SECTION 12: DRUG GUIDE

Acetylsalicylic acid (Aspirin/ASA) **Section 12:1**

Acetylsalicylic acid, the over the counter medication known as aspirin, is strongly recommended for use as an anticoagulant in the setting of myocardial infarctions.

Effects:

ASA inhibits the formation of thromboxane A2, which is a platelet aggregating and vasoconstricting prostaglandin. It will also inhibit the production of prostacyclin which is an antiaggregating and vasodilating prostaglandin. The overall effect will be to inhibit clot formation and vasoconstriction.

Platelet aggregation has been implicated in the pathogenesis of atherosclerosis, which in turn contributes to acute episodes of transient ischemic attacks, unstable angina and myocardial infarctions.

Indications:

Any acute coronary syndrome

Contraindications:

Contraindicated in patients allergic to ASA or ASA products.

Contraindicated in patients that cannot swallow or are not controlling their own airway.

Known bleeding disorders (hemophelia, Christmas Disease, Von Willibrand's Syndrome, etc.)

Precautions:

History of asthma.

History of recent GI bleed.

It is not to be given for analgesic purposes such as headaches or orthopedic injuries.

Administration:

324 mg ASA in the form of 4 children's chewable aspirin PO if the patient is able to swallow voluntarily and has a patent airway. (Each tablet contains 1¼ grains pr 81 gm of ASA).

Administration of ASA should be given to patients early in the treatment process. ASA has been shown to be very beneficial to patients.

Side Effects and Special Notes:

Patients who normally take regular doses of ASA or ASA compounds can have gastrointestinal disorders such as GI hemorrhage or impaired gastric emptying.

Side effects include GI irritation, nausea and vomiting, and occult GI bleeding.

Overdoses can result in tinnitus, metabolic acidosis, respiratory alkalosis, ARDS and occult GI bleeding.

ASA is metabolized by the liver and excreted by the kidneys. Use with caution in patients with liver dysfunction and impaired renal function.

Some asthmatics are sensitive to ASA and ASA products. Ingestion of ASA can worsen or precipitate an asthma attack in these individuals. If wheezing occurs, administer albuterol nebulizer.

ASA is sold over the counter for a wide variety of maladies. Some of the products that contain ASA are:

Alkaseltzer	Dia-gesic	Percodan
Anacin	Ecotrin	Soma
Axotl	Emprin	Synalgos
Aspirin	Excedrin	Talwin
Bayer aspirin	Fiorinal	Vanquish
Bufferin	Midol	Zorprin
Darvon	Norgesic	

Adenosine (Adenocard) **Section 12:2**

Adenosine in an endogenous nucleoside that is found within the cells.

Effects:

Briefly depresses SA and AV node activity.

Interrupts reentry pathway abnormalities such as PAT and WPW, and allows the normal sinus pathway to function.

Does not have an effect on atrial fibrillation, atrial flutter or ventricular tachycardia.

The drug has a 10 second half-life, and is not metabolized by the body. It can be given to patients with hepatic and renal deficiencies or digitalis toxicity.

Indications:

Supraventricular tachycardias, PAT, AV nodal, WPW and LGL.

Stable narrow complex tachycardia.

Contraindications:

Patients with 2nd degree block, 3rd degree block, or sick sinus syndrome, without a functioning pacemaker in place.

Known hypersensitivity to adenosine.

Precautions:

Known atrial fibrillation, atrial flutter or ventricular tachycardia.

Administration:

Adult:

Initial dose of 12 mg IV or IO fast push.

May be repeated at 12 mg IV fast push if rhythm has not converted. Total dose not to exceed 24 mg.

Boluses of over 12 mg are not recommended.

Pediatric:

1st dose: 0.1 mg/kg IV fast push IV or IO. 2nd dose: 0.2 mg/kg IV fast push IV or IO.

Side Effects and Special Notes:

Need a six second pre and post conversion EKG strip.

Side effects:

facial flushing

headache and anxiety

hypotension

dyspnea

chest pain

syncope

nausea and vomiting

metallic taste

arrhythmias

Adenosine can cause transient arrhythmias. These include asystole, AV blocks, bradycardias, and PVCs. They will usually resolve themselves within 30 seconds and do not require treatment if conversion occurs. Do not administer repeated doses if the arrhythmia re-occurs.

Patients who take caffeine or Theophylline compounds may require higher doses to achieve conversion.

It can be used safely in patients with digitalis toxicity.

Patients on Dipridomole (Presantine, an anti platelet medication), for cardiac and peripheral vascular disease, or carbamazepine or those with transplanted hearts should be given 3 mg (or 1/4 the dose) since a full dose will cause prolonged adverse effects.

Adenosine should be given through a free flowing IV/IO line due to the short half-life.

Albuterol (Proventil, Ventolin) **Section 12:3**

Albuterol is a beta-adrenergic agent that stimulates the Beta 2 receptor sites of the sympathetic nervous system. This causes smooth muscle dilation which relieves bronchospasms.

Effects:

Potent bronchodilator.

Slight increase in heart rate and blood pressure.

Indications:

Respiratory distress due to asthma or COPD.

Alleviate bronchospasm due to allergy or anaphylaxis.

Contraindications:

Known hypersensitivity to beta agonists.

Precautions:

Use with care in patients who have hypertension, coronary artery disease, or CHF.

Remember all that wheezes are not asthma. Pulmonary edema secondary to congestive heart failure or cardiogenic shock may cause wheezing. Use of capnography to aid in determining the presence of bronchospasm is highly recommended. Albuterol, as a first line drug, may be detrimental to these patients.

Administration:

Adult and Pediatric

2.5 mg in 3 cc of saline nebulized and inhaled. Set the O2 at 6 liters/minutes to achieve a fine mist, which may be repeated. In severe cases, continuous nebulization may be required.

It is important that the patient be instructed on the use of a nebulizer, and if MDIs have been used, that the patient be instructed to rinse their mouth and spit prior to the nebulized treatment. This minimizes side effects and enhances the efficiency of nebulized treatments.

It is important that the patient be instructed on the use of a nebulizer. In order to be effective, the patient must inhale the mist as deeply as possible and then hold their breath as long as they are able to. This allows maximum inhalation and absorption of the drug.

Sequential updrafts may be given if necessary.

For EMT-P's, Albuterol can be mixed with Atrovent in the nebulizer. See Atrovent Protocol. The Albuterol/Atrovent combination has proven synergistic effects.

Albuterol and Atrovent may be given through in-line nebulization to intubated patients. See manufacturer directions and individual department policies.

Side Effects and Special Notes:

Albuterol must reach the alveoli in order to be absorbed. Patients who are in severe distress and have low or minimal tidal volume will not benefit from Albuterol unless the drug reaches the alveoli. In such cases, strongly consider use of epinephrine.

Albuterol is also supplied in the form of an inhaler called Ventolin or Proventil.

Side effects of albuterol include anxiety, nausea, vomiting, and tachyarrhythmias. These side effects are usually due to the medication collecting on the mucous membranes. When the patient has a history of multiple use of home inhalers rinsing the patient's mouth, prior to administration of an oral nebulizer, will enhance effects of the drug and minimize side effects.

Amiodarone **Section 12:4**

Amiodarone is a K+ blocker, Na+ blocker, weak Ca++ blocker, alpha blocker and beta blocker. It has an affinity for cardiac muscle.

