CRITICAL CARE TRANSPORT TIER I PROTOCOLS

The following protocols are for Advanced Scope of Practice. Only providers who have completed additional system education are authorized to perform.

These protocols are designed only for patients who are being transferred from one medical facility to another. A Medical Control Physician must be contacted if the protocol parameters are not met or any of the following conditions apply:

1. Patient is hypotensive at the time of transfer.
2.. Patient is hypoxic (less than 92% SpO_2)
3. An acute deterioration or change in the patient's status is noted or anticipated.
4. Patient is under the age of 8 or less than 30kg
5. Medications ordered are outside of the concentrations or infusion rates that are permitted by the current prehospital treatment protocols.
6.. The prehospital provider has any concern that the provider's experience or abilities, or the available equipment, may not meet the patient's anticipated needs during the transport.

Patients who are being transported on more than two (2) continuously infusing medications, or more than one (1) medication to increase their blood pressure must be transported with a provider from the sending facility to assist with those medications.

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EXPANDED SCOPE QA/QI

Agency:_____Date:_____MICU:_____ Paramedic:_____Lic. No.:_____
Transport from:_____Transport to:_____

- ☐ Vital signs documented at minimum every ten minutes.
  Yes/No Change in vitals
  - ☐ Documentation reveals change noted, and care rendered accordingly

- ☐ Documentation reveals ongoing assessment to monitor for
  - ☐ Hypotension
  - ☐ Extreme bradycardia or tachycardia, dysrhythmia
  - ☐ Increasing chest pain
  - ☐ Altered mental status or change in neuro exam
  - ☐ Documentation of appropriate care rendered accordingly

- ☐ Any alterations in IV status documented
  - ☐ IV catheter unexpected discontinued
  - ☐ Rate adjustments of infusions
  - ☐ IV Medications within Advanced Scope Protocol
  - ☐ Documentation of appropriate care rendered accordingly

- ☐ Were ventilator settings changed during transport
  - ☐ Reason and response documented

- ☐ Was Medical Control or Ordering Physician contacted after EMS arrival
  - ☐ Reason and response documented
  - ☐ Name of physician included in documentation

- ☐ Any unusual occurrences documented
  - ☐ Issues reported to EMS System Coordinator

- ☐ Chart reviewed by EMS System Coordinator
  - ☐ Any abnormalities in transport require EMS MD review
  - ☐ Follow up with transporting crew

PAIN MANAGEMENT

Isolated Traumatic Injuries:

1. Treat patient per ROUTINE TRAUMA CARE- STABLE PATIENT or EXTREMITY TRAUMA PROTOCOL
2. Consider TORADOL 15mg IVP or 30mg IM.

Caution: **Toradol is contraindicated in patients with active peptic ulcer disease and / or recent GI bleeding, advanced renal failure, or any patient at risk for bleeding.**

Non-Traumatic Pain:

1. Treat patients per appropriate System Protocol.
2. Patients with Altered Level of Consciousness (ALOC) or unstable vital signs should not receive pain medications.
3. Consider TORADOL (Ketorolac) 15mg IVP or 30mg IM.
   a. Avoid in anyone who has suspected bleeding (for example: trauma, abdominal aortic aneurysm rupture, gastrointestinal bleeding), or known or suspected kidney disease, liver disease, blood disorders, ulcers, heart disease, alcohol use, high blood pressure, eye disease, any allergies—especially aspirin/NSAID allergy (e.g. –ibuprofen, celecoxib).
4. Consider MORPHINE SULFATE 4mg, IVP for patients up to 65 years of age.
   a. Consider 2 mg IVP for patients over 65 years of age.
   b. May repeat MORPHINE SULFATE in 2-4 mg increments every 15 minutes to a maximum of 10mg or until the patient indicates relief or tolerance of pain, or begins to become drowsy.
5. Consider HYDROMORPHONE (Dilaudid) 0.5mg IVP.
   a. May repeat HYDROMORPHONE 0.5mg every 5 minutes to a maximum 2mg until the patient indicates relief or tolerance of pain, or begins to become drowsy.
   b. Patient 65 years of age and older, HYDROMORPHONE 0.2mg IVP every 5 minutes to a maximum 2 mg until the patient indicates relief or tolerance of pain.
6. Consider SUBLIMAZE (Fentanyl) 50mcg IVP OVER 2 minutes.
   a. May repeat SUBLIMAZE 50mcg IVP every 5 minutes to a maximum of 100mcg.
   b. Patients 65 years of age and older should get doses of 25mcg IVP over 2 minutes and can be repeated every 5 minutes to a maximum of 100mcg.

Watch for ALOC and respiratory depression when administering narcotics. If ALOC and respiratory depression occurs, administer NALOXONE per the ALOC Protocol.

ACETADOTE (ACETYLCYSTEINE)

Indications:

1. Antidote for acetaminophen overdose

Contraindications:

1. Hypersensitivity

Drug Interactions:

1. None

Dosage and Administration:

Adult Acetaminophen Poisoning:

1. ACETADOTE must be initiated by the transferring hospital
2. Administration:
   a. Loading dose: 150mg/kg(maximum dose 15 g) infused over 60 minutes
   b. Second dose 50mg/kg (maximum dose 5 g) infused over 4 hours
   c. Third dose: 100mg/kg (maximum dose 10 g)infused over 16 hours.
3. Must be administered with IV infusion pump.

