

Relaxes vascular smooth muscle resulting in dilation of both arterial and venous beds including: Coronary artery, capillary vessels, and large veins which promotes peripheral pooling of blood and decreases venous return to the heart, reducing L ventricular and diastolic pressure (preload).
Reduces cardiac consumption and demand
Reduces infarction size by reducing preload

Uses

Relieves pain of angina pectoris, severe hypertension, refractory CHF, relief of smooth muscle spasm, dissecting aortic aneurysm.

Dosages

Sublingual - 0.4mg which may be repeated every 5 minutes to a total of 3 doses
Transdermal - 1" applied to L anterior chest

Side Effects

Headache, flushing, dizziness, palpitations, SL burning, orthostatic hypotension, circulatory collapse.

Contraindications

Hypersensitivity to nitrates
Severe anemia
Hypotension (Systolic BP <100)
increased intracranial pressure

Precautions

NTG is sensitive to the environment and should be kept at a stable temp and kept in it's dark brown bottle out of direct sunlight.
Monitor Vitals and BP frequently and assure BP is >100 before each dose given
If tablet does not have bitter taste or lacks the burning sensation the tablet may be outdated
If blurred vision or dry mouth occurs, consider discontinuing or contact medical control.
Use extreme caution if pt is taking other antihypertensive drugs or ED drugs.

Antidote

Trendelenburg position
Fluid bolus

Normal Saline

Class

Electrolyte Solution

Effect

Increases blood pressure by increasing the amount of fluid in the vasculature
Provides a way to inject medications by means of IV/IO

Uses

Patients who are or at risk of becoming hypotensive
Patients who are in need or has a potential of needing IV medication

Dosages

Protocol dependent
Usually administered at a minimum of TKO/KVO ("To keep open"/"Keep vein open")
For volume expansion: Titrate to BP of >100 or adequate BP to situation

Side Effects

Hypertension, pulmonary hypertension, fluid induced anemia

Contraindications

None

Precautions

Use with caution in patients with: CHF, Pulmonary edema, HTN, pediatrics, geriatrics
Lung sounds and BP should be monitored frequently when administering bolus's

Antidote

None - Stop/slow infusion

Promethazine (Phenergan)

Class

Antihistamine, H1 receptor antagonist.

Effect:

Acts on blood vessels, GI, respiratory system by competing with histamine for H1 receptor site
Decreases allergic response by blocking histamine.

Uses

Motion sickness, rhinitis, allergy symptoms, sedation, nausea

Doses

Adult - 12.5mg-25mg via IM, IV/IO
Ped - 0.25-0.5mg/kg via IM, IV/IO

Side Effects

Dizziness, drowsiness, poor coordination, fatigue, anxiety, hypotension, tachycardia, wheezing, chest tightness, rash, blurred vision, dilated pupils, tinnitus

Contraindications

Hypersensitivity to H1 receptor antagonist
Acute asthma attack
Lower respiratory tract disease

Precautions

Increased intraocular pressure, renal disease, cardiac disease, HTN, seizure disorder, peptic ulcers, hyperthyroidism, prosatic hypertrophy, bladder neck obstruction, pregnancy category C

Antidote

Treat symptomatically

Sodium Bicarbonate

Class

Electrolyte - Alkalinizing Agent

Effect

Reacts with hydrogen ions to form water and carbon dioxide to buffer metabolic acidosis
Shifts the oxyhemoglobin saturation curve, inhibiting the release of oxygen
Induces hyperosmolarity and hypernatremia
Produces paradoxical acidosis due to production of carbon dioxide, which is freely diffusible into myocardial and cerebral cells and may depress function

Uses

Severe acidosis
Cardiac arrest only after more definitive and substantiated interventions such as prompt defibrillation, effective CPR, airway management and hyperventilation with 100% oxygen and use of such drugs as epinephrine and Lidocain have been utilized.
Tricyclic antidepressant overdose
hyperkalemia

Doses

Cardiac arrest: 1mEq/kg IVP initially. Maximum of 0.5mEq/kg may be given for subsequent doses no less than every 10 minutes.
Tricyclic antidepressant overdose: 1-3 mEq/KG IV slow push
Pediatric Doses: Same as adult

Side Effects

Gastric distention, belching/flatulence, renal calculi/crystals, alkalosis, hypernatremia, hyperkalemia, hyperosmolarity.

Contraindications

None in emergency setting

Precautions

Monitor EKG, Vitals, and pulmonary functions. Do not mix with other drugs including epinephrine as it will inactivate the opposing drugs. Be sure to flush IV/IO well before administering. Use caution with those who have renal failure. Is not an antiarrhythmic. Will worsen intracellular acidosis, and cause cerebrospinal fluid/central venous acidosis during CPR and pt may require hyperventilation.

Antidote

None needed. Treat specific side effects.

Thiamine

Class

Vitamin (B1)

Effect

Acts as a coenzyme in carbohydrate metabolism
Prevention of beriberi and Wernicke's encephalopathy syndrome

Uses

Coma of unknown origin, especially if ETOH or malnourishment is suspected.
Delirium Tremens
Suspected Wernicke's or Korsakoff's Syndrome

Dosages

Adult Dose: 100mg IV/IM over 3 minutes if alcoholism is suspected
Pediatric Dose: 10-50mg IV or IM

Side Effects

Hypotension

Contraindications

Hypersensitivity

Precautions

Thiamine deficiency has been known to occur three weeks after total absence of dietary thiamine. Rapid administration of thiamine has been associated with hypotension. Pregnancy risk category A/C if dosage is greater than that the daily recommended daily allowance.

