Acetaminophen (Tylenol)

Class: Analgesic

Description:
Acetaminophen has analgesic and antipyretic properties with effects equivalent to those of aspirin. Acetaminophen elevates the pain threshold.

Mechanism of Action:
Acetaminophen is an analgesic and antipyretic drug that is used to relieve pain and fever. Acetaminophen blocks pain by inhibiting the synthesis of prostaglandin, a natural substance in the body that initiates inflammation. Acetaminophen reduces fever by acting on the hypothalamus region of the brain, which regulates temperature.

Indications:
Mild to moderate pain and fever.

Contraindications:
Known hypersensitivity and/or allergy. Severe liver disease. Prior acetaminophen use that exceeds 3,000 mg in a 24-hour period. Chronic alcoholism. Malnutrition. Patients under four (4) years of age.

Precautions:
Acetaminophen should be used with caution in patients with liver disease/failure.

Side Effects:
Nausea/Vomiting

Interactions:
Acetaminophen has no severe interactions with any other drugs.

SCEMSA Policies:
PD# 8066 - Adult Pain Management
PD# 9018 – Pediatric Pain Management

Adenosine

Class: Antiarrhythmic

Description:
Adenosine is a naturally occurring nucleoside that slows AV conduction through the AV node. It has an exceptionally short half-life and a relatively good safety profile.

Mechanism of Action:
Adenosine decreases the conduction of the electrical impulse through the AV node and interrupts AV re-entry pathways in PSVT. The half-life of Adenosine is about 5 seconds. Because of its rapid onset of action and very short half-life, the administration of Adenosine is sometimes referred to as chemical cardioversion.

Indications:
Adenosine is used in PSVT refractory to common vagal maneuvers.

Contraindications:
Adenosine is contraindicated in patients with second or third degree heart block, sick sinus syndrome, or those with known hypersensitivity to the drug.

Precautions:
Adenosine typically causes arrhythmias at the time of cardioversion; in extreme cases, transient asystole may occur. Adenosine should be used cautiously in patients with asthma.

Side Effects:
Facial flushing, headache, shortness of breath, dizziness, and nausea.

Interactions:
Methylxanthines (Aminophylline and Theophylline) may decrease the effectiveness of Adenosine, requiring larger doses. Dipyridamole (Persantine) can potentiate the effects of Adenosine.

SCEMSA Policies:
8024 - Cardiac Dysrhythmias
9014 - Pediatric Cardiac Dysrhythmias

Albuterol

Class: Sympathetic Agonist

Description:
Albuterol is a sympathomimetic that is selective for Beta-2 adrenergic receptors.

Mechanism of Action:
Albuterol is a selective Beta-2 agonist with a minimal number of side effects. It causes prompt bronchodilation and has a duration of action of approximately 5 hours.

Indications:
Bronchial asthma, reversible bronchospasm associated with COPD and emphysema.

Contraindications:
Known hypersensitivity to the drug.

Precautions:
Use caution when administering this drug to elderly patients and those with cardiovascular disease or hypertension. If possible, peak flow rate should be measured before and after administration.

Side Effects:
Palpitations, anxiety, dizziness, headache, nervousness, tremors, hypertension, arrhythmias, chest pain, nausea, vomiting.

Interactions:
The possibility of developing unpleasant side effects increases when administered with other sympathetic agonists. Beta-blockers may blunt the effects of Albuterol.

SCEMSA Policies:
PD# 8001- Allergic Reaction
PD# 8026 - Respiratory Distress
PD# 8029 - Hazardous Materials
PD# 9002 - Pediatric Allergic Reaction/Anaphylaxis
PD# 9003 - Pediatric Respiratory Distress

Amiodarone

Class: Antiarrhythmic Agent

Description:
Amiodarone is a class III Antiarrhythmic agent used to treat ventricular arrhythmias unresponsive to other antiarrhythmics.

Mechanism of Action:
Amiodarone prolongs the action potential duration in all cardiac tissues.

Indications:
Ventricular fibrillation, ventricular tachycardia.

Contraindications:
Breast-feeding, patients in cardiogenic shock, severe sinus node dysfunction resulting in marked bradycardia, second or third-degree AV block, symptomatic bradycardia, or known hypersensitivity.

Precautions:
Amiodarone should be used with caution in patients with latent or manifest heart failure because failure may be worsened by its administration.

Side Effects:
Hypotension, bradycardia, increased ventricular beats, prolonged P-R interval, prolonged QRS complex, prolonged Q-T interval. The patient should also be monitored for signs of pulmonary toxicity such as dyspnea and cough.