Pediatric Acetaminophen Poisoning:

1. ACETADOTE must be initiated by the transferring hospital.
2. Administration:
   a. Loading dose: 150mg/kg infused over 60 minutes; maximum dose: 15 g/dose.
   b. Second dose 50mg/kg administered over 4 hours; maximum dose: 5 g/dose.
   c. Third dose: 100mg/kg infused over 16 hours; maximum dose: 10 g/dose.
3. Must be administered with IV infusion pump.

AMIODARONE

Indications:

1. Management of regular wide complex tachycardia in stable patients
2. Irregular wide complex tachycardia in stable patients
3. Antidysrhythmic for the management of ventricular fibrillation (VF) and pulseless ventricular tachycardia (VT)

Contraindications:

1. Hypersensitivity
2. High degree AV blocks or sinus node dysfunction with marked bradycardia unless a functioning pacemaker is in place.
3. Congestive heart failure
4. Cardiogenic Shock

Drug Interactions:

Enhanced bradycardia and hypotension when given with other beta-blockers or calcium channel blockers

Dosage and Administration:

1. AMIODARONE infusion must be initiated at the transferring hospital.
2. Verify concentration and infusion rate prior to leaving the transferring hospital.
3. Assess Potassium, Magnesium and Liver function test results if available. Request Magnesium if Mg is less than 2, and Potassium if potassium is less than 4
4. Review medication administration record. If taking beta blocker or calcium channel blocker, notify Medical Control at Resource Hospital (AMIODARONE) may be used with caution with these medications).
5. Assess input and output.
6. Monitor blood pressure, heart rate. Notify Medical Control at Resource Hospital if heart rate less than 60 or B/P less than 90.
7. Rate of infusion should not be changed unless ordered.
8. Amiodarone is incompatible with other drugs.
9. Infuse through a central line if available. Loading dose to be given prior to transfer at transferring hospital.
10. After loading dose, 360 mg administered over the next 6 hours. Rate of 1 mg/min.
11. After initial 6 hour infusion, 540mg over the next 18 hours (0.5mg/min)
12. Must be infused by IV pump.

ANGIOMAX (Bivalirudin)

Indications:

1. For use as an anticoagulant in patients undergoing percutaneous coronary intervention (PCI) including patients with heparin-induced thrombocytopenia (HIT) and heparin-induced thrombocytopenia and thrombosis syndrome (HITTS).
2. For initial anticoagulation in patients with non-ST elevation acute coronary syndrome (unstable angina or acute myocardial infarction, NSTEMI) undergoing early invasive strategy.

Contraindications:

1. Patients with active bleeding.
2. Patients with hypersensitivity to ANGIOMAX or its components

Drug Interactions:

May act synergistically with other anticoagulants. Sending physician to decide on use with other anticoagulants

Dosage and Administration:

1. Patients receiving ANGIOMAX on transfers should be carefully monitored for hemodynamic stability and bleeding.
2. Contact medical control to obtain orders if bleeding or pressure drops (Systolic less than 90, MAP less than 65, or decrease in systolic blood pressure by more than 20 mmHg from start of patient contact) should be called to Medical Control.
3. Infusion must be started at sending facility.
4. Must be infused by IV pump.

ANTIBIOTICS

Indications:

(This is not an exhausted list, just a list of the most common antibiotics).

1. **Aminoglycosides:** Gram negative bacteria, bone and joint, soft tissue, Post-op, UTIs, and intra-abdominal infections.
2. **Cephalosporin:** Gram positive cocci and limited use against gram negative (E. coli).
3. **Chloramphenicol:** NOT TO BE USED IN TRIVIAL INFECTIONS. Serious infection caused by Salmonella, Rickettsia, and Chlamydia. Meningitis caused by hemophilus influenza, and Meningococcal meningitis.
4. **Erythromycin (EES) and Macrolides:** Bacteriostatic against Streptococcus sp., Staphylococcus aureus, Mycoplasma pneumoniae, Hemophilus influenza (when used with sulfonamides), and many others.
5. **Penicillin:** Bactericidal against Gram negative bacteria such as Hemophilus influenza, Escherichia coli, Proteus mirabilis, Neisseria gonorrhea; Gram positive organisms such as Streptococcus.
6. **Polymyxin:** Has potent bactericidal activity against many gram negatives such as Pseudomonas, Proteus, and Hemophilus.
7. **Sulfonamide:** Wide bacteriostatic spectrum against gram positives and gram negatives.
8. **Anti-fungal:** Wide fungicidal activity against Candida, Trichophyton, Epidermophyton, and Microsporum.
9. **Fluoroquinolones:** Broad spectrum of activity against gram positive and gram negative bacteria including pseudomonas (Ciprofloxacin=Cipro®)
10. **Tetracycline:** Rickettsia, Chlamydia, and Mycoplasma. Use to treat syphilis and gonorrhea for patients who are allergic to PCN

Contraindications:

1. General: Contraindicated if any history of hypersensitivity to the particular class of antibiotics. Must use another class
2. Aminoglycosides: Can cause renal or hearing impairment.
3. Cephalosporin: Use with caution with renal and hepatic impaired patients.
4. Chloramphenicol: Pregnancy and nursing mothers.
5. Erythromycin (EES) and Macrolides: In patients taking Seldane® and other antihistamine(s) may lead to Torsades de Pointes.
6. Penicillin: Use with caution on patients with hay fever or other allergies.
7. Polymyxin: Use in pregnancy if benefits outweigh risks.
8. Sulfonamide: Third trimester pregnancy, nursing mothers, and infants under two months.
9. Anti-Fungal: None when indicated.
10. Fluoroquinolones: Children and nursing mothers.
11. Antitubercular: In Isoniazid use - Liver disease or a history of alcoholism or injection drug use is an important concern.