Antidote

None listed

Valium (Diazepam)

Class

benzodiazepines

Effect

Binds to a specific subunit on the $GABA_A$ receptor at a site that is distinct from the binding site of the endogenous GABA molecule. The $GABA_A$ receptor is an inhibitory channel which, when activated, decreases neuronal activity.
appears to act on areas of the limbic system, thalamus, and hypothalamus, inducing anxiolytic effects. Its actions are due to the enhancement of GABA activity. Benzodiazepine drugs including diazepam increase the inhibitory processes in the cerebral cortex.

Uses

Seizures, sedation, anxiety, and muscle spasms

Dosages

Adult Dose: 5-10mg via IV/IO
Pediatric Dose: 0.25mg/kg via IV/IO up to adult dose

Side Effects

Dizziness, Nausea, Impaired balance, impaired coordination, drowsiness, sedation, depression, and paradoxical tachycardia.

Contraindications

Ataxia, severe hypoventilation, hepatic and renal deficiencies, severe respiratory disorders, psychosis, hypersensitivity, allergic to Valium

Precautions

Use with caution in geriatric patients. Monitor EKG, vitals and respiratory status closely especially those who are hypotensive. Use caution with pregnancy as it may cross the placenta membrane causing "floppy infant syndrome".

Antidote

Flumazenil (Romazicon) 0.2mg via IV repeated every minute until pt awakes from sedation.

Verapamil

Class

Calcium channel blocker

Effect

Decreases the discharge of sinoatrial node.

Decreases AV nodal conduction while increasing AV nodal refractory period.

Decreases activity in spontaneously active fibers by reducing the slope of phase 4 of the action potential.

Produces vasodilation in most peripheral vascular beds and in coronary arteries of most patients who does not have atherosclerotic disease.

Reduces after load and myocardial contractility

Inhibits calcium ion influx through slow channels into conductile and contractile myocardial cells and vascular smooth muscle cells.

Uses

PSVT that does not require electrocardioversion

Atrial flutter and fibrillation with rapid ventricular response

Dosages

Adult Dose: 0.15mg/kg to max of 10mg IV/IO given over 1 minute. May repeat after 30 minutes with 0.15mg/kg up to an additional 10mg if initial dose has no response or not adequate.

Pediatric Dose: **0-1y/o** 0.1-0.2mg/kg via IV/IO not to exceed 5mg
May repeat x1 after 30 minutes

1-15y/o 0.1-0.3mg/kg via IV/IO not to exceed 5mg
May repeat x1 after 30 minutes

Side Effects

Dizziness, headache, hypotension, heart failure, bradycardia, AV block, ventricular asystole, peripheral edema, Nausea/Vomiting.

Contraindications

Concomitant IV Beta Blocker Administration, shock or severe hypotension, 2nd/3rd degree AV blocks, Sick sinus syndrome (unless pacemaker is placed), WPW, Severe heart failure unless precipitated by SVT, Ventricular tachycardia.

Precautions

If pt is on beta blockers, extreme caution in pregnancy, transient decrease in arterial pressure due to peripheral vasodilation.

Antidote

Treat symptoms, may consider calcium chloride.

Versed (Midazolam)

Class

Benzodiazepine

Effect

The therapeutic as well as adverse effects of midazolam are due to its effects on the $GABA_A$ receptors; midazolam does not activate $GABA_A$ receptors directly but, as with other benzodiazepines, it enhances the effect of the neurotransmitter GABA on the $GABA_A$ receptors resulting in neural inhibition. Almost all of the properties can be explained by the actions of benzodiazepines on GABAA receptors. This results in the following pharmacological properties being produced: sedation, hypnotic, anxiolytic, anterograde amnesia, muscle relaxation and anti-convulsant.

Uses

Seizures
Sedation

Dosages

All Ages: 0.2mg/kg given IN via MAD up to 10mg.
(May reference dosing chart in the "Procedures" section)

Side Effects

Sedation, apnea, respiratory distress, lethargy, loss of coordination, dizziness

Contraindications

Ataxia, severe hypoventilation, hepatic and renal deficiencies, severe respiratory disorders, psychosis, hypersensitivity, allergic to Valium

Precautions

Use with caution in geriatric patients. Monitor EKG, vitals and respiratory status closely especially those who are hypotensive. Use caution with pregnancy as it may cross the placenta membrane causing "floppy infant syndrome".

Antidote

Flumazenil (Romazicon) 0.2mg via IV repeated every minute until pt awakes from sedation.

Zofran (Ondansetron Hydrochloride)

Class

Antiemetic

Effects

Blocks serotonin, both peripherally on vagal nerve terminals and centrally in chemoreceptor trigger zone. Prevents nausea and vomiting.

Uses

General treatment of nausea and vomiting

Dosages

Adult Dose: 4mg IV/IO over 2-5 minutes. May repeat x1 if needed after 15 minutes.
Pediatric Dose: 0.1mg/kg via IV/IO over 2-5 minutes. May repeat x1 if needed after 15 minutes.

Side Effects

Headache, constipation, diarrhea, rash, bronchospasm

Contraindications

Pt has known allergic reaction or hypersensitivity.

Precautions

Flush line well before and after administration.

Antidote

None noted. Treat symptomatically.