Interactions:
Amiodarone may react with Warfarin, Digoxin, Procainamide, Quinidine, and Phenytoin.

SCEMSA Policies:

PD# 8024 - Cardiac Dysrhythmias
PD# 8031 - Cardiac Arrest
PD# 9006 - Pediatric Cardiac Arrest

Aspirin

Class: Platelet Aggregator Inhibitor

Description:
Aspirin is an anti-inflammatory agent and an inhibitor of platelet function.

Mechanism of Action:
Aspirin blocks the formation of the substance thromboxane A2, which causes platelets to aggregate and arteries to constrict.

Indications:
Aspirin is used for new chest pain suggestive of acute myocardial infarction.

Contraindications:
Known hypersensitivity. Aspirin is relatively contraindicated in patients with active ulcer disease and asthma.

Precautions:
Aspirin can cause GI upset and bleeding. Aspirin should be used with caution in patients who report allergies to NSAIDs.

Side Effects:
Heartburn, GI bleeding, nausea, vomiting, wheezing, and prolonged bleeding.

Interactions:
When administered together, aspirin and other anti-inflammatory agents may cause an increased incidence of side effects. Administration of aspirin with antacids may reduce blood levels by reducing absorption.

SCEMSA Policies:
PD# 8030 - Chest Pain

Atropine Sulfate

Class: Anticholinergic

Description:
Atropine is a parasympatholytic that is derived from parts of the Atropa Belladonna plant.

Mechanism of Action:
Atropine is a potent parasympatholytic and is used to increase the heart rate in hemodynamically significant bradycardias. Atropine acts by blocking acetylcholine receptors, thus inhibiting parasympathetic stimulation. Atropine has positive chronotropic properties and little or no inotropic effect. It plays an important role as an antidote in organophosphate poisonings due to its bronchodilation and drying of respiratory tract secretions.

Indications:
Hemodynamically significant bradycardia and asystole.
Bronchial asthma, reversible bronchospasm associated with chronic bronchitis and emphysema—organophosphate overdose.

Contraindications:
Known hypersensitivity.

Precautions:
Atropine may worsen the bradycardia associated with second-degree type II and third-degree AV blocks. In these instances, pacing should be attempted prior to administration of Atropine For respiratory use: Use caution when administering this drug to elderly patients and those with cardiovascular disease or hypertension. If possible, peak flow rate should be measured before and after administration.

Side Effects:
Blurred vision, dilated pupils, dry mouth, tachycardia, drowsiness, confusion, palpitations, anxiety, dizziness, headache, nervousness, rash, nausea, and vomiting.

Interactions:
There are few interactions in the pre-hospital setting.

SCEMSA Policies:
PD# 8018 – Poisoning/OD
PD# 8024 – Cardiac Dysrhythmias
PD# 8027 – Nerve Agent Exposure
PD# 8029 – Hazardous Materials
PD# 9010 – Pediatric OD/Poisoning
PD# 9014 – Pediatric Cardiac Dysrhythmias

Dextrose

Class: Simple sugar.

Description:
A hexose sugar freely soluble in water

Mechanism of Action:
When administered intravenously, this solution restores blood glucose levels in hypoglycemia and provides a source of carbohydrate calories.

Indications:
25% or 50% Dextrose is indicated in the treatment of insulin hypoglycemia (hyperinsulinemia or insulin shock) to restore blood glucose levels.
The solution is also indicated, after dilution, for intravenous infusion as a source of carbohydrate calories in patients whose oral intake is restricted or inadequate to maintain nutritional requirements.

Contraindications:
A concentrated dextrose solution should not be used when intracranial or intraspinal hemorrhage is present, nor in the presence of delirium tremens if the patient is already dehydrated.

Precautions:
25% or 50% Dextrose Injection is hypertonic and may cause phlebitis and thrombosis at the site of injection. The solution should be given slowly, preferably through a small-bore needle into a large vein, to minimize venous irritation.

Side Effects:
Hyperosmolar syndrome, resulting from excessively rapid administration of concentrated dextrose, may cause mental confusion and/or loss of consciousness.
Reactions, which may occur because of the solution or the technique of administration include febrile response, infection at the site of injection, venous thrombosis, or phlebitis extending from the site of injection, extravasation, and hypervolemia.
If an adverse reaction does occur, discontinue the infusion, evaluate the patient, institute appropriate therapeutic countermeasures, and save the remainder of the fluid for examination if deemed necessary.