Adverse Reactions:

The most common life threatening reaction of all antibiotics is anaphylaxis. When these medications are being given, you should have epinephrine readily available for quick administration per ANAPHYLAXIS protocol.

Vancomycin:

This medication can cause red man syndrome. If redness occurs and there is no pharynx swelling, the sensation of the patient's throat closing, or trouble breathing, medical control should be contacted for dose adjustment. If this is suspected, the medication should be stopped until confirmed it can be restarted by medical control.

Administration and Dosage:

1. Antibiotic must be started at hospital prior to transport.
2. Rate of infusion should not be changed unless ordered.-
3. Only one antibiotic may infuse at a time.
4. Must infuse by IV infusion pump.
5. The most common life threatening reaction is allergic reaction.

BETA BLOCKING AGENTS (METOPROLOL, LABETALOL,ESMOLOL)

INDICATIONS

1. Used alone or in combination with other agents in the management of hypertension.
2. Management of angina pectoris.
3 Prevention of myocardial infarction.

CONTRAINDICATIONS

1. Uncompensated congestive heart failure.
2. Pulmonary edema
3. Cardiogenic shock
4. Bradycardia or heart block

DRUG INTERACTION

1. General anesthesia, IV Phenytoin, and Verapamil may cause additive myocardial depression.
2. May decrease the beta effects of Dopamine or Dobutamine.
3. Additive bradycardia may occur with digitalis glycosides.
4. Additive hypotension may occur with other antihypertensives, alcohol or nitrates.
5. May alter effectiveness of insulin or oral hypoglycemic agents.
6. May decrease effectiveness of beta-adrenergic bronchodilators.

ADMINISTRATION

1. Must be initiated as a continuous infusion by the sending facility
2. Sending physician should give titration order
    a. Single dosing change is allowed, further dosing changes must be after medical control discussion
3. Typical dose
    a. Labetalol is 0.25-3mg/kg/hour
    b. Metoprolol 5-10mg over 30-60 minutes
    c. Esmolol: 50-150 mcg/kg/min

SPECIAL NOTES

1. Use cautiously within 14 days of MAO inhibitor therapy

BLOOD ADMINISTRATION

Indications:

1. To maintain blood volume or replenish blood loss

Contraindications:

1. Non-compatible blood, Religious preferences

Adverse Reactions:

1. Transfusion reactions
2. Fever, chills
3. Nausea, vomiting
4. Anaphylaxis.

Dosage and Administration:

1. Initial blood administration will be started at the transferring hospital, and must be running for 20 minutes prior to starting transport.
2. Verify the physician order for blood product, blood type, rate of infusion and use of micro aggregate or leukocyte removal filter.
3. Assess patient for religious or cultural objections to transfusion, history of previous reaction to a blood product and for pre-transfusion symptoms that could be mistaken for a transfusion reactions.
4. Record baseline BP prior to starting transfusion and at least every 10 minutes after you take over patient care.
5. 20 gauge IV or large site is preferred.
7. If temperature increases greater than 1 degree Celsius, immediately stop transfusion, remove bag and tubing, start NS infusion. DO NOT DISCARD THE BLOOD PRODUCT.
8. Prior to transport, confirm with nurse the patient ID band, Blood Bank Band and Label on all blood being administered or transferred with patient ~~with nurse~~.
9. When infusion is completed, flush the line with NS to prevent clot formation.

For any suspected transfusion reaction:

1. Stop the transfusion, do not clear tubing.
2. Remove bag and tubing, start Normal Saline through a new IV. If a new IV is not available, draw off a 5cc waste prior to administering saline through the IV the blood was transfusing.
3. Notify Medical Control.
4. Monitor and treat symptoms.
5. Save bag and tubing for testing.

CALCIUM PREPARATIONS

(CALCIUM GLUCONATE, CALCIUM CHLORIDE)

Indications:

1. Antidote for calcium channel blocker overdoses
2. Concern for bradycardia or cardiac arrest from hyperkalemia (wide QRS with bradycardia and hypotension)
3. Topical Burns with hydrofluoric acid
4. Magnesium sulfate overdoses

Contraindications:

1. Hypercalcemia
2. Documented hypersensitivity
3. Life-threatening cardiac arrhythmias may occur in known or suspected severe HYPOkalemia

Drug Interactions:

1. Increase toxicity of cardiac glycoside (Foxglove or Digoxin)
2. Calcium should be given in a dedicated IV line
3. DO NOT mix with Sodium Bicarbonate

Dosage and Administration:

1. Calcium Gluconate
   a. Adult: [5 - 10 ml, 1.5g to 3g] SLOW IVP (administer of 2-5 minutes unless in cardiac arrest) repeat if necessary after 5 - 10 min.
   b. Infusion: 10% solution, 60mg/kg over 5-10 minutes (Maximum: 6g/dose)
   c. Pediatric: [0.6 ml/kg] SLOW IVP of 10% solution
2. Calcium Chloride:
   a. Adult: [5-10ml] by SLOW IVP. Repeat every 10 minutes as needed (1 ml of 10% = 100 mg of calcium chloride).
   b. Pediatric: [0.2 ml/kg] (10% solution) by SLOW IVP. Repeat once in 10 minutes if needed.
3. May increase cardiac irritability, i.e., PVC's, particularly in the presence of digitalis.
4. Local infiltration will cause significant tissue necrosis at injection site.
5. If using as Infusion: -must be started at transferring hospital and via IV infusion pump .