Effects:

Increases action potential and refractoriness
Creates homogeneous repolarization (antifibrillatory)
Decreases energy requirements for defibrillation
Dilates coronary arteries

Indications:

Wide beat tachycardia with a pulse

Ventricular Fibrillation/Pulseless Ventricular Tachycardia

ROSC (Return of Spontaneous Circulation) from VF/Pulseless VT

Contraindications:

Known hypersensitivity

Cardiogenic Shock

Marked sinus bradycardia, $2^{o}/3^{o}$ heart block

Ventricular escape or accelerated IVR

Precautions:

May cause severe hypotension and profound bradycardia. Due to these side effects, if the ROSC results in a bradycardia, ensure adequate ventilation to increase the rate prior to administration of amiodarone.

May prolong QT interval.

WPW is a relative contraindication

Use caution in irregular wide beat tachycardia. Consider atrial fibrillation with aberrancy.

Administration:
Adult:
Pulseless VT/VF – 300 mg IV push, then flush with 10cc NS
Wide beat tachycardia with a pulse/Resuscitated VF/VT – 150 mg, slow IVP

Pediatric:
Pulseless VF/VT – 5 mg/kg IV/IO by rapid bolus
Wide beat tachycardia with a pulse – 5 mg/kg IV/IO slow IVPFor slow IV administration of amiodarone, mix 150 mg in 50-150 ml IV bags of NS or D5W and infuse over 10 minutes.

Side effects and Special Notes:

Slow heart rates are relatively common. Oxygenation and time will usually lead to an increase in heart rate.

Hypotension will usually respond to controlled fluid administration, such as 250 – 300 ml challenges.

Bradycardia <u>with</u> profound hypotension is rare. Bradycardias are unresponsive to atropine, pacing is the management of choice. If dopamine is required, high alpha doses are generally more useful.

Atropine Sulfate **Section 12:5**

Atropine is a cholinergic blocking agent that inhibits the effects of the parasympathetic nervous system.

Effects:

Increases sinus node discharge by blocking vagal influence.

Increases conduction through the AV junction, which increases ventricular sensitivity to atrial impulses.

Reduces the motility of the GI tract.

Reduces the action of the urinary bladder and may cause urinary retention.

Causes pupil dilation.

Dries mucosal membranes, especially in the mouth.

Dilates smooth muscle and reduces secretions in the bronchioles.

Indications:

Symptomatic bradycardia, especially in the setting of atrial bradycardias and proximal heart blocks.

As an antidote to organophosphate and nerve agent poisonings.

Second line medication in asystole/IVR.

Contraindications:

Contraindicated in atrial fibrillation and atrial flutter. It may cause one-to-one conduction, which will increase the ventricular rate.

Precautions:

Bradycardias in the setting of a myocardial infarction are often a protective mechanism to lower the heart's demand for oxygen.

Do not treat bradycardias unless the patient is symptomatic with hypotension or altered LOC.

Too little atropine can induce paradoxical bradycardia. When indicated, atropine should be given rapid IVP and in the appropriate dosages.

Administration:

Adult

Symptomatic Bradycardia: 0.5 mg IV/IO, repeated every 5 minutes to a total dose of 3 mg.

Asystole: 1 mg repeated every 3-5 minutes IV/IO, to a total dose of 3 mg for an adult.

Organophosphate and nerve agent poisonings: 2 mg IV/IO repeated every 5 minutes until patient is no longer symptomatic. True organophosphate poisoning will require a very large amount of atropine to completely reverse the SLUDGE effects, much more than is usually carried in the field.

Pediatric

0.02 mg/kg IV/IO. (0.1mg min for children, 0.1mg max for infants, 0.5 mg max dose for children and 1 mg for adolescent)

Side Effects and Special Notes:

Atropine may be given IV/IO or ET.

Small doses may cause a paradoxical bradycardia, especially in children.

When treating bradycardias, only treat patients who are symptomatic. Treat the patient - not the EKG rhythm!

Side effects include tachycardia, dry mouth, altered vision and headaches.

Atrovent (Ipratropium Bromide) **Section 12:6**

Atrovent is an anticholinergic agent that relaxes bronchial smooth muscle and inhibits mucous production by antagonizing the action of acetylcholine.

Effects:

When combined with albuterol, atrovent has a synergistic effect in the relief of bronchospasm.

Indications:

Respiratory distress due to asthma, RAD (reactive airway disease), or COPD.

Alleviate bronchospasm due to allergy or anaphylaxis.

Contraindications:

Patients with known hypersensitivity to Atrovent or to atropine and it's derivatives. Those with known allergies to soybeans or peanuts.

Precautions:

Atrovent is not to be used by itself during the acute event. It must be used in combination with a Beta2 agonist such as albuterol.

Atrovent should be used with caution in patients with narrow angle glaucoma, prostatic hypertrophy, or bladder-neck obstruction.

Administration:

Adult and Pediatric

500 mcg (1 Unit-Dose Vial) mixed with albuterol, administered nebulized and inhaled. Set the O2 at 6 liters/minutes to achieve a fine mist, which may be repeated every 10-15 minutes. In severe cases, continuous nebulization may be required. Atrovent should be mixed with albuterol in the nebulizer.

It is important that the patient be instructed on the use of a nebulizer. In order to be effective, the patient must inhale the mist as deeply as possible and then hold their breath as long as they are able to. This allows maximum inhalation and absorption of the drug.

Updrafts of Albuterol/Atrovent may be repeated in 20 minutes if necessary.

Albuterol/Atrovent may be given through in-line nebulization to intubated patients.

Side Effects and Special Notes:

Albuterol must reach the alveoli in order to be absorbed. Patients who are in severe distress and have low or minimal tidal volume will not benefit from Albuterol unless the drug reaches the alveoli. In such cases, strongly consider use of epinephrine. Blurred vision, eye pain when used with a mask.

Dextrose 50% **Section 12:7**

Dextrose is a 6-carbon sugar, which is the principle form of carbohydrates used by cells for energy.

Effects:

Glucose, which is the basic fuel for cells, will raise the level of sugar in the blood.

Glucose is a large macromolecule that can only enter the cells with the assistance of insulin. If insulin is not present, the sugar will remain in the blood stream.

Indications:

A patient who has a history of diabetes and signs of hypoglycemia, including: altered mental status, cold, clammy skin and a compatible glucometer reading.

Consider administration in a patient with a history of diabetes who is suffering a medical cardiac arrest.

In patients with a home glucometer reading of 60 mg or less, with a neurologic deficit or altered state of consciousness.

Hypothermia, generalized.

Precautions:

Check the blood glucose level (BGL) of the blood, if possible, prior to administration of D50. However,-the patient assessment is more important than the actual number of the BGL. In a diabetic, the faster the BGL falls the more likely s/s of hypoglycemia will occur. In a diabetic, rely on your patient assessment.

Use with caution in patients with suspected low potassium levels, such as patients receiving diuretics without the use of supplemental potassium. Hypokalemia becomes more severe with administration of glucose. However, this is not a contraindication to its use for a patient that is truly hypoglycemic.

A BGL should be obtained prior to D50 administration.

A sugar solution (such as D50 or sugared juices, "Glucola," honey, molasses, Karo syrup) may be given orally if the patient is awake and there is no danger of compromising the airway.

Administration:

Adult

25 g (50 ml amp) IV, in 10 g increments, slow push into secure vein.

Infiltration of glucose will cause necrosis of tissue. The IV/IO must be secure. If there is a doubt to the patency of the line, do not administer D50 through it. Start another IV.

When administering D50, confirm that the line is patent. This should be checked 2-3 times during administration. If infiltration does occur, stop administration immediately and notify receiving facility. Administer D50 in 15-20 ml increments, flushing the line with saline in between. This will minimize the effect of the hypertonic D50 on the vessel walls.