Interactions:
Dextrose injection without electrolytes should not be administered simultaneously with blood through the same infusion set because of the possibility that pseudo-agglutination of red cells may occur.

SCEMSA Policies:
PD# 8061 - Decreased Sensorium
PD# 9001 - Pediatric Airway Obstruction or Respiratory Arrest
PD# 9005 - Pediatric Decreased Sensorium

Diazepam (Only During Midazolam Shortage)

Class: Benzodiazepine

Description:
Anxiolytic, anti-seizure

Mechanism of Action:
Benzodiazepine induces a calming effect and acts on parts of the limbic system, thalamus, and hypothalamus.

Indications:
Diazepam is used to treat anxiety disorders, alcohol withdrawal symptoms, muscle spasms, or seizures.

Contraindications:
Known hypersensitivity to diazepam, acute narrow-angle glaucoma, and untreated open-angle glaucoma.

Precautions:
Extreme caution with chronic lung disease or unstable cardiovascular (CV) status when treating status epilepticus and severe recurrent seizures. To reduce the possibility of venous thrombosis, phlebitis, local irritation, or swelling, inject slowly when used IV (taking at least 1 min for each 5mg [1mL] given); do not use small veins. Extreme caution during administration to elderly, very ill patients, and those with limited pulmonary reserve due to the possibility of apnea and/or cardiac arrest; resuscitative equipment should be readily available. Avoid in patients in shock, coma, or in acute alcoholic intoxication with depressed vital signs. It may impair mental/physical abilities. May precipitate tonic status epilepticus in patients treated with IV for petit mal status or petit mal variant status. Monitor for apnea, cardiac arrest, and return to seizure activity.

Side Effects:
Sedation.

Interactions:
Barbiturates, alcohol, or other CNS depressants increase depression with an increased risk of apnea; resuscitative equipment should be readily available. Reduce the dose of narcotics by at least 1/3 and administer in small increments. Caution with other psychotropic agents or anticonvulsants, particularly with compounds that may potentiate the action of therapy (e.g., phenothiazines, narcotics, barbiturates, MAOIs, and other antidepressants). It may produce hypotension or muscular weakness with narcotics, barbiturates, or alcohol. Cimetidine may delay clearance.

SCEMSA Policies:
PD# 8061 - Decreased Sensorium
PD# 9005 - Pediatric Decreased Sensorium

Diphenhydramine

Class: Antihistamine

Description:
Diphenhydramine is a potent antihistamine that blocks H1 and H2 histamine receptors.

Mechanism of Action:
Diphenhydramine blocks the effects of H1 receptor stimulation (bronchoconstriction, visceral contractions) and that of H2 receptor stimulation (peripheral vasodilation and secretion of gastric acids). Diphenhydramine is also useful in the treatment of dystonic reactions accompanying phenothiazine use.

Indications:
Anaphylaxis, Allergic reactions, Dystonic (extrapyramidal) reactions due to phenothiazines

Contraindications:
Asthma, nursing mothers

Precautions:
The primary drug for the treatment of severe allergic reactions is epinephrine, as it reverses the effects of histamines. Diphenhydramine will block histamine receptors, preventing subsequent stimulation.

Side Effects:
Sedation dries bronchial secretions, blurred vision, headache, palpitations, and tachycardia.

Interactions:
Potentiation can occur by the administration of CNS depressants, other antihistamines, narcotics, and Alcohol.

SCEMSA Policies:
PD# 8001- Allergic Reaction;
PD# 8007 -Dystonic Reaction
PD# 9002 - Pediatric Allergic Reaction/Anaphylaxis

Epinephrine

Class: Sympathetic Agonist

Description:
Epinephrine is a naturally occurring catecholamine. It is a potent alpha- and beta-adrenergic stimulant with more profound beta effects.

Mechanism of Action:
Epinephrine works directly on alpha- and beta-adrenergic receptors with effects of increased heart rate, cardiac contractile force, increased electrical activity in the myocardium, systemic vascular resistance, increased blood pressure, and increased automaticity. It also causes bronchodilation. Effects usually appear within 90 seconds of administration and last only a short duration.

Indications:
Bronchial asthma, exacerbation of COPD, anaphylaxis, cardiac arrest, overdose-induced heart block, and hypotension.

Contraindications:
Underlying cardiovascular disease, hypertension.

Precautions:
Epinephrine should be protected from light. It also tends to be deactivated by alkaline solutions.