NOTE:

RAPID INJECTION CAN CAUSE HYPOTENSION, BRADYCARDIA, AND DEATH.

CARDIZEM (Diltiazem)

Indications:

For management of narrow complex tachycardias.

Contraindications:

1. Documented hypersensitivity
2. Wolff-Parkinson-White syndrome
3. Lown-Ganong-Levine syndrome
4. Symptomatic severe hypotension (systolic BP < 90 mm Hg)
5. Sick sinus syndrome (if no pacemaker)
6. Second and third degree heart block (if no pacemaker present), and complete heart block.
7. Contraindications for IV administration
   a. Use in newborns (because of benzyl alcohol)
   b. concomitant beta-blocker therapy
   c. cardiogenic shock iv. ventricular tachycardia (must determine whether origin is supraventricular or ventricular)

Drug Interactions:

1. Additive effects in prolonging AV conduction when using beta-blockers or digitalis concomitantly with diltiazem HCl.

Adverse Reactions:

CNS: Dizziness, paresthesia, headache, weakness, visual disturbances.

CV: hypotension, facial flushing, junctional or AV dissociation, chest pain, congestive heart failure, ventricular or atrial arrhythmias, edema.

Dermatologic: Injection site reaction (itching / burning), sweating.

GI: Constipation, nausea, vomiting, dry mouth

Administration and Dosage:

1. Verify concentration, dosage and Vital Sign parameters on the physician order sheet from transferring hospital. (Usual concentration is 125mg / 100ml D5W or D5/0.45 NS; this yields -1 mg/ml delivered dose).
2. Typical dosing is 5-15mg/kg/min as continuous infusion
3. Monitor vital signs: B/P, pulse rate every 15 minutes with continuous EKG monitoring.
4. Obtain titration order from sending physician for HR or BP changes ((HR < 110 or >150, or systolic BP < 90). One change is allowed through this order, further changes require approval from medical control.
5. Notify Medical Control of any AV block.

Decadron (Cordicosteroids)

Indications:

1. Spine injury associated with trauma
2. Reactive airway disease with no response to Albuterol and other treatments
3. Croup
4. Patients suffering from high altitude cerebral edema (HACE)
5. Cerebral Edema (must be ordered by sending physician

Contraindications:

1. Documented hypersensitivity
2. Systemic fungal infection, cerebral malaria

Adverse Reactions:

1. None

Dosage and Administration:

1. Adults – [10 mg] IV/IO/IM
2. Pediatrics – [0.6 mg/kg] IV/IO/IM (Max dose of 10mg)
3. Rarely used as an IV infusion.
4. Compatible with D5/NS.

DILAUDID (HYDROMORPHONE)

Indications:

1. Analgesia for patients with moderate to severe pain

Contraindications:

1. Hypersensitivity
2. Hypotension is a relative contraindication to use. Remember that some people will be hypotensive in response to pain itself. Be cautious.
3. Do not use in persons with respiratory difficulties because their respiratory drive might be depressed
4. In the presence of major blood loss, the body's compensatory mechanisms may be suppressed by the use of morphine, and the hypotensive effect will become very prominent. Fentanyl is preferred in these instances.

Drug Interactions:

1. Additive effects with other CNS depressants
2. MAO inhibitors can cause unpredictable and severe reactions reduce dose to 25% of a usual dose.

Administration and Dosage:

1. Verify drug, dose and route of administration.
2. DILAUDID PCA must be run through a PCA pump.
3. Refer to compatibility chart before pushing DILAUDID through an infusing IV. If no IV infusing, begin NS at KVO rate.
4. Administer HYDROMORPHONE (Dilaudid) 0.5mg IVP.
   a. May repeat HYDROMORPHONE 0.5mg every 5 minutes to a maximum 2mg until the patient indicates relief or tolerance of pain.
   b. Patient 65 years of age and older, HYDROMORPHONE 0.2mg IVP every 5 minutes to a maximum 2 mg until patient indicates relief or tolerance of pain.
5. Monitor vital signs; if respiratory depression or altered level of consciousness occur contact Medical Control physician and administer NARCAN per the ALTERED LEVEL OF CONSCIOUSNESS Protocol.
6. Monitor pain scale before and after administration.

DOBUTAMINE

Indications:

1. Cardiogenic Shock
2. Hemodynamically significant hypotension not from hypovolemia.
3. Short-term treatment of acute decompensated heart failure.