Pediatric

Newborn - 1 yr = D10% 2-4ml/kg bolus

1 yr - 8yrs = D25% 2-4ml/kg

A 10% solution is made by squirting 2ml D50 into a 10-12 ml syringe and adding 8ml NS to it.

Side Effects and Special Notes:

D50 is remarkably free of side effects and should be used whenever a question of hypoglycemia exists.

D50 should be considered in all patients with altered mental status or neurologic deficit. A BGL should be obtained and D50 administered as indicated.

If the patient is unconscious, BGL should be drawn and glucose given. If the patient is conscious, the situation is less urgent - await results of home glucometer before administering glucose.

One bolus should be sufficient to raise the blood sugar 50-100 mg%. The patient should have a significant increase in mentation within 10-15 minutes. The base physician should be consulted prior to giving second dose if additional therapy seems necessary.

The effects will be delayed in elderly people with poor circulation.

Do not draw glucose tubes from site proximal to an I.V. containing glucose.

If IV/IO access is not available, use glucagon. See glucagon drug guide.

Diazepam (Valium) **Section 12:8**

Valium is a member of the Benzodiazepine family

Effects:

Acts as a sedative for states of anxiety.
Potent skeletal muscle relaxant.
Useful for premedication for certain procedures such as cardioversion due to its sedation and amnesiac properties.
Suppresses the spread of seizure activity within the motor cortex of the brain. It does not inhibit abnormal electrical discharges in the brain.

Indications:

Any seizure which has lasted longer than 3 minutes, or repetitive seizures without a return to consciousness. Do not give unless the patient is actively seizing
Skeletal muscle relaxant (back spasms, spasms with bone fractures)
Procedural sedation. Versed is the preferred drug for this, but Valium is acceptable.

Precautions:

Since diazepam can cause respiratory depression and/or hypotension, the patient must be placed on cardiac monitor, pulse oximeter, and capnometry.
If the patient begins to hypoventilate, assist ventilations with a BVM and consider intubation.

Administration:

Adult
1-10 mg slow IV/IO push or IM, 10-20 mg rectally.
May repeat to a total max dosage of 20 mg.

Pediatric
0.25 mg/kg slow IV/IO push to a maximum of 5 mg.
0.5 mg/kg for rectal administration, max dose of 10mg rectally.

Side Effects and Special Notes:

Common side effects include drowsiness, dizziness, fatigue and ataxia. Paradoxical excitement or stimulation sometimes occurs.
Most likely to produce respiratory depression in patients who have taken other sedative drugs, especially alcohol and barbiturates.

Diphenhydramine (Benadryl) **Section 12:9**

Diphenhydramine is an antihistamine and is sold over-the-counter as an antihistamine in the form of Benadryl.

Effects:

Blocks H1 receptor sites which inhibits the effects of histamine during an allergic reaction.

Directly effects the CNS, which may act as a depressant, or occasionally stimulant, depending on individual variation.

May cause an anticholinergic reaction resulting in an increase in heart rate, dilated pupils, a decrease in GI tract motility and drying up mucous membranes.

Antiparkinsonism effect is used to treat acute dystonic reactions due to antipsychotic drugs (e.g., haloperidol, or phenothiazines such as Thorazine, Compazine and Stellazine). These reactions include: oculogyric crisis, acute torticollis and facial grimacing.

Indications:

The second line drug in anaphylaxis and severe allergic reactions (after epinephrine).

To counteract acute dystonic reactions due to antipsychotic drugs.

Used in conjunction with haloperidol administration, where patient becomes agitated from side effects of the haloperidol.

Hypotension secondary to a narcotic overdose.

Precautions:

It may have synergistic effect with alcohol or other depressants.

Use with caution in asthmatics. It may exacerbate or initiate an asthma attack.

Administration:

Adult

50 mg slow IV/IO push or deep IM injection.

Use with haloperidol: 12.5-25 mg IV/IO

Pediatric < 8yrs old
1-2 mg/kg slow IV/IO push or deep IM injection, max of 50mg total

Side Effects and Special Notes:

Side effects include: tachycardia, hypotension, headache, sedation and drowsiness.

Dopamine (Intropin) **Section 12:10**

Dopamine is a naturally occurring catecholamine and the effects are dose dependent. The desired effect is achieved by administering a specific dose.

Effects:

Chemical precursor of epinephrine, acts on both alpha and beta adrenergic receptor sites.
The effects differ with dosage given:

1. 1-2 mcg/kg/min - dilates renal and mesenteric blood vessels (no effect on heart rate or blood pressure).
2. 2-10 mcg/kg/min - inotropic (beta) effects on heart which usually increase cardiac output without much of an increase in heart rate or blood pressure.
3. 10-20 mcg/kg/min – chronotropic (alpha) effects on heart and peripheral vasoconstrictive effects result in tachycardia and increased blood pressure.

Indications:

Primary indication is cardiogenic shock.

May be useful in forms of shock, other than hypovolemic shock.

Bradycardias as second or third option

Contraindications:
Hypovolemia

Precautions:

May induce non-compensatory tachyarrhythmias, in which case infusion should be decreased or stopped.

High doses may cause extreme peripheral vasoconstriction.

Certain antidepressants potentiate the effects of this drug. Check for medications and contact base if other medications are being used.

Should not be added to sodium bicarbonate or other alkaline solutions, dopamine will precipitate and be inactivated.

Administration:

Adult and Pediatric

IV (or IO) infusion only. Mix 400 mg in 250 cc NS to produce a concentration of 1600 mcg/cc. Infusion rate should start between 2-5 mcg/kg/min. Gradual increases up to 10 mcg/kg/min usually achieve desired effect.

Doses ranging from 10-20 mcg/kg/min result in increased alpha effect with increased oxygen demand and are not desirable.

Consider carrying a dopamine dosage chart.

Side Effects and Special Notes:

Patients on beta blockers may require a higher dose of dopamine to achieve desired effect.

Side effects include ectopic beats and nausea and vomiting most commonly. Angina has been reported following treatment. (Tachycardia and arrhythmias are less likely than with other catecholamines.

Can precipitate hypertensive crisis in susceptible individuals.

Rule out hypovolemia. Dopamine is contraindicated for hypovolemia.

Dopamine is best administered by an infusion pump to accurately regulate rate. For this reason it is hazardous when used in the field. Monitor closely.

Infiltration will cause severe tissue necrosis. Do not administer through an IV that is not patent.

Consider starting a second line for the dopamine infusion.

Dopamine Drip rate chart: Mix 400 mg in 250 cc NS with a micro drip for a concentration of 1600 mcg/cc and run at:

mcg/ kg/min	**20 kg**	**30 kg**	**40 kg**	**50 kg**	**60 kg**	**70 kg**	**80 kg**	**90 kg**	**100 kg**
2 mcg	1.5	2	3	4	5	5	6	7	8
5 mcg	4	6	8	9	11	13	15	17	19
10 mcg	8	11	15	19	23	26	30	34	38
15 mcg	11	17	23	28	34	39	45	51	56
20 mcg	15	23	30	38	45	53	60	68	75

Epinephrine (Adrenaline) **Section 12:11**

Epinephrine is a catecholamine that is secreted by the adrenal glands. Epinephrine has potent alpha and beta effects.

Effects:

Increases myocardial contractile force.
Increases automaticity.
Increases heart rate.
Increases cardiac irritability
Increases myocardial O2 consumption.
Increases systemic vascular resistance.
Increases arterial blood pressure.
Potent bronchodilator.

