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.

Pharmacokinetics:
Absorbed along the small intestine by passive diffusion, reaches peak blood concentrations within 90 minutes after ingestion

Prehospital Indications:
Mild to moderate pain, fever

Contraindications:
Known hypersensitivity and/or allergy. Severe liver disease. Patients under four (4) years of age.

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

Side Effects:
Nausea/Vomiting

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

Adenosine

Class: Antiarrhythmic

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

Mechanism of Action:
Slows conduction through the atrioventricular (AV) and sinoatrial (SA) nodes, interrupting reentry pathways and briefly blocking conduction.

Pharmacokinetics:
Onset immediate, duration < 10 seconds

Pre-hospital Indications:
Adenosine is used in SVT refractory to common vagal maneuvers

Contraindications:
Adenosine is contraindicated in patients with second or third degree heart blocks, poison induced or drug induced tachycardia

Precautions:
Adenosine typically causes arrhythmias at the time of cardioversion; in extreme cases, transient asystole may occur. Bronchospasm may occur in patients with a history of airway disease, such as asthma or COPD.

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

SCEMSA Policies:
PD# 8024 - Cardiac Dysrhythmias
PD# 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 that causes relaxation of smooth muscles in the bronchial tree, decrease in airway resistance, facilitates mucous drainage, and improves airflow.

Pharmacokinetics:
Onset 5-15 minutes inhaled. Duration 3-6 hours for bronchial smooth muscle relaxation

Pre-hospital Indications:
Respiratory distress: bronchial asthma, bronchospasms; pulmonary edema

Contraindications:
Known hypersensitivity to the drug.

Precautions:
Use caution when administering this drug to elderly patients and those with cardiovascular disease or hypertension.

Side Effects:
Palpitations, anxiety, dizziness, headache, nervousness, tremors, hypertension, dry mouth

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

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

Mechanism of Action:
Amiodarone is a class III antiarrhythmic agent that works on multiple channels (sodium, potassium, calcium) to slow conduction through the AV node, reduce myocardial irritability, and inhibit adrenergic stimulation. Amiodarone prolongs the action potential duration in all cardiac tissues.

Pharmacokinetics:
Onset minutes after IV bolus administration

Prehospital Indications:
Ventricular fibrillation, ventricular tachycardia.

Contraindications:
Patients in cardiogenic shock, bradycardia, second or third-degree AV block

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.

SCEMSA Policies:
PD# 8024 - Cardiac Dysrhythmias
PD# 8031 - Cardiac Arrest
PD# 8834 - Medication Administration - Amiodarone
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.

Pharmacokinetics:
Onset is 5-30 minutes

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

Contraindications:
Known hypersensitivity, acute asthma attack

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, stomach pain, tinnitus

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 poisoning due to its bronchodilation and drying of respiratory tract secretions.

Pharmacokinetics:
Peak effect in 20-30 minutes IM, 2-4 minutes IV/IO, duration 4 hours

Prehospital Indications:
Symptomatic bradycardia, organophosphate overdose

Contraindications:
Known hypersensitivity.

Precautions:
Atropine may worsen the bradycardia associated with second-degree type II and third-degree AV blocks.

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

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

Buprenorphine

Class:
Analgesic, opioid antagonist, opioid partial agonist

Description:
Buprenorphine is used to treat opioid use disorder; it eases withdrawal symptoms and reduces craving.

Mechanism of Action:
Exerts its analgesic effect via high affinity binding to mu-opioid receptors in the CNS; displays partial mu agonist and weak kappa antagonist activity

Pharmacokinetics:
Rapid absorption, peak concentration 0.5-1 hour after administration

Prehospital Indications:
Management of opioid withdrawal

Contraindications:
Methadone use within the last 10 days; altered mental status; severe medical illness; current intoxication or recent use of benzodiazepine, alcohol, or other intoxicants suspected; no clinical opioid use disorder symptoms

Precautions:
Calculate a COWS score before administration

Side Effects:
Diaphoresis, abdominal pain, nausea, headache, palpitations, withdrawal syndrome

SCEMSA Policies:
PD# 8969 - Buprenorphine

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. Main form of glucose used by the body to create energy.

Pharmacokinetics:
Onset < 1 minute, peak effect dependent upon degree and cause of hypoglycemia

Prehospital Indications:
Hypoglycemia

Contraindications:
Suspected intracranial hemorrhage.

Precautions:
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:
Hyperglycemia, pain at the injection site and necrosis.

SCEMSA Policies:
PD# 8002 - Diabetic Emergencies
PD# 9007 - Pediatric Diabetic Emergency

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.