Side Effects:
Palpitations, anxiety, tremulousness, headache, dizziness, nausea, vomiting, myocardial oxygen demand.

Interactions:
Effects can be intensified in patients taking antidepressants

SCEMSA Policies:
PD# 8001- Allergic Reaction
PD# 8018 - Poisoning/OD
PD# 8026 - Respiratory Distress
PD# 8031 - Cardiac Arrest
PD# 9002 - Pediatric Allergic Reaction/Anaphylaxis
PD# 9003 - Pediatric Respiratory Distress
PD# 9006 - Pediatric Cardiac Arrest
PD# 9009 - Neonatal Resuscitation
PD# 9010 - Pediatric OD/Poisoning
PD# 9014 - Pediatric Cardiac Dysrhythmias

Fentanyl

Class: Opioid analgesic

Description:
Short-acting opiate analgesic for IV/IO/IN use in pain management

Mechanism of Action:
Narcotic analgesic; produces analgesic and sedative effects. Alters respiratory rate and alveolar ventilation, which may last longer than analgesic effects.

Indications:
Pain management

Contraindications:
Known hypersensitivity, bronchospasm, head injury with increased ICP, MAO Inhibitor use, Myasthenia gravis.

Precautions:
Administer only if specifically trained in the use of IV anesthetics and management of the respiratory effects of potent opioids. An opioid antagonist, resuscitative and intubation equipment, and oxygen should be readily available. Fluids and other countermeasures to manage hypotension should be available when used w/ tranquilizers. May cause muscle rigidity, particularly w/ muscles used for respiration. May cause euphoria, miosis, bradycardia, and bronchoconstriction. Caution in respiratory depression-susceptible patients (e.g., comatose patients w/ head injury or brain tumor); may obscure the clinical course of patients w/ head injury. Caution w/ COPD, decreased respiratory reserve, potentially compromised respiration, liver/kidney dysfunction, and cardiac bradyarrhythmias. Monitor vital signs routinely.

Side Effects:
Respiratory depression, apnea, rigidity, bradycardia.

Interactions:
Severe and unpredictable potentiation w/ MAOIs; appropriate monitoring and availability of vasodilators and β-blockers for HTN treatment is indicated. Additive or potentiating effects w/ other CNS depressants (e.g., barbiturates, tranquilizers, narcotics, general anesthetics); reduce dose of other CNS depressants. May cause CV depression w/ diazepam.

SCEMSA Policies:
PD# 8066 - Pain Management
PD# 9018 - Pediatric Pain Management

Glucagon

Class: Hormone and Anti-hypoglycemic

Description:
Glucagon is a hormone secreted by the alpha cells of the pancreas. It is used to increase the blood glucose level in cases of hypoglycemia in which an IV cannot immediately be placed.

Mechanism of Action:
Glucagon causes a breakdown of stored glycogen to glucose and inhibits the synthesis of glycogen from glucose. A return to consciousness following the administration of Glucagon usually takes from 5-20 minutes. Glucagon is only effective if there are sufficient stores of glycogen in the liver. Glucagon exerts a positive inotropic action on the heart and decreases renal vascular resistance.

Indications:
Hypoglycemia, Beta-Blocker overdoses.

Contraindications:
Known hypersensitivity.

Precautions:
Glucagon is only effective if there are sufficient stores of glycogen in the liver. Glucagon should be administered with caution to patients with a history of cardiovascular or renal disease.

Side Effects:
Hypotension, dizziness, headache, nausea, vomiting.

Interactions:
There are few interactions reported in the emergency setting.

SCEMSA Policies:
PD# 8002 – Diabetic Emergencies
PD# 8018 – Poisoning/OD
PD# 9007 – Pediatric Diabetic Emergncies

Glucose, Oral

Class: Simple sugar.

Description:
A hexose sugar freely soluble in water

Mechanism of Action:
Restores blood glucose levels in hypoglycemia and provides a source of carbohydrate calories.

Indications:
Treatment of insulin hypoglycemia (hyperinsulinemia or insulin shock) to restore blood glucose levels.

Contraindications:
Patients without a gag reflex or the capability to protect the airway or swallow.

Precautions:
Caution when giving to patients with a decreased level of consciousness.

Side Effects:
When used in small doses, no COMMON side effects have been reported.

Interactions:
No significant interactions when used in the emergency setting.