Indications:

Ventricular fibrillation/pulseless wide beat tachycardia.
Asystole.
Pulseless Electrical Therapy.
Anaphylactic shock.
Severe asthma

Contraindications:

There are no contraindications for epinephrine in true anaphylactic shock.

Precautions:

Should not be added directly to sodium bicarbonate infusion, catecholamines may be partially inactivated by alkaline solution.

When used, the increased cardiac workload in susceptible individuals can precipitate angina and/or an MI. Use with caution in older adults, those with a cardiac history, and those with a history of peripheral vascular insufficiency. In the case of asthma, weigh risk vs benefit prior to administration.

In elderly patients with wheezing, consider CHF or pulmonary embolus. Capnography/capnogram is helpful in identifying bronchospasm.

Administration:

Adult

Cardiac arrest**:** 1 mg of 1:10,000 solution IV/IO or 2 mg ET every 3-5 minutes

Mild or moderate allergic reactions: 0.3 mg (0.3 ml of 1:1,000 solution) SQ or IM
Anaphylaxis: 0.1 mg (1 ml of 1:10,000 solution) IV.
Severe asthma: 0.3 mg (0.3 ml of 1:1,000 solution) SQ

Pediatric

Cardiac arrest:

First dose: 0.01 mg/kg (0.1 mL/kg of 1:10,000) IV/IO or 0.1 mg/kg (0.1 mL/kg of 1:1000) ET every 3-5 minutes.

Subsequent doses: 0.1 mg/kg (0.1 mL/kg of 1:1000) IV/IO or 0.2 mg/kg (0.2 mL/kg of 1:1000) ET.

Bradycardia: 0.01 mg/kg (0.1 ml/kg of 1:10,000) IV/IO

Anaphylaxis: 0.01mg/kg of 1:10,000 solution IV/IO

Severe asthma: 0.01 mg/kg (0.01 ml/kg of 1:1000) SQ or IM

Side Effects and Special Notes:

Anxiety, tremors, vomiting, palpitations, tachycardias and headaches are common with administration of epinephrine. These can be very severe when given IV.

Epinephrine will be inactivated by prolonged exposure to light. It should be stored in a dark place.

Epinephrine may induce vomiting in children.

Epinephrine should not be given without signs as well as symptoms of anaphylaxis. It is common to have an allergic reaction without it progressing into anaphylaxis.

Cardiac arrest dosing for adults and pediatrics were based on the 2005 ACLS and PALS guidelines respectively.

Epinephrine AutoInject **Section 12:12**

EMT-Basics may administer a Epinephrine Auto-Injector, after calling for a direct order, in situations where the patient is suffering from an anaphylactic reaction. The EpiPen can be the patient's own prescribed EpiPen or another EpiPen available for use.

Effects/Precautions:

The beneficial actions of epinephrine in the management of acute anaphylaxis are bronchodilation and vasoconstriction.

Patients with a history of severe allergic reactions may be prescribed epinephrine (Adrenaline, EpiPen) in a preloaded syringe for rapid administration following exposure to an allergen.

The onset of action following administration is rapid, with a peak effect at about 15 minutes.

Epinephrine may have serious side effects including cardiac arrhythmias and hypertension, and should only be used on patients experiencing life threatening implications of a serious allergic reaction.

Airway management, oxygenation and ventilation, circulatory support and rapid transport must never be delayed in favor of epinephrine auto-injector.

Objective Information:

Chief complaint of acute allergic reaction with history of same.
Objective signs of anaphylaxis including:

1. Severe respiratory distress
2. Hypotension

Additional signs of anaphylaxis that may occur in the presence of the above include:

a. Hives
b. Wheezing or stridor
c. Visible swelling of face, tongue or neck

Side Effects and Special Notes:

Anxiety, tremors, vomiting, palpitations, tachycardias and headaches are common with administration of epinephrine.

Epinephrine will be inactivated by prolonged exposure to light. It should be stored in a dark place.

Epinephrine may induce vomiting in children.

Epinephrine should not be given without signs as well as symptoms of anaphylaxis. It is common to have an allergic reaction without it progressing into anaphylaxis.

Fentanyl Citrate (Sublimaze) **Section 12:13**

Fentanyl is a schedule II controlled substance that is a potent synthetic narcotic. Fentanyl possesses a more rapid onset of action when compared to Morphine, but a shorter half-life thereby lessening the likelihood of clouding physical exams in the ED. Fentanyl is also less likely to produce hypotension, histamine or allergic reactions, or emesis than Morphine.

Effects:

Narcotic analgesic.

Pupil constriction.

Decreased respiratory rate and tidal volume.

Onset < 1 minute IV (7-15 IM), duration 3-60 minutes IV (1-2 hrs IM)

Indications:

Severe Burns.

Severe pain of non-traumatic origin such as back spasms or kidney stones (nephrolithiasis).

Extremity injuries when severe pain is present, with no evidence of significant head, chest or abdominal injuries.

Used in conjunction with Versed for procedural sedation.

Contraindications:

Hypersensitivity to fentanyl.

Myasthenia gravis

MAO Inhibitors

Precautions:

May cause respiratory depression or apnea

Duration of respiratory depression may exceed the analgesic effect

Residual Fentanyl from one dose can potentiate further doses

Concurrent use with alcohol and other CNS depressants potentiate effect

Use cautiously in patients with chronic liver disease

Pregnancy safety: Category C – Precautionary use during pregnancy

Administration:

Adult

Pain management: 1-2 mcg/kg slow IV/IM/MAD. Fentanyl should be titrated to pain and vital signs.

Contact the base physician for subsequent doses beyond 2 mcg/kg.

Use with Versed for sedation as an analgesia adjunct: 1-2 mcg/kg slow IVP.

Pediatric

Pain management: 1-2 mcg/kg IV or IM, titrate to pain and vital signs.

Contact base physician for subsequent doses beyond 2 mcg/kg.

Use with Versed for sedation: 1-2 mcg/kg IVP

Side Effects and Special Notes:

May cause: sedation, nausea, respiratory depression, and hypotension.

Use with caution in patients susceptible to respiratory depression: CHI & brain tumor.

Allergic reactions are rare, but can happen. Question patient regarding previous medication allergies.

If respiratory depression occurs, assist ventilations and assess effectiveness. Administer Narcan as a last resort.

An uncommon side effect is “rigid” or “frozen” chest. If this occurs, assist ventilations and inform the receiving hospital. Narcan is ineffective in such situations.

Fentanyl is safe for combination with Haloperidol (Haldol) and benzodiazepines (Valium & Versed).

Furosemide (Lasix) **Section 12:14**

Furosemide is diuretic that works in the Loop of Henle in the kidney. This medication is commonly used in the prehospital and home setting for congestive heart failure.

Effects:

Potent diuretic with a rapid onset of action and short duration of effect.

Acts primarily by inhibiting sodium reabsorption throughout the kidneys. This causes an increase in sodium and potassium excretion.

Potent vasodilator in the pulmonary capillary beds, which may decrease the cardiac workload.

Peak effect: ½ - 1 hour after IV administration. The duration is about two hours. (Duration 6-8 hours if given orally, with a peak in 1 - 2 hours.)

Indications:

Acute pulmonary edema. Administration will reduce venous pressure in the lungs and decrease extracellular fluid volume in congestive heart failure the setting of normo/hypertension.

Contraindications:
Hypersensitivity and allergy to sulfonamides
Hypovolemia
Hypotension
Pneumonia

Precautions:

Dilation of pulmonary capillary bed occurs within minutes of administration. The effect of the diuresis may be seen within 10-15 minutes.

Can lead to profound diuresis with resultant hypovolemic shock and electrolyte depletion.

Should not be used in children or pregnant women.