Pharmacokinetics:
Onset of action almost immediately intravenously, peak effects within 1-5 minutes

Prehospital Indications:
Seizures, behavioral crisis, premedication before cardioversion

Contraindications:
Known hypersensitivity to diazepam

Precautions:
Chronic lung disease, 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 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.

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.

Pharmacokinetics:
Onset is 15-30 minutes

Prehospital Indications:
Allergic reactions, dystonic (extrapyramidal) reactions, anaphylaxis

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:
Drowsiness, dizziness, blurred vision, headache, palpitations, and tachycardia

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.

Pharmacokinetics:
Onset is < 2 minutes IV, 1-3 minutes IM; duration is 5-10 minutes IV, 20-30 minutes IM

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

Contraindications:
None in the pre-hospital emergency setting.

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

Side Effects:
Palpitations, anxiety, headache, dizziness, nervousness/restlessness, hypertension, nausea/vomiting

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 agonist-analgesic of opiate receptors; inhibits ascending pain pathways; produces analgesic and sedative effects. Alters respiratory rate and alveolar ventilation, which may last longer than analgesic effects.

Pharmacokinetics:
Onset is immediate; peak in 3-5 minutes; duration is 30-60 minutes

Prehospital Indications:
Pain management

Contraindications:
Known hypersensitivity, bronchospasm, head injury with increased ICP, MAO Inhibitor use, Myasthenia gravis, pregnancy with pain from active labor.

Precautions:
Respiratory depression, hypotension, possible muscle rigidity. Oxygen should be readily available. Fluids and other countermeasures to manage hypotension should be available. Caution w/ COPD, decreased respiratory reserve, potentially compromised respiration, and cardiac bradyarrhythmia. Monitor vital signs routinely.

Side Effects:
Respiratory depression, dyspnea, apnea, bradycardia, altered level of consciousness, hypotension, syncope, nausea/vomiting

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. 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.

Pharmacokinetics:
Onset is 5-20 minutes; duration is 1-1.5 hours

Prehospital Indications:
Hypoglycemia

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. Glucagon will produce worsening hypoglycemia in patients with known insulinoma (insulin-secreting tumor).

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

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

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.

Pharmacokinetics:
Rapidly absorbed in the gastrointestinal tract, leading to a quick spike in blood glucose levels that stimulates insulin secretion, typically returning to baseline within 2 hours.

Prehospital 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.

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

Ipratropium Bromide (Atrovent)

Class: Anticholinergic/Bronchodilator

Description:
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.

Mechanism of Action:
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

Pharmacokinetics:
Acts rapidly within 1-3 minutes, peaks in 1-2 hours

Prehospital Indications:
Bronchial asthma, bronchospasm associated with COPD and emphysema

Contraindications:
Known hypersensitivity to the medication or to Atropine.

Precautions:
Paradoxical bronchospasm may occur in a small percentage of patients who receive ipratropium.

Side Effects:
Cough, throat irritation, headache, dry mouth, palpitations, nervousness, hypertension, nausea/vomiting

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 by direct action on the cortex and limbic system while providing pain relief, sedation, and memory loss.

Pharmacokinetics:
Onset 3-5 minutes, duration 20-40 minutes

Prehospital Indications:
Pain management

Contraindications:
Hypertension, stroke, head trauma, or intracranial mass, intracranial bleeding, increased intracranial, pregnancy with pain from active labor.

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, anaphylaxis, hallucinations, hypertension, nystagmus, involuntary movements, hypersalivation, nausea/vomiting

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. Ketorolac reversibly inhibits cyclooxygenase-1 and 2 enzymes, which decreases formation of prostaglandin precursors. Inhibits platelet function.

Pharmacokinetics:
Onset minutes after IM/IV/IO administration

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

Precautions:
Ketorolac is not indicated for the treatment of abdominal or chest pain.

Side Effects:
GI bleeding, nausea/vomiting, headache, drowsiness, abdominal pain, dyspepsia, diarrhea

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

Lidocaine

Class: Antiarrhythmic

Description:
Lidocaine is a class I antiarrhythmic agent that is also used for local and topical anesthesia.

Mechanism of Action:
Lidocaine depresses the automaticity of the Purkinje fibers raising the depolarization threshold in the ventricular fibers and decreases tendency to fibrillate.

Pharmacokinetics:
Onset is 2 minutes; peak in 3-5 minutes; duration is 10-20 minutes

Prehospital Indications:
Ventricular tachycardia or wide complex tachycardia with pulses, recurrent refractory ventricular fibrillation, pulseless ventricular tachycardia, pre-treatment of localized pain caused by fluid boluses through an IO.