Adverse Reactions:

1. Hypokalemia from increased cardiac output
2. Tachycardia
3. Ventricular dysrhythmias or ectopy.
4. Hypertension.
5. Angina
6. Headache
7. Dyspnea

Dosage and Administration:

1. IV DOBUTAMINE must be initiated at the transferring hospital.
2. Verify infusion rate, infusion dosage, patient's weight prior to transfer.
3. Monitor BP and heart rate continuously. If heart rate increases more than 15% of baseline rate or hypotension occurs, notify Medical Control.
4. Refer to compatibility chart before infusing any medication through the DOBUTAMINE line. No other IV drugs can be administered through a DOBUTAMINE line.—
5. Central line is preferred but not required for administration.
6. If any redness, swelling, tenderness, warmth appears at IV site, discontinue IV after reestablishing a new IV site.
7. Must infuse with an IV infusion pump

Dopamine

CLASS:

- Sympathomimetic

INDICATIONS:

1. Correction of hemodynamic imbalance in hypoperfusion syndromes other than volume deficit
2. Cardiac dysfunction due to AMI
3. Cardiac dysfunction due to CHF
4. Poor perfusion due to sepsis
5. Neurologically induced vasodilation (neurogenic shock)
6. Renal failure

CONTRAINDICATIONS:

1. Uncontrolled tachycardia
2. Ventricular irritability
3. Hypertension
4. Hypoperfusion from volume deficit

COMPLICATIONS/ADVERSE REACTIONS/SIDE EFFECTS:

1. Tachycardia
2. Hypertension
3. Ventricular irritability
4. Angina
5. Anxiety
6. Decreased peripheral perfusion
7. Tissue necrosis with infiltration of IV line

PRECAUTIONS:

Use with caution in the following patients:

1. Children
2. Patients with occlusive vascular disease (or other types of peripheral vascular insufficiency)

ADMINISTRATION and DOSE:

1. Must be initiated at the sending facility
2. Must have titration order from sending physician
   a. Single titration allowed, further medication dosing changes require medical control contact
3. Verify patient's weight (in *kilograms*)
4. Incompatible with Sodium Bicarb. No IV push drugs can be administered through this line. Monitor patient closely for rhythm changes en route and repeat vital signs *every 15*

minutes

5. Monitor urine output (should be at least 25 mL/hr).

FENTANYL (SUBLIMAZE)

Indications: Analgesia for patients with moderate to severe pain

Contraindications:

1. Hypersensitivity/known intolerance
2. Patients particularly sensitive to respiratory depression
3. Myasthenia gravis
4. Pregnancy WARNING: Should be used with caution in the elderly and in patients with hypotension, suspected gastrointestinal obstruction, head injury, and concomitant CNS depressants

Drug Interactions:

1. Benzodiazepines (i.e:Diazepam) - increased risk of CV depression
2. Sedatives/Hypnotics, other opioids, CNS depressants and alcohol - increased risk of hypotension.
3. Avoid use in patients who have received MAO inhibitors within the previous 14 days - may produce unpredictable, potentially fatal reactions.

Adverse Reactions:

CV: Palpitations, increased or decreased B/P, cardiac arrest, shock, arrhythmias.

Dermatologic: Rash, hives, flushing, warmth, sensitivity to cold

GI: Nausea/vomiting.

Respiratory: slow, shallow respirations, apnea, laryngospasm, bronchospasms, suppression of cough reflex.

Other: Physical tolerance and dependence, psychological dependence.

Contraindications:

Hypersensitivity to opioids, acute bronchial asthma, upper airway obstruction, pregnancy.
Use cautiously with bradycardia, history of seizures, lactation, renal dysfunction, drug addiction.

Dosage and Administration:

1. Verify drug, dose and route of administration.
2. FENTANYL PCA must be run through a PCA pump.
3. Refer to compatibility chart before pushing FENTANYL through an infusing IV. If no IV established, begin NS at KVO rate.
4. Administer FENTANYL at a rate of 50mcg/min (50mcg/ml) IVP.
5. Monitor vital signs; if respiratory depression or altered level of consciousness occur, contact Medical Control physician and administer NARCAN per the ALTERED LEVEL OF CONSCIOUSNESS PROTOCOL.
6. Monitor pain scale before and after administration.

FOSPHENYTOIN

Indications:

1. Active Seizures
2. Seizure prophylaxis

Contraindications:

1. Hypersensitivity
2. -SA or AV heart blocks
3. Stokes-Adams syndrome
4. -Bradycardia/hypotension
5. -Tricyclic Antidepressant toxicity

Adverse Reactions:

1. Cardiac dysrhythmias
2. Hypotension

Dosage and Administration:

1. The dose, concentration in solutions, and infusion rates for fosphenytoin are expressed as **Phenytoin Sodium Equivalents (PE).**
2. Do not exceed 150 mg PE/minute. Slower administration reduces incidence of cardiovascular events, as well as severity of paresthesias and pruritus. Highly sensitive patients (elderly, preexisting cardiovascular conditions) should receive fosphenytoin more slowly (e.g. 25-50 mg PE/minute).
3. Infusion must be started by the transferring hospital prior to transport.
4. Must be administered via IV infusion pump.

GLYCOPROTEIN INHIBITORS (AGGRASTAT, INTEGRILIN)

Indications:

1. In combination with heparin, it is indicated for the treatment of acute coronary syndrome, including patients who are to be managed medically and in patients that are undergoing PTCA or atherectomy.

Contraindications:

1. Known hypersensitivity to any component of the product
2. Active internal bleeding, stroke, a history of bleeding diathesis within the previous 30 days
3. A history of intracranial hemorrhage, intracranial neoplasm, arteriovenous malformation, or aneurysm.
4. A. history of thrombocytopenia following prior exposure to a Glycoprotein(GP) IIb/IIIa Inhibitor
5. Major surgical procedure or severe physical trauma within the previous month
6. History, symptoms, or findings suggestive of aortic dissection
7. Severe hypertension (systolic blood pressure >180 mmHg and/or diastolic blood pressure >110 mmHg)
8 Concomitant use of another parenteral GP IIb IIIa inhibitor
9. Acute pericarditis

Drug Interactions.