Contact base physician if urine is bloody. Trauma to the kidneys and urinary system makes the use of Furosemide hazardous.

Administration:

Adult

20-80 mg slow IV push (over two minutes).

Patients not already on Lasix require lower doses of 20-40 mg usually.

Patients on home Lasix may require higher doses of Lasix to achieve the desired effect, starting dose should be same as patients daily dose.

Side Effects and Special Notes:

Hyponatremia, hypokalemia and hypovolemia are the main side effects.

Rapid infusion can cause damage to the patient's hearing. Lasix must be administered as a slow push.

The hypokalemia induced is of concern in digitalized patients and particularly those who have digitalis toxicity. EKG changes that will be indicative of hypokalemia include: flattened or absent T waves, prominent U wave, PAT, atrial arrhythmias, and right bundle branch blocks.

May cause acute and profound diarrhea.

Because of hypokalemia and hyponatremia, the patient must be placed on a cardiac monitor if not done previously.

Glucagon **Section 12:15**

Glucagon is a natural hormone in the body. It is produced by the pancreas.

Effects:

Glucagon acts on liver glycogen, converting it to glucose and raising blood glucose levels.
Relaxes smooth muscle in the GI tract resulting in dilation and decreases motility.

Indications:

Hypoglycemic patients in which oral glucose is contraindicated and after 2 unsuccessful IV attempts.

Contraindications:

Contraindicated in patients with known hypersensitivity to the drug.

Precautions:

Glucagon is only effective if there are stores of liver glycogen present. In malnourished, starving, or alcoholic patients it may be ineffective.

May not take effect for 5-20 minutes.

Use with caution in patients with cardiovascular or renal disease.

Administration:

Adult

Hypoglycemia: 1 mg (1 unit) IM, follow with oral glucose or food

B-Blocker and Ca Channel Blocker OD: 5 mg IV, repeat as long as symptoms present.

Pediatric

Hypoglycemia and B-Blocker and Ca Channel Blocker OD: 0.025-0.1 mg/kg IM

Side Effects and Special Notes:

Nausea and vomiting are known to occur, especially in children.

Haloperidol (Haldol) **Section 12:16**

Haldol is a butyrophenone (antipsychotic) and acts as a potent tranquilizer.

Effects:

A powerful sedative and tranquilizer
Peripheral vasodilation

Indications:

Patients who are violent and combative, or pose a safety threat to themselves or others.

Contraindications:

Known hypersensitivity to this drug
Pregnancy and lactating mothers
History of seizures
Suspected acute myocardial infarction
Significant respiratory depression
Systolic blood pressure less than 100 mmHg
Renal/liver failure
Parkinson's Disease
Children under 8 years old

Precautions:

May cause tachycardia and hypotension, which can be treated with position and fluids.

Should profound hypotension occur that is unresponsive to positioning and fluid therapy, vasopressor therapy may be required.

Haloperidol may decrease the effectiveness of dopamine.

Epinephrine should not be used since haloperidol may block its vasopressor activity and paradoxically further lower the blood pressure.

May cause prolongation of the QT interval. Therefore, the patient must have an IV placed and be put on the cardiac monitor as soon as possible.

Some patients may experience a dysphoric reaction (unpleasant sensations manifested as restlessness, hyperactivity, or anxiety) following haloperidol administration. This may be treated with diphenhydramine.

Extra-pyramidal reactions have been noted hours to days after administration of haloperidol, usually presenting as a spasm of the muscles of the tongue, face, neck, and back. This reaction can also be treated with diphenhydramine.

Rare instances of neuroleptic malignant syndrome (very high fever and muscular rigidity) have been known to occur after the administration of haloperidol.

Administration:

Patients over 8 years of age

Initial dose: 5 – 10 mg IM (start on lower side for smaller patients)

Repeat doses: Contact base physician for direct orders.

Side Effects and Special Notes:

Hypotension is usually transient and usually resolves with a fluid bolus. Tachycardia, sedation, dysphoria, and extrapyramidal reactions are also known to occur.

Diphenhydramine can be used prophylactically to prevent dysphoria or dystonic reactions.

The anticholinergic effect of diphenhydramine can cause drowsiness and therefore can be used in conjunction with a sedative such as haloperidol to potentiate the sedative effect desired to treat combative patients.

Inhaler, Prescribed (Albuterol, Ventolin, Proventil, Combivent) Section 12:17

EMT-Basics may provide assistance in the administration of a patient's own physician prescribed Metered Dose Inhalers (MDI) in situations where the patient is unable to self administer the medication due to circumstances which may include lack of training, poor understanding of prescription use or lack of physical access to the medication.

EMT-Basics may not initiate administration of MDI's, administer medication that is not specifically prescribed for the patient or administer MDI's to patients who do not meet the criteria listed below.

Effects/Precautions:

The only medications intended for this protocol are: albuterol (Ventolin, Proventil) and albuterol/atrovent (Combivent).

Other prescribed inhaled medications (i.e.: Atrovent, Tornalate, Maxair, Serevent, Beclavent, Azmacort, Alupent) are not intended for this protocol, nor are they indicated for the acute situation. These medications are not intended for the management of emergencies, and should not be used by EMT-Basics.

Over the counter inhalers (i.e.: Primatene) should never be administered by prehospital personnel.

It is important that the EMT-Basic generally recognize the names of the various medications and realize which one is appropriate for the care of patients with respiratory emergencies.

Side effects are usually minor and include tremors, nervousness and mild tachycardia.

Albuterol is a very safe drug and may be administered repeatedly in most individuals.

Indications:

Difficulty breathing with signs and symptoms of respiratory distress.

Side Effects and Special Notes:

Patient should be alert enough to use inhaler.

If the patient has a spacer (Aerochamber, mouthpiece extension tube) it should be used. This device ensures more complete inhalation of the metered dose.

IV Solutions **Section 12:18**

There are two types of solutions available for use in the field: normal saline (NS) and Lactated Ringer's (LR).

Effects:

Normal distribution of fluid through-out the body:

1. Total body water = 60% of body weight
2. Intracellular fluid = 40% of body weight
3. Extracellular fluid = 20% of body weight
4. Interstitial fluid = 15% of body weight
5. Intravascular fluid = 5% of body weight

Volume expanders (Lactated Ringer's, normal saline, blood,) expand the extracellular fluid space.

1. Lactated Ringer's contains electrolytes and lactate which acts as a buffer. LR is isotonic to body fluids.
2. Normal saline contains .9% sodium chloride which is similar to that of the blood and is considered isotonic.

Indications:

To expand intravascular volume in the presence of shock, volume depletion, dehydration, burns, severe nausea or vomiting

To stimulate Starling's reflex in the heart

To establish a drug administration route.

Precautions:

In hemorrhagic shock, volume expansion with crystalloid (LR and NS) and blood is the treatment of choice. Volume expanders alone are not as efficient in raising intravascular volume and do not increase oxygen carrying capacity. They are still life-saving as a temporary treatment.

Volume overload is a constant danger. Maintain close monitoring on your IV rate during transport.

Administration:

Establish an IV/IO line by using a peripheral vein cannulation or intraosseous access.
Rate should always be set at a TKO rate unless a fluid challenge is indicated.

1. A microdrip will deliver 60 drops per cc and should be used when running a medication line.
2. A macrodrip will deliver 15 drops per cc and should be used when administering NS.

The amount of fluid that can be infused is dependent on the diameter and length of the catheter used.

1. A 24-gauge is the smallest and a 14-gauge is the largest that can be used in the field.
2. For volume expansion, a large catheter should be used, such as a 16 or 14-gauge.
3. For medication drip lines, a smaller size such as an 18-gauge is acceptable.