SCEMSA Policies:
PD# 8002 – Diabetic Emergencies
PD# 9007 – Pediatric Diabetic Emergencies

Ipratropium Bromide (Atrovent)

Class: Anticholinergic/Bronchodilator

Description:

Ipratropium bromide is an anticholinergic agent used in the management of bronchospasm. Ipratropium competes with acetylcholine for binding at the cholinergic muscarinic receptors in the lung (M1, M2, M3). Antagonism of the cholinergic muscarinic receptors results in a decrease in the formation of cyclic guanosine monophosphate (cGMP), which leads to decreased contractility of bronchial smooth muscle resulting in bronchodilation. When administered via inhalation, the effects of ipratropium are almost exclusively limited to the airway. Inhaled ipratropium has minimal effect on heart rate or intraocular pressure.

Mechanism of Action:

Ipratropium is in a class of medications called bronchodilators. It works by relaxing and opening the air passages to the lungs to make breathing easier.

Indications:

Bronchial asthma, reversible bronchospasm associated with COPD and emphysema.

Contraindications:

Known hypersensitivity to the medication or to Atropine.

Precautions:

Ipratropium should be used with caution in patients with narrow-angle glaucoma..
Paradoxical bronchospasm may occur in a small percentage of patients who receive ipratropium. If suspected, discontinue use.

Side Effects:
Cough, throat irritation, headache, dry mouth, urinary retention.

Interactions:
None reported with a single dose.

SCEMSA Policies:
PD# 8001- Allergic Reaction
PD# 8026 - Respiratory Distress
PD# 8029 - Hazardous Materials
PD# 9002 - Pediatric Allergic Reaction/Anaphylaxis
PD# 9003 - Pediatric Respiratory Distress

Ketamine

Class: Dissociative Anesthetic

Description:

A class III scheduled drug used as an anesthetic and sedative. Ketamine has strong hallucinogenic, tranquilizing, and dissociative effects.

Mechanism of Action:

Classified as an NMDA receptor antagonist, having hallucinogenic or euphoric properties. It induces a trance-like state while providing pain relief, sedation, and memory loss.

Indications:
In the pre-hospital setting, Ketamine is indicated for pain management.

Contraindications:
Ketamine is contraindicated in patients in whom a significant elevation of blood pressure would constitute a serious hazard, such as those patients with hypertension, stroke, head trauma, or intracranial mass or intracranial bleeding. Similarly, ketamine should be used with caution in patients with increased intracranial pressure or increased intraocular pressure (e.g., glaucoma) because these pressures may increase significantly after a single dose of ketamine. Carefully evaluate patients with ocular trauma or space-occupying lesions (i.e., brain neoplasms) prior to administration of ketamine.

Precautions:
Because of the substantial increase in myocardial oxygen consumption, ketamine should be used with caution in patients with hypovolemia, dehydration, or cardiac disease, especially coronary artery disease (e.g., angina, congestive heart failure, and myocardial infarction).

Side Effects:
Bradycardia, laryngospasm, apnea, ocular hypertension, anaphylaxis, increased ICP, hallucinations, hypertension, nystagmus, involuntary movements, hypersalivation, nausea, and vomiting.

Interactions:
Concomitant use of opiates with another CNS depressant can lead to additive respiratory depression, hypotension, profound sedation, or coma.

SCEMSA Policies:
PD# 8066 – Pain Management

Ketorolac (Toradol)

Class: Non-Steroidal Anti-Inflammatory

Description:

Ketorolac is a non-steroidal anti-inflammatory agent (NSAID) with potent analgesic effects and moderate anti-inflammatory effects.

Mechanism of Action:

Ketorolac works by blocking the production of prostaglandins, compounds that cause pain, fever, and inflammation.

Indications:

Mild to Moderate Pain.

Contraindications:

Known hypersensitivity, allergy to any NSAID (including aspirin), Asthma, Renal Insufficiency, Peptic Ulcer Disease, GI Bleeding, Pregnancy, Hypovolemia, Trauma other than Isolated Extremity Trauma, Anticipated Major Surgery (within 7 days).

Precautions:

Ketorolac is not indicated for the treatment of abdominal or chest pain. The dose of Ketorolac should be reduced by 50% in patients > 65 years of age due to concern for age-related reduction of renal function.

Side Effects:

GI Bleeding, Nausea/Vomiting, Headache, Drowsiness, Abdominal Pain, Dyspepsia, Diarrhea.

Interactions:

The risk of severity of adverse effects can be increased when Acetaminophen is combined with Ketorolac.