1. Increased risk of bleeding when used with other blood thinners or anti-platelet medication

Dosage and Administration.

1. Requires an infusion pump
2. Must be ordered by sending physician—
3. AGGRASTAT: loading dose: 25 mcg/kg, maintenance infusion of 0.15 mcg/kg/min. For-patients with Creatinine Clearance <60, adjust maintenance infusion to 0.075 mcg/kg/min
4. Percutaneous (coronary intervention care of the femoral artery access site) therapy with Glycoprotein (GP) IIb/IIIa Inhibitors is associated with an increase in bleeding rates, particularly at the site of arterial access for femoral sheath placements.
5.. Minimize vascular and other trauma. When obtaining intravenous access, non-compressible sites (e.g., subclavian or jugular veins) should be avoided.

H2 BLOCKERS (ZANTAC (RANITIDINE), PEPCID (FAMOTIDINE), TAGAMET (CINETODINE)

Indications:

1. Treatment of duodenal or gastric ulcers
2. Reduce risk of upper GI bleeding in critically ill patients
3. Uncomplicated GERD

Contraindications:

1. Hypersensitivity to H2 receptor antagonists.

Drug Interactions:

1. Dofetilide

Usual dosages:

Pepcid bolus:	20mg over 15-30 minutes every 12 hours.
Cimentidine bolus:	300mg IV over 15-20 minutes every 6 – 8 hours.

Dosage and Administration:

1. Continuous infusions MUST be started at the transferring hospital.
2. Verify dosage, concentration, prior to leaving transferring hospital.
3. Must be given via IV infusion pump.
4. Confusion and dizziness may occur in elderly patients.
5. Use with caution in patients with renal and hepatic impairment
6. Blood dyscrasias including thrombocytopenia

HEPARIN

Indications:

1. Adjunct to treatment for coronary occlusion
2. Thrombosis in deep vein phlebitis
3. Pulmonary emboli
4. Atrial fibrillation to prevent emboli
5. Low dose to maintain IV patency
6. Disseminated Intra-vascular Coagulation (DIC)

Contraindications:

1. Uncontrolled bleeding, except in DIC
2. Severe thrombocytopenia
3. Hypersensitivity to heparin, and to pork and/or beef
4. Severe hepatic disease with hypoprothrombinemia

Drug Interaction:

1. Increased risk of bleeding when used with aspirin, non-steroidal anti-inflammatory agents, dipyridamole, dextran, quinidine, cefamandole, cefmetazole, cefoperazone, cefotetan, thrombolytics, and warfarin.

Usual Concentrations: 25,000 units in 500ml = 50 units/1ml
25,000 units in 250ml = 100 units/1 ml

Dosage and Administration:

1. Routine cardiac care.
2. Verify initial dose concentration, and infusion rate as well as total time at transferring facility prior to departure. Double check rate and dosage with RN (treatment of STEMI or NSTEMI is 12 units/kg/hour, treatment of DVT, PE, arterial/venous thrombus is 18units/kg/hour).
3. Assess PTT prior to transfer if available
   a. Follow sending facility Heparin Nomogram if available, if not, then follow the SMD Heparin Management Nomogram. See Link **https://hshs.ellucid.com/documents/view/53873**
4. Heparin infusion must be initiated at the transferring hospital.
5. Rates of infusion should not be changed unless ordered.

INSULIN

Indications:

1. Diabetic ketoacidosis
2. Hyperglycemia
3. Hyperkalemia
4. Beta Blocker Overdose

Contraindications:

1. Hypersensitivity

Drug Interactions:

1. Beta-adrenergic blocker may block signs and symptoms of hypoglycemia.
2. Increase insulin requirements: alcohol, glucocorticoids, and thyroid preparations
3. Decreased insulin requirements: anabolic steroids, tricyclic antidepressants, and MAO inhibitors.

Adverse Reactions: Hypoglycemia

Note:

Different preparations of Insulin have peak effects. Make sure which one is being used.

Dosage and Administration:

1. Insulin must be infused by an infusion pump.
2. Must be started by transferring hospital.
3. Monitor blood sugar at the start of transport and every hour during transport
4. Assess level of consciousness, vital signs and blood glucose level.
5. If level of consciousness decreases, or blood glucose levels drop below 70mg/dl, ~~stop~~ pause insulin infusion, give 100cc of D10, and contact Medical Control.
6. Rate of infusion should not be changed unless ordered.
7. Typical dosing is 0.05 to 0.1 units/kg/hr. For beta blocker overdose: 1 units/kg/hr
8. If medication is given with blood sugar less than 300, make sure dextrose containing fluid is ordered as well. Contact medical control if sending physician refuses to order.
9. Common dosage 100 units /100 ml = concentration of 1 unit / ml.

ISOPROTERENOL

INDICATIONS:

Life-threatening bradycardia.