Side Effects and Special Notes:

Amounts of 250-300 ml challenge the heart and stimulate Starling's reflex. Amounts of 300-500 ml (or 20 ml/kg for pediatrics) are designed to replace fluid lost and can be repeated as necessary. Assess lung sounds frequently.

IV fluids are frequently at room temperatures, this may precipitate hypothermia and appropriate warming methods should be considered in all patients who receive multiple fluid boluses.

Large amounts of fluid (> 2 liters) has been known to dilute clotting factors and has the potential for fluid overload.

Signs and symptoms of overload include dyspnea, orthopnea, rales, JVD, polyuria and hypertension.

If fluid overload occurs, immediately turn the IV to a slow TKO and advise the receiving physician. The elderly, pediatrics, and those with kidney and heart problems are particularly vulnerable to fluid overload.

Lidocaine (Xylocaine) Gel **Section 12:18**

Lidocaine, in viscous solution, is a topical anesthetic.

Effects:

Stabilizes cell membrane by blocking sodium (Na+) transport across the membrane, inducing local anesthesia

CNS stimulation: tremors, restlessness and clonic convulsions followed by CNS depression and respiratory failure at higher doses.

Indications:

Providing local anesthetic effect prior to nasal intubation

Contraindications:

Allergy to lidocaine

Precautions:

Use with caution if the heart rate is < 50. If absorbed systemically, Lidocaine may suppress the heart beats which are maintaining adequate circulation.

Use with extreme caution in presence of advanced AV block unless artificial pacemaker is in place.

In atrial fibrillation or flutter, quinidine like effect may cause ventricular acceleration.

Administration:

Adult and Pediatric

Administer one of two ways,

1. apply gel to tube prior to insertion, or
2. insert gel in nare prior to insertion of ET tube

Side Effects and Special Notes:

When gel administered into nare, side effects are uncommon minimal

Magnesium sulfate **Section 12:19**

A normally occurring intracellular electrolyte

Effects:

Enhances the sodium and potassium pump, which stabilizes the cardiac cell membrane, prolongs the resting membrane potential and relaxes smooth muscle.

Acts as a calcium channel blocker.

Prolongs the PR interval, AV node refractory period and SA conduction time.

Depresses the CNS by blocking neuromuscular transmitters.

Indications:

Seizures secondary to eclampsia.

Torsades de Pointe.

Asthma refractory to epinephrine and/or albuterol

Contraindications:

Hypersensitivity

Complete heart block

Precautions:

May cause hypotension and AV heart blocks.

Respiratory depression may occur. Be prepared to assist ventilations.

Administration:

Adult

Cardiac: 2 g IV push

Eclampsia: 5 gm in 50-100 ml over 15-30 minutes, or

if IV unavailable, administer 2.5 g IM in each buttock.

Asthma: 2 g in 50-100 ml over 10 minutes

Side Effects and Special Notes:

Side effects include: flushing, thirst, sweating, muscle weakness and sedation.

Use with caution in patients with renal failure or are on digitalis preparations.

Methylprednisolone (Solu-Medrol) **Section 12:20**

Methylprednisolone is an systemic anti-inflammatory (synthetic steroid) agent

Effects:

Methylprednisolone suppresses severe inflammation by stabilizing mast cell membranes and inhibiting the action of leukotrines. In addition, it potentiates vascular smooth muscle relaxation by increasing sensitivity of the Beta2 receptors and altering airway hyperactivity.

Indications:

Allergic reactions and anaphylaxis
Asthma

Contraindications:

None in the acute setting

Precautions:
Use with caution in patients with GI bleeding, diabetes mellitus, CHF, renal disease, or hypertension.

Administration:

Adult - 125 mg IV
Pediatric - 2 mg/kg IV

Side Effects and Special Notes:

Long term use may cause numerous effects including: delayed healing, hypertension, sodium and water retention, alkalosis and may precipitate hypokalemia (flat t-waves, presence of U-waves)

May blunt oral hypoglycemic agents

Effects are seen within 20 minutes to 6 hours and persist for a variable period.

Pregnancy Safety: Not established – crosses the placenta and may cause fetal harm.

Midazolam (Versed) **Section 12:21**

Midazolam is a water soluble, short acting benzodiazepine.

Effects:

Short acting central nervous system depressant.
Time to onset of action is 2 - 5 minutes.
Duration can last for 15 to 90 minutes.

Indications:

Procedural sedation with Fentanyl or Morphine
Chemical restraint/sedation
Status epilepticus (second line therapy to diazepam)

Contraindications:

Known hypersensitivity to Midazolam or Benzodiazepines.
Hypotension < 90 mmHg

Precautions:

Pulse oximetry, capnography and cardiac monitoring should be used when midazolam has been administered.

Immediate ventilatory assistance with 100% O2 and Bag-valve-mask may be necessary to maintain oxygenation.

Use caution when administering midazolam to the patient when alcohol has been ingested.

Headache, variation in blood pressure including hypotension, variations in pulse rate, and decreased respiratory rate are all potential side effects.

Consider lower initial dose for elderly patients.

Administration:

Adult

Sedation/chemical restraint: 2-5 mg IV, IM, IND. May be repeated to a maximum dose of 5 mg. Contact medical control for additional doses.

Sedation in analgesia adjunct: 1-2 mg IV after Fentanyl or Morphine

Seizures: 2-5 mg IV, IM, IND and repeat as needed.

Pediatric

Sedation, or seizures: 0.10 mg/kg IV/IO/IM/IND to a maximum single dose of 2 mg. Repeat as needed.

Special Notes:

Prior to sedating patients, when possible a detailed neurological exam should be noted, and documented as a field baseline noting any possible spinal, extremity or mental status deficits.

When using midazolam as a chemical restraint, document the behaviors that warrant its use.

Glasgow Coma Scale shall be documented as pre-sedation mental status.

When using procedural sedation, documentation of the required consent, assessments, vital signs, monitoring procedures, and medications will be done.

Morphine sulfate **Section 12:22**

Morphine is a narcotic that blocks the opiate receptor sites from activation by the neurotransmitter, substance P, in the spinal cord. Morphine also occupies the μ (mu) receptor sites in the brain.

Effects:

Narcotic analgesic.
Pupil constriction.
Decreased respiratory rate and tidal volume.
Peripheral vasodilatation.
Decreased myocardial oxygen demand.
Decreased cardiac afterload (left ventricular end diastolic pressure).
Decreased cardiac work load.

Indications:

Pulmonary edema of cardiac origin when BP is normal or hypertensive

ACS chest pain (refer to ACS Protocol for further information), second to nitroglycerine.

Second to fentanyl for: extremity fractures when severe pain is present

Second to fentanyl for severe pain of non-traumatic origin such as back spasms or kidney stones.

Second in line to fentanyl for use in procedural sedation.

Contraindications:

Hypersensitivity to morphine and morphine preparations (Codeine, Percodan, Lomotil, etc.)
Hypotension

Precautions:

Vasodilation due to morphine may exacerbate hypovolemic shock.
Use with caution in patients with respiratory difficulties because their respiratory drive may be depressed.
May cause vomiting. Slow administration and administration of diphenhydramine or promethazine may minimize these effects.
Use cautiously in patients with COPD or chronic liver disease.

Administration:

Adult

ACS chest pain – 2 to 5 mg IV, may repeat until pain free or systolic BP 90 mmHg.

Peripheral pain - Initial dose should be 5 mg IV/IM/IO/Intranasal. Repeat until pain free, pain is manageable or until systolic BP 90 mmHg.