SCEMSA Policies:
PD# 8066 – Adult Pain Management
PD# 9018 – Pediatric Pain Management

Magnesium Sulfate

Class: Mineral and Electrolyte Replacement/Supplement; Miscellaneous Anticonvulsants

Description: Magnesium is a naturally occurring mineral that is important for many systems in the body, especially the muscles and nerves.

Mechanism of Action: Magnesium Sulfate's mechanism of action is multifaceted, primarily by acting as a Central Nervous System (CNS) depressant, blocking neuromuscular transmission, and causing vasodilation

Indications: Magnesium Sulfate is used for seizures in known or suspected pregnancy (greater than 20 weeks) OR if a possible pregnancy within the last 6 weeks. It is to be administered even if the seizure has resolved.
Magnesium Sulfate is used for moderate to severe respiratory distress with severe wheezing and shortness of breath. It is also used to treat polymorphic ventricular tachycardia (Torsades de Pointes).

Contraindications: If any known hypersensitivity reaction to magnesium sulfate has occurred in the past, it should not be administered. If a patient is in a known heart block, has recent myocardial damage, or has significant heart rhythm problems, magnesium sulfate should not be given as it can exacerbate the already slowed cardiac conduction. Patients with Myasthenia Gravis or other neuromuscular diseases.

Precautions: Use caution in patients with renal impairment, as Magnesium Sulfate is removed from the body solely by the kidneys. Use caution when other CNS depressants (e.g., barbiturates, narcotics, typnotics, anesthetics) are given concurrently, as magnesium sulfate can have additive depressant effects.

Side effects: Possible side effects include: Flushing, sweating, Hypotension, Headache, Nausea, Vomiting, Drowsiness, Muscle Weakness, and Pain or Irritation at the injection site. Serious side effects include: Respiratory Depression, CNS Depression, Cardiac Disturbances, Circulatory Collapse, Hypothermia, and Hypocalcemia.

Interactions: Magnesium sulfate has numerous interactions with other medications, including antibiotics, calcium channel blockers, and neuromuscular blocking agents. These interactions can decrease the effectiveness of other drugs or increase the risk of magnesium toxicity, which can be serious.

SCEMSA Policies:
PD# 8003 – Seizures
PD# 8026 – Respiratory Distress
PD# 8031 – Non-Traumatic Cardiac Arrest
PD# 9003 – Pediatric Respiratory Distress

Midazolam

Class: Sedative and Hypnotic

Description:
Midazolam is a benzodiazepine with strong hypnotic and amnestic properties.

Mechanism of Action:
Midazolam is a potent but short-acting benzodiazepine used as a sedative and hypnotic. It is three to four times more potent than Diazepam. Its onset of action is approximately 1.5 minutes when administered IV. Midazolam has impressive amnestic properties, and like other benzodiazepines, it has no effect on pain.

Indications:
Midazolam is used as a premedication before cardioversion and other painful procedures. Active seizures.

Contraindications:
Known hypersensitivity, narrow-angle glaucoma, shock, depressed vital signs, and alcoholic coma.

Precautions:
Emergency resuscitative equipment must be available prior to the administration of Midazolam. Midazolam has more potential than other benzodiazepines to cause respiratory depression and respiratory arrest.

Side Effects:
Laryngospasm, bronchospasm, dyspnea, respiratory depression and arrest, drowsiness, altered mental status, amnesia, bradycardia, tachycardia, premature ventricular contractions, and retching.

Interactions:
The effects of Midazolam can be accentuated by CNS depressants such as narcotics and alcohol.

SCEMSA Policies:
PD# 8024 - Cardiac Dysrhythmias
PD# 8003 - Seizures
PD# 8062 - Behavioral Crisis/Restraint
PD# 9008 - Pediatric Seizures
PD# 9014 - Pediatric Cardiac Dysrhythmias

Morphine Sulfate

Class: Narcotic Analgesic

Description:
Morphine is a potent CNS depressant and analgesic.

Mechanism of Action:
Morphine acts on opiate receptors in the brain, providing analgesia and sedation. It increases peripheral venous capacitance and decreases venous return. Morphine also decreases myocardial oxygen demand.

Indications:
Severe pain associated with myocardial infarction, kidney stones, etc., and pulmonary edema.

Contraindications:
Volume depletion, severe hypotension, hypersensitivity, undiagnosed head injury, or abdominal pain.

Precautions:
Morphine has a high tendency for addiction and abuse. Morphine can cause severe respiratory depression in high doses, especially in patients with respiratory impairment. Narcan should be available as an antagonist.