Contraindications:
Supraventricular rhythms or bradycardias, known hypersensitivity

Precautions:
Lidocaine can cause CNS disturbances

Side Effects:
Sleepiness, dizziness, disorientation, confusion, convulsions, hypotension, bradycardia

SCEMSA Policies:
PD# 8024 - Cardiac Dysrhythmias
PD# 8808 - Vascular Access
PD# 9006 - Pediatric Medical Cardiac Arrest

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

Pharmacokinetics:
Immediate onset of action in prehospital setting

Prehospital 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. 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.

Side effects:
Flushing, sweating, hypotension, headache, nausea, vomiting, drowsiness, muscle weakness, respiratory depression, CNS depression, cardiac disturbances, hypothermia, and hypocalcemia.

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. Binds GABA receptors at several sites within the central nervous system, potentiating ABA activity and thereby producing anxiolytic, anticonvulsant, muscle relaxant, and amnestic effects. Midazolam has impressive amnestic properties, and like other benzodiazepines, it has no effect on pain.

Pharmacokinetics:
Onset 3-5 minutes IV, 15-20 minutes IM, 6-14 minutes IN; Duration 1-6 hours IV/IM

Prehospital Indications:
Premedication before cardioversion and other painful procedures, active seizures, behavioral crisis.

Contraindications:
Known hypersensitivity, shock, depressed vital signs

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, nausea/vomiting

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.

Pharmacokinetics:
Onset is immediate IV, 15-30 minutes IM; duration is 2-7 hours

Prehospital Indications:
Pain management

Contraindications:
Volume depletion, severe hypotension, hypersensitivity, undiagnosed head injury, abdominal pain, pregnant with active labor pains

Precautions:
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.

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

Naloxone (Narcan)

Class: Opiate 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.

Pharmacokinetics:
Onset is < 2 minutes IV, 2-10 minutes IM; duration is 20-120 minutes

Prehospital Indications:
Reversal of respiratory depression caused by opioids

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, withdrawal symptoms

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.

Pharmacokinetics:
Onset is 1-3 minutes SL or TD; duration is 20-30 minutes

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

Contraindications:
Hypotension, increased intracranial pressure, chest trauma, use of phosphodiesterase type-5 inhibitors (Viagra, Cialis, Sildenafil, Tadalafil, Vardenafil, Avanafil, or equivalent) within previous 48 hours

Precautions:
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

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

Normal Saline (0.9% NaCl)/NS

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:
Isotonic, crystalloid solution containing 0.9% NaCl. Increases intravascular volume which can increase preload, cardiac output, and tissues perfusion.

Pharmacokinetics:
Onset is immediate; duration of effect is typically 30 minutes

Prehospital Indications:
Sepsis, burns, hyperglycemia, hypotension, shock, heat-related problems (heat exhaustion, heat stroke)

Contraindications:
NS should be used with caution with patients with congestive heart failure.

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.

SCEMSA Policies:
Many

Ondansetron

Class: Selective 5-HT_3 receptor antagonist, antiemetic

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

Mechanism of Action:
Mechanism of Action has not been established. It is believed to block serotonin receptors (5-HT3) in both the GI tract and the brains vomiting control center (within the medulla), reducing nausea and vomiting.

Pharmacokinetics:
Onset is 1-5 minutes; duration is 4-6 hours

Prehospital Indications:
Nausea/Vomiting

Contraindications:
Known hypersensitivity to ondansetron or any of its components

Precautions:
Avoid in patients with prolonged QT syndrome. Monitor ECG in patients with electrolyte abnormalities (e.g., hypokalemia, hypomagnesemia), CHF, bradyarrhythmia, and in patients taking other medications that lead to QT prolongation

Side Effects:
Headache, diarrhea, constipation, fever, pruritus, dizziness, bradycardia, drowsiness/sedation (PO); malaise/fatigue, anxiety/agitation, urinary retention

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.

Pharmacokinetics:
Onset is < 15 minutes (observed < 5 minutes for tricyclic overdose); clinical effect < 15 minutes; duration is 1-2 hours

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

Contraindications:
There are no absolute contraindications in the prehospital setting.

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:
Extracellular alkalosis, tissue damage if IV infiltrates, pulmonary edema

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.

Pharmacokinetics:
Onset is 5-15 minutes; duration is 2-3 hours

Prehospital Indications:
Hemorrhagic shock, active hemorrhaging due to trauma

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, hypersensitivity.

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

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