Pediatric

0.1 - 0.2 mg/kg IV or IM for initial dose, can administer up to 0.4 mg/kg without direct order. Contact base physician for additional doses beyond 0.4 mg/kg total.

Side Effects and Special Notes:

Some patients are hypotensive as a reaction to pain itself.

Allergic reactions are rare, nausea and vomiting is normal side effect.

Be prepared to administer and assist ventilations if respirations depressed. Use of naloxone is a last resort.

Monitor for hypotension, consider trendelenburg and fluid bolus if necessary.

Promethazine or diphenhydramine may be used to treat nausea and vomiting induced by Morphine.

Naloxone (Narcan) **Section 12:23**

Naloxone is a narcotic antagonist

Effects:

Narcan competitively binds to μ (mu) sites in the central but which exhibits almost no pharmacologic activity of its own. Duration of action is approximately 1-4 hours.

Indications:

Respiratory depression due to narcotic effects.

Contraindications:

None in the emergent situation.

Precautions:

In patients physically dependent on narcotics, violent withdrawal symptoms may be precipitated.
Be prepared to restrain the patient. They may become violent when the Narcan reverses the drug's effect.

Administration:

Adult
2 mg IV, IM, SQ, IND or SL repeated as needed.
Titrate the dose to reverse respiratory depression.

Pediatric < 6 yrs old
1 mg IV, IM, SQ, IND or SL repeated as needed
Titrate the dose to reverse respiratory depression.

Side Effects and Special Notes:

Narcan is relatively safe and free from side effects.

The triad of narcotic overdose is: respiratory depression, constricted pupils, and altered mentation. In patients that have built up a tolerance, altered mentation may not be apparent.

Assume all overdoses are polypharmacy. Consider use of naloxone when initial therapies are unsuccessful in supporting vital functions.

The duration of some narcotics, particularly synthetic narcotics, requires higher doses of naloxone for reversal. Subsequent doses of naloxone may be required.

Patients who have received this drug must be transported to the hospital. Signs/symptoms of narcotic overdose may recur as the naloxone wears off.

Narcotic drugs include morphine, fentanyl (Sublimaze), meperidine (Demerol), heroin, Dilaudid, Percodan, codeine, Lomotil, Propoxyphene (Darvon), Pentazocine (Talwin), among others.

Large doses (4-6 mg of naloxone) may be needed to reverse Propoxyphene (Darvon) or Percodan overdose.

Demerol (Meperidine) will not cause pupillary constriction.

Pupillary constriction may be over-ridden by cerebral hypoxia, resulting in dilated pupils.

Nitroglycerine **Section 12:24**

Nitroglycerine relaxes smooth muscle.

Effects:

Decreases oxygen demand on the heart

Vasodilation which causes pooling of blood in peripheral veins and decreases the preload (amount of blood returned to the heart).

Decreased peripheral vascular resistance and afterload (amount of blood leaving the heart or the pressure in the arterial system).

Dilation of the coronary arteries.

Generalized smooth muscle relaxation.

Indications:

Chest pain related to ACS.
Chest, arm or neck pain thought to be related to ACS.
Pulmonary edema, to increase venous pooling and lower cardiac preload and afterload.

Contraindications:

Hypotension less than 90 systolic.
Do not manage hypertension with nitroglycerin.
Patients who have taken erectile dysfunction medications within the last 24 hours. See Special Notes.

Precautions:

Right coronary artery (RCA) occlusion. Consider administration of a fluid challenge prior to NTG.

Generalized vasodilation may cause profound hypotension and reflex tachycardias.

NTG loses its potency easily. Tablets should be stored in a dark glass container with tight lid and not exposed to heat.

Blood pressure should be taken and recorded before and after administration. Do not administer if the systolic blood pressure is 90 mmHg or less.

Administration:

0.4 mg orally (tablets sublingual, spray on oral mucosa).

The dose may be repeated every 5 minutes as long as the systolic pressure is >90 mmHg or the pain has been relieved.

An effective dose will act within 2 minutes and will last for 30 minutes.

Side Effects and Special Notes:

Common side effects include throbbing headache, flushing, dizziness, syncopal episode and burning under the tongue. If these do not occur, the medication may be expired.

A potentially serious side effect includes marked hypotension, particularly orthostatic.

Hypotensive effects are increased when the patient is upright.

Because nitroglycerin causes generalized smooth muscle relaxation, it may be effective in relieving chest pain caused by an esophageal spasm that mimics ACS chest pain.

Erectile dysfunction medications are taken by both men and women and include: sildenafil (Viagra), tadalafil (Cialis), vardenafil (Levitra), etc.

Nitroglycerine: Assisted Med Admin by EMT-B Section 12:25

EMT-Basics may provide assistance in the administration of a patients own physician prescribed sublingual Nitroglycerine in situations where the patient is unable to self administer the medication due to circumstances including lack of training, poor understanding of prescription use or lack of physical access to the medication.

EMT-Basics may not initiate administration of nitroglycerin, administer medication that is not specifically prescribed for that patient, or administer nitroglycerin to patients who do not meet the criteria listed below.

Effects/Precautions:

Vasodilation which causes pooling of blood in peripheral veins and decreases the preload (amount of blood returned to the heart).

Decreased peripheral vascular resistance and afterload (amount of blood leaving the heart or pressure in the arterial system).

Dilation of the coronary arteries.

Generalized smooth muscle relaxation.

May cause hypotension or orthostatic hypotension.

Indications:

Chief complaint: ACS chest pain
Vital signs: Systolic BP > 100 mmHg
Oxygen therapy must always precede medication administration.

Side Effects and Special Notes:

Common side effects include throbbing headache, flushing, dizziness, syncopal episode and burning under the tongue. If these do not occur, the medication may be expired.

A potentially serious side effect includes marked hypotension, particularly orthostatic.

Hypotensive effects are increased when the patient is upright.

Because nitroglycerin causes generalized smooth muscle relaxation, it may be effective in relieving chest pain caused by an esophageal spasm that mimics ACS chest pain.

Erectile dysfunction medications are taken by both men and women and include: sildenafil (Viagra), tadalafil (Cialis), vardenafil (Levitra), etc.

Oral Glucose (Glutose and Insta-glucose) **Section 12:26**

Oral glucose is a high concentration carbohydrate.

Effects:

Oral glucose acts to increase blood glucose levels.

Indications:

Altered level of consciousness in a patient with a history of diabetes.
Hypoglycemia.

Contraindications:

Decreased mentation leading to an inability to maintain airway
Patients unable to swallow

Side Effects and Special Notes:

There are no side effects when administered properly.

Due to the gel thickness, there is a potential for airway obstruction or aspiration.

Have suction equipment available when administering oral glucose.

Oxygen **Section 12:27**

Oxygen is an odorless, colorless and tasteless gas that is present in the atmosphere. It is essential for the production of energy in the cells.

Effects:

Oxygen added to the inspired air may increase the amount of oxygen crossing the alveolar membrane. This may prevent or relieve tissue hypoxia which can cause cell damage and death.

Breathing in most individuals is regulated by small changes in acid/base balance, CO2 levels in the blood and concentrations of O2 in the blood. Changes in acid/base and CO2 levels are the predominant stimuli that regulate respiratory rate and effort.

Indications:

Presence of hypoxia as evidenced by respiratory distress or altered mentation.
Situations in which oxygen demands have increased.

Precautions:

If the patient is not breathing adequately, the treatment of choice is assisted ventilation, not just O2.

Do not ever withhold oxygen from a patient who is in respiratory distress because of a COPD history.