Side Effects:
Nausea, vomiting, abdominal cramps, blurred vision, constricted pupils, altered mental status, headache, respiratory depression.

Interactions:
CNS depression can be enhanced when administered with antihistamines, antiemetics, sedatives, hypnotics, barbiturates, and alcohol.

SCEMSA Policies:
PD# 8066 - Pain Management
PD# 9018 - Pediatric Pain Management

Naloxone

Class: Narcotic Antagonist

Description:
Naloxone is an effective narcotic antagonist.

Mechanism of Action:
Naloxone is chemically similar to narcotics; however, it has only antagonistic properties. Naloxone competes for opiate receptors in the brain and displaces narcotic molecules from opiate receptors. It can reverse respiratory depression from a narcotic overdose.

Indications:
Complete or partial reversal of depression caused by narcotics. Naloxone can also be used in the treatment of coma of unknown origin.

Contraindications:
Known hypersensitivity.

Precautions:
Naloxone should be administered cautiously to patients who are known or are suspected to be physically dependent on narcotics. Abrupt and complete reversal by Naloxone can cause withdrawal-type effects.

Side Effects:
Hypotension, hypertension, ventricular arrhythmias, nausea, vomiting.

Interactions:
Naloxone may cause narcotic withdrawal in the narcotic-dependent patient. Only enough of the drug should be given to reverse respiratory depression.

SCEMSA Policies:
PD# 2523 – Administration of Naloxone by Law Enforcement First Responders
PD# 8004 – Suspected Narcotic Overdose
PD# 9011 – Pediatric Overdose

Nitroglycerine

Class: Nitrate

Description:
Nitroglycerine is a potent smooth muscle relaxant used in the treatment of angina pectoris.

Mechanism of Action:
Nitroglycerine is a rapid smooth muscle relaxant that reduces cardiac work and to a lesser degree dilates the coronary arteries. This results in increased coronary blood flow and improved perfusion of the myocardium. Pain relief following Nitroglycerine administration usually occurs within 1 to 2 minutes, with therapeutic effects up to 30 minutes later.

Indications:
Chest pain associated with angina pectoris, acute myocardial infarction, and acute pulmonary edema.

Contraindications:
Hypotension, increased intracranial pressure.

Precautions:
Patients taking Nitroglycerine may develop a tolerance to the drug necessitating a higher dose. Headache from vasodilation of the cerebral vessels is common. Nitroglycerine deteriorates rapidly once opened. Nitroglycerine should be protected from light.

Side Effects:
Headache, dizziness, weakness, tachycardia, hypotension, orthostasis, skin rash, dry mouth, nausea, vomiting.

Interactions:
Nitroglycerine can cause hypotension in patients who have recently ingested alcohol. It can cause orthostatic hypotension when used in conjunction with beta-blockers.

SCEMSA Policies:
PD# 8026 - Respiratory Distress
PD# 8030 - Chest Pain

Normal Saline (0.9% NaCl)

Class: Isotonic Crystalloid Solution

Description:
Normal Saline contains 154mEq/L of sodium ions and approximately 154mEq/L of chloride ions. Because the concentration of sodium is near that of the blood, the solution is considered isotonic.

Mechanism of Action:
Normal Saline replaced water and electrolytes.

Indications:
Heat-related problems (heat exhaustion, heat stroke).

Contraindications:
The use of 0.9%NaCl should not be considered in patients with congestive heart failure because circulatory overload can easily be induced.

Precautions:
When large amounts of Normal Saline are administered, it is quite possible for other physiological electrolytes to become depleted.

Side Effects:
Rare in therapeutic doses.

Interactions:
Few in the emergency setting.

SCEMSA Policies:
Many

Ondansetron

Class: 5-HT_3 receptor antagonist

Description:
Antiemetic medication is available for IV, oral, or sublingual administration.

Mechanism of Action:
Selective 5-HT_3 receptor antagonist; has not been established

Indications:
Nausea/Vomiting

Contraindications:
Known hypersensitivity to ondansetron or any of its components

Precautions:
. Hypersensitivity reactions were reported in patients hypersensitive to other selective 5-HT_3 receptor antagonists. ECG changes, including QT interval prolongation and torsade's de pointes, were reported; avoid in patients w/ congenital long QT syndrome. Monitor ECG in patients with electrolyte abnormalities (e.g., hypokalemia, hypomagnesemia), CHF, bradyarrhythmias, and in patients taking other medications that lead to QT prolongation. Serotonin syndrome reported; d/c and initiate supportive treatment if symptoms occur. Use in patients following abdominal surgery or w/ chemotherapy-induced N/V may mask a progressive ileus and/or gastric distension. Does not stimulate gastric/intestinal peristalsis; do not use instead of NG suction. (ODT) Contains phenylalanine; caution in phenylketonuric patients.