Concetration:

0.2mg/mL

Administration and Dosing:

1. Must be initiated at sending facility
2. Sending physician should give titration order
   a. Single dosing change is allowed, further dosing changes must be after medical control discussion
3. Typical Dosing: 2-10 mcg/min

COMMENTS:

Synthetic sympathomimetic primarily Bada adrenergic. Large chronotropic effect. Beware of tachyarrhythmias, myocardial ischemia, and hypotension

INCOMPATIBLE WITH PHENEGRAN, SODIUM BICARB, SODIUM NITROPRUSSIDE AND ATROPINE

KETAMINE

Indications:

1. Analgesia in circumstances of severe pain which:
   a. is poorly controlled with opioids.
   b. the use of opioids is either contraindicated or would likely result in side effects (e.g. respiratory depression, hypotension, etc.) that increase risk to the patient.
2. Chemical restraint of patients with excited delirium (ExDs) when other methods are unsuccessful or less advantageous.
3. Assistance in intubation, to be given per the MEDICATION-ASSISTED INTUBATION Protocol.

Contraindications (Relative):

1. Patients with a history of coronary artery disease.
2. Patients at risk for increased blood pressure, ICP or IOP
3. Hemodynamically unstable patients.

Dosage and Administration:

Pain Management:

1. 0.3mg/kg IV/IO, May repeat every 20 minutes PRN
   a. Max of three doses for a total maximum of 0.9 mg/kg.
   b. Medical Control must be contacted for any dosing over 0.9mg/kg.
2. 0.5mg/kg IM/IN. May repeat 2 X 20 minutes as needed.
   a. maximum of two doses for a total of 1 mg/kg
   b. Medical control must be contacted for any dosing beyond 1 mg/kg

Chemical Restraint in Excited Delirium:

1. 5 mg/kg IM. May repeat x1 (maximum total dosage of 10mg/kg after 20 minutes (per EXCITED DELIRIUM Protocol).

Medication-Assisted Intubation:

1. See MEDICATION-ASSISTED INTUBATION Protocol.

Special Notes:

1. Use of Ketamine for Medication-Assisted Intubation is for patients 13 years of age or older.
2. Monitoring of patients receiving KETAMINE must include continuous waveform ETCO2, pulse oximetry, ECG, and mental status monitoring.
3. Use the lowest dose required to achieve the desired effect.
4. Hypersalivation, pharyngeal irritation, or rapid administration -may induce laryngospasm on rare occasion.
   a. If hypersalivation is present, administer 0.5mg Atropine.
5. Emergence delirium (varying in character from pleasant dream-like states to hallucinations) occurs in approximately 12% of patients and usually lasts for up-to a few hours. It is less frequent in children and the elderly. This effect may be

attenuated by the administration of a benzodiazepine agent if emergence-delirium occurs, as well as, the minimization of sensory stimulation to the patient (this does not preclude obtaining vital signs).

KETOROLAC (Toradol)

Indications:

1. For the acute management of moderately severe pain for children > 1 year and adults.

Contraindications:

1. Allergy to aspirin, ketorolac, or other NSAIDS
2. Asthma (relative)
3. Women who are in active labor or are breastfeeding
4. Significant renal impairment particularly when associated with volume depletion
5. Previous or current GI bleeding, intracranial bleeding, coagulation defects, patients with a high risk of bleeding.
6. Coagulation defects
7. Proven or necrotizing enterocolitis

Drug Interactions:

1. Coumadin
2. Plavix
3. ASA
4. Other NSAIDs or anticoagulants.

Dosage and Administration:

1. Adult: [15 mg] IV [30mg] IM
2. Pediatric: > 1yr. [0.5 mg/kg] IM/IV
3. Best for possible kidney stone patients

LASIX (FUROSEMIDE)

Indications:

1. Hypertensive emergencies (AMI, APE, or encephalopathy)

Contraindications:

1. Hypovolemia
2. Hypokalemia
3. Hypotension

Drug Interactions:

1. Severe hypotension with antihypertensives and nitrates

Dosage and Administration:

1. Common dosage: 250mg Lasix in 250 ml NS (1mg/ml). Maintenance dose:1 – 4 mg/kg/hr not to exceed 4mg/min
2. Infusion must be started at the transferring hospital.
3. Verify concentration, infusion rate and V/S parameters prior to leaving transferring hospital.
4. Assess serum potassium levels prior to transfer if available.
5. Monitor and document V/S at least every 15 minutes while in transit.
6. Notify Medical Control ~~Base Command~~ if B/P drops below 15% of baseline.
7. Monitor ECG. Notify Medical Control of any new onset or increase of ventricular ectopy
8. Do not give IV bolus medications through the LASIX infusion.

Normal Value Serum Potassium—3.5 -5.0

LEVALBUTEROL (XOPENEX)

Indications:

1. XOPENEX is used to treat reversible airway obstruction caused by:
   a. Wheezing associated with asthma.
   b. COPD
   c. Chronic Bronchitis.

Dosage and Administration:

1. Nebulizer
   a. Adolescents and Adult: [1.25 mg] in 3 ml of sterile NS given as inhalation therapy over 5-15 minutes, may be repeated as necessary.
   b. Infants: [0.075 mg/kg/dose, maximum 1.25mg] in 3 ml of sterile NS given as inhalation therapy over 5-15 minutes, may be repeated as necessary.
2. It is not recommended that this drug be mixed with Atrovent.