Oxygen will dramatically accelerate combustion. Be sure that bystanders extinguish cigarettes and that there are no open flames or embers in the area.

Petroleum products will become ignited by oxygen. Do not ever lubricate an O2 regulator or cylinder with a petroleum product. Also, if the patient has petroleum products on their lips (such as chapstick) the oxygen can burn the tissue. Be sure to wipe it off prior to O2 administration.

Administration:
Nasal Cannula at 4-6 L/min
Mask Non-rebreather (12-15 L/min)
BVM with O2 at 15 L/min

Note on administration: There is a difference between respiration and ventilation. Respiration is the exchange of gases at the alveolar level (alveolar respiration). The exchange of gases at the cellular level (cellular respiration) is indicated by pulse oximetry (SaO2). Pulse oximetry is also affected by the presence of adequate and inadequate peripheral perfusion.

Ventilation is the mechanical movement of gases in and out of the lungs. Ventilation is measured by capnography. Keep in mind that capnography also indirectly measures perfusion. Both assessment tools are designed to add to the clinical picture of the patient, NOT substitute for a good assessment. Application of oxygen by itself, does not effect ventilation. Both respiration and ventilation need to be assessed and managed.

Side Effects and Special Notes:

Non-humidified O2 is drying and irritating to mucous membranes.

Restlessness may be an important sign of hypoxia.

Oxygen toxicity (overdose) in infants is not a hazard from acute administration in the prehospital setting.

Ambient oxygen is 21%. For every additional liter/minute of oxygen administered, the percentage increases by 3%. For example, 1 liter/minute will deliver 24%, and 4 liters/minute will deliver 33%.

A nasal cannula should be set at 4-6 liters/minute. Greater amounts will dry the mucosal membranes and cause a headache.

A non-rebreather mask must be set at a minimum of 12 liter/minute. The proper amount of liter flow is recognized when the reservoir fills.

There may be some confusion regarding hypoxic drive and giving O2 to patients with a history of COPD. A small percentage of patients with COPD (chronic obstructive lung disease) are always slightly hypoxic. Because of the chronic hypoxia, these patients have a build-up of carbon dioxide in their blood. The carbon dioxide retention overwhelms the normal respiratory drive, and their drive may become dependent on oxygen levels. Because of this, some care should be taken when administering oxygen to COPD patients. If they receive what their body interprets as too much O2, their respiratory effort and drive becomes depressed. However, this normally takes about 30-45 minutes to occur. Therefore, the amount of oxygen given to the patient should be dependent on the patient's condition.

Phenylephrine (Neosynephrine) **Section 12:28**

Phenylephrine has potent alpha adrenergic stimulation on the sympathetic nervous system.

Effects:

Marked contact vasoconstriction, especially on the nasal mucosal membranes.
Nasal decongestion.
Pupil dilation.
Slight increase in blood pressure.

Indications:

Used prior to nasal intubation to decrease mucosal trauma and minimize bleeding.

Precautions:

Use with extreme caution in patients with known hypertension, hyperthyroidism, diabetes, or cardiovascular disease.
Pediatrics and geriatrics will be more susceptible to idiosyncratic reactions.

Administration:

Adult and Pediatric
2 drop/spray in each nare.

Side Effects and Special Notes:

When used as a pretreatment for nasal intubation, the precautions should not cause undue concern. Airway control takes priority.

Promethazine (Phenergan) **Section 12:29**

Promethazine is an antiemetic, antihistamine

Effects:

Competes for muscarinic and histamine receptors sites in medullary chemoreceptor zone, in the inner ear
and H1 blocking activity peripherally.

Indications:

Nausea, vomiting

Nausea/vomiting due to morphine stimulated histamine release

Motion sickness, nausea and vertigo

Allergic reactions where the GI tract is the target organ

Contraindications:

Any allergy to promethazine or the phenothiazines

Sulfite allergy

Precautions:

Hypotension

CNS depression (incidence increased in patient > 75 y/o, consider 12.5 mg as initial dose)

Presence of ETOH or sedatives

History of seizures

Administration:

Onset rapid and peaks within 30-80 minutes

Duration 4-6 hours

Adults – 25 and repeat if necessary to 50 mg, IV or IM

Pediatrics – > 2 y/o - 0.25-0.5 mg/kg to a maximum of 12.5 mg

Side Effects and Special Notes:

Drowsiness, dizziness, dry mouth and blurred or double vision are common.

Changes in heart rate and blood pressure may also occur. If hypotension occurs, administer fluid bolus.

Dystonia and/or tardive dyskinesia are uncommon but may be reversed by 50 mg diphenhydramine IV.

Elderly may become agitated or disoriented, consider reducing the dose in elderly patients.

Sodium Bicarbonate **Section 12:30**

Sodium Bicarbonate is an alkalotic solution that is used in neutralizing acids in the blood secondary to cardiac arrests. Sodium bicarbonate also increases the availability of sodium ions to pass through sodium channels thus helping reverse sodium channel blocking effects of tricyclic antidepressants (TCAs).

Effects:

Correct metabolic acidosis. Acidosis may depress cardiac contractility, effect of cardiac drugs and lower the fibrillation threshold.

Increased pH of the blood.

Indications:

Correct a known metabolic acidosis that preceded a cardiac arrest.
Correct a known hyperkalemia.
Tricyclic antidepressant overdoses with tachyarrhythmias, ectopy or QRS width >.12.

Precautions:

Addition of too much sodium bicarbonate will cause a metabolic alkalosis which is very difficult to reverse. This is a greater problem than an acidic state.

Bicarb will inactivate catecholamines (epinephrine and dopamine) in solution.

May paradoxically increase cerebral acidosis in diabetics (especially pediatric diabetics) who are ketotic.

Administration:

Adult/Pediatric
1 mEq/kg in the well ventilated patient. Repeat dose of .5 mEq/kg every 10-15 minutes. (8.4% solution)

Side Effects and Special Notes:

Per the American Heart Association, "The value of sodium bicarbonate is questionable during cardiac arrest, and it is not routinely recommended for the routine cardiac arrest sequence."

Bicarb does not replace adequate ventilation, which is the most important factor in treating acidosis.

Carbon dioxide is generated in the blood after administration. Effective ventilation is essential to remove excess CO2 from the body.

Topical Ophthalmic Anesthetic (Alcaine) **Section 12:31**

Effects:

Provides topical ophthalmic anesthesia during transport of patients with actual or potential serious eye injuries that present with a "foreign body sensation". These anesthetics have a rapid (20-30) second onset of action and a typical duration of 15-30 minutes.

Indications:

Foreign Body
Corneal abrasion
UV burns to eyes ("Welders Flash", "Snow Blindness")

Contraindications:

Globe lacerations, rupture or penetrations
Know hypersensitivity to local anesthetics (novacaine, lidocaine, etc,)

Administration:

Adult and Pediatric

Use fresh, unopened bottle for each patient.

Do not touch the tip of the bottle on anything (eye) or this will contaminate the medication.

Do not allow patient to self-administer.

Place 2 drops in affected eye(s).

Have the patient shut eyes, if that is difficult, cover eyes to prevent rubbing or touching of the eyes. This is to prevent further injury.

Repeat application as needed.

Discard bottle once transport has been completed.

Side Effects and Special Notes:

A mild transient burning/stinging may be experienced upon initial application.

Secondary damage may occur if the eye is not protected from further damage following topical anesthesia of the cornea.

Topical ophthalmic anesthetics may be given after patient consents to transport to an emergency department for definitive therapy. Due to the complete anesthetic properties a patient may inappropriately attempt to refuse following administration.