Side Effects:
Headache, diarrhea, constipation, fever, pruritus, dizziness, bradycardia, drowsiness/sedation. (Inj) Inj-site reaction. (PO) Malaise/fatigue, anxiety/agitation, urinary retention

Interactions:
Inducers or inhibitors of CYP3A4, CYP2D6, and CYP1A2 may change the clearance and $T_{1/2}$. Potent CYP3A4 inducers (e.g., phenytoin, carbamazepine, and rifampin) may significantly increase clearance and decrease blood levels. May reduce analgesic activity of tramadol. May cause serotonin syndrome w/ other serotonergic drugs (e.g., SSRIs, SNRIs, MAOIs, mirtazapine, fentanyl, lithium, tramadol, IV methylene blue); d/c and initiate supportive treatment if symptoms occur.

SCEMSA Policies:
PD# 8063 - Nausea/Vomiting
PD# 9020 – Pediatric Nausea/Vomiting

Sodium Bicarbonate

Class: Alkalinizing Agent

Description:
Sodium Bicarbonate is a salt that provides bicarbonate to buffer metabolic acidosis.

Mechanism of Action:
Sodium Bicarbonate increases pH by providing the bicarbonate buffer (a weak base). Making the urine more alkaline enhances Tricyclic Antidepressant excretion. Sodium Bicarbonate is used to increase the pH of the urine and thereby speed excretion from the body.

Indications:
Tricyclic antidepressant overdose, Phenobarbital overdose, severe acidosis refractory to hyperventilation, and known hyperkalemia.

Contraindications:
There are no absolute contraindications.

Precautions:
Sodium Bicarbonate can cause metabolic alkalosis when administered in large quantities. It is important to calculate the dosage based on weight and size.

Side Effects:
There are few side effects when used in the emergency setting.

Interactions:
Most catecholamines and vasopressors (e.g., Epinephrine and Dopamine) can be deactivated by alkaline solutions such as Sodium Bicarbonate. Calcium Chloride should not be administered in conjunction with Sodium Bicarbonate, as a precipitate will form.

SCEMSA Policies:
PD# 8018 - Poisoning/OD
PD# 9010 - Pediatric OD/Poisoning

TXA (Tranexamic Acid)

Class: Synthetic Antifibrinolytics

Description:
Hemostatic agent. Has actions similar to aminocaproic acid but is approximately 10x more potent.

Mechanism of Action:
Tranexamic acid is a hemostatic agent and is a synthetic derivative of the amino acid lysine. Tranexamic acid binds to the lysine-binding site for fibrin on the plasminogen/plasmin molecule. Saturation of this high affinity-binding site by tranexamic acid displaces plasminogen from the surface of fibrin. This prevents the binding of fibrin to plasmin, preserves and stabilizes the matrix structure of fibrin, and diminishes the ability of plasmin to lyse fibrin clots.

Indications:
TXA has been shown to improve mortality in trauma patients with signs of hemorrhagic shock. TXA is indicated in critical trauma patients with blunt or penetrating torso trauma with signs of hemorrhagic shock, Bradykinin-mediated angioedema and Histamine-induced angioedema.

Additional Use:
- Topical (soaked gauze)
    - Epistaxis, wound, dental
- Nebulizer
    - Tonsil and/or hemoptysis

Contraindications:
Isolated head, neck, or extremity trauma; more than 3 hours since injury; thromboembolic event (Stroke, MI, or PE) in last 24 hours; traumatic arrest with more than 5 minutes of CPR without ROSC; hypotension secondary to suspected cervical cord injury with motor deficit or spinal shock.
Tranexamic acid is contraindicated in patients with known tranexamic acid hypersensitivity. Severe allergic reactions have been reported

Side Effects:
Anaphylaxis, thromboembolism, headache, abdominal pain, rash.

Interactions:
No significant interactions with other medications used in the SCEMSA

SCEMSA Policies:
PD# 8001 – Allergic Reaction/Anaphylaxis
PD# 8026 – Respiratory Distress
PD# 8065 – Hemorrhage