LEVOPHED (NOREPINEPHRINE)

Indications: Hypotension

Contraindications: Mesenteric or peripheral vascular disease (ischemia)

Adverse Reactions:

1. Bradyarrhythmias
2. Peripheral ischemia
3. Headache
4. Extravasation causing skin necrosis

Precautions

1. Avoid hypertension
2. Central lines must be used for infusions due to risk of extravasation

Dosage and Administration:

1. Levophed must be initiated at the transferring hospital through a central line.
2. Verify infusion rate, infusion dosage, patient's weight prior to transfer.
3. Administer at 5 – 30mcg/min or 0.05-0.4 mcg/kg/min. Typical starting dose is 5 mcg/min.
4. Titration orders should be confirmed with sending physician (typically 5 mcg/min) See titration sheet addendum
    a. Single dose adjustment allowed. Further changes requires medical control discussion and approval
5. Monitor for tachycardia and hypotension.
6. Refer to compatibility chart before infusing any medication through the LEVOPHED line. No IV push drugs through a LEVOPHED infusion.
7. If any redness, swelling, tenderness, warmth appears at IV site, discontinue IV after reestablishing a new IV site.
8. Must infuse with infusion pump

LORAZEPAM (Ativan®)

INDICATIONS

1. Control of seizures
2. Uncontrolled shivering in hypothermia
3. Reduction of anxiety in agitated or violent patients suffering behavioral emergencies
4. Maintenance of sedation in an already intubated patient (Midazolam is preferred for this indication)

CONTRAINDICATIONS

1. Hypersensitivity
2. Severe respiratory depression
3 Acute narrow angle glaucoma
4. Sleep apnea

ADMINISTRATION

1. Adults
   a. 2mg IV/IO, slow with IV running open. Maximum dose of 4mg
   b. 0.01 – 0.1 mg/kg/hr continuous infusion for maintenance of sedation in an already intubated patient
2. Pediatric
   a. 0.05-0.1 mg/kg. Onset 2-3 minutes. Maximum dose 4mg
   b. 0.01 – 0.1 mg/kg/hr continuous infusion for maintenance of sedation in an already intubated patient
3. Do no mix with other medication or dilute
4. Give through the proximal end of IV tubing, flush well

SPECIAL NOTES

1. Most likely to produce respiratory depression in patients who have taken other depressant drugs, especially alcohol and barbiturates.
2. It can cause local venous irritation. Use relatively large veins.
3. Utilization of pharmacological agents for the primary purpose of sedation, induction, or muscle relaxation to facilitate placement of an advanced airway requires Medical Direction Committee Special Skills approval.

MAGNESIUM SULFATE

Indications:

1. Treatment of seizures associated with eclampsia, and seizures, refractory to benzodiazepines.
2. First-line antidysrhythmic in the treatment of Torsades de Pointes.
3. Acute asthma refractory to other more conventional treatment, or when the effects of beta-adrenergic medications contraindicate their use.

Contraindications:

1. Hypermagnesemia
2. Hypocalcemia
3. Anuria
4. Heart blocks
5. Diabetic Coma
6. Myocardial damage

Adverse Reactions:

CNS: Sweating, weak or absent reflexes, drowsiness, muscle weakness

CV: Hypotension, flushing, circulatory collapse, heart block, depressed cardiac function.

Other: Respiratory paralysis and hypocalcemia

Dosage and Administration:

1. Magnesium needs to be initiated at transferring hospital.
2. Must be infused via IV infusion pump.
3. Monitor vital signs every 10 minutes while drug is infusing.
4. Monitor for weakness in extremities. Watch for signs of respiratory depression and second and third degree heart block.
5. Early indicators of toxicity include: profound thirst, feeling of warmth, sedation, confusion, muscle weakness.
6. Maximum infusion rate is 150 mg/minute.
7. ~~-~~Dose/concentration will be determined by transferring facility. Should be given as 2 grams in 100ml, infused through a pump.
   a) For magnesium replacement: 2g over 60 minutes
   b) For asthma: 2g over 20 minutes
8. Hypomagnesia is usually accompanied by other electrolyte deficiencies, especially calcium and potassium.
9. IV bolus cannot be given in field unless by direct order of Medical Control in life-threatening situation. IV bolus in seizing pregnant patient, ~~1~~-2 grams over 2 minutes may be given on direct order from Medical Control Physician. Action is immediate following administration; duration approximately 30 minutes.

MANNITOL

Indications:

1. Cerebral edema
2. Increased intra-cranial pressure

Contraindications:

1. Hypersensitivity
2. Anuria
3. Hypovolemia/dehydration
4. Active intra-cranial bleeding
5. Pulmonary edema

Adverse Reactions:

1. Tachycardia,
2. blurred vision,
3. fluid and electrolyte imbalance
4. hypotension.

Dosage and Administration:

1. Routine Medical Care.
2. Verify orders for administration of Mannitol. It will be administered on a scheduled dose time as begun at referring hospital.
3. Should be run through an in-line filter
4. Document vitals every 5 minutes.
5. Flush with sterile water before and after administration.
6. Incompatible with most other drugs.
7. May crystallize at low temperatures.
8. Must have Foley Catheter in place prior to transport.

Methylprednisolone (Solu-Medrol®)

INDICATIONS

1. Reactive airway disease with no response to Albuterol and other treatments
2. Allergic reactions
3. Spinal cord injury
4. ARDS

CONTRAINDICATIONS

1. Hypersensitivity
2. Relative contraindications: Immunocompromised state; psychotic disorders

DRUG INTERACTION

None

ADMINISTRATION

1. Adults – [125mg] IV/IO (Max dose 125mg)
2. Pediatrics – [1-2mg/kg] IV/IO (Max dose 125mg)
3. Continuous infusion rates vary by indication. Orders should be confirmed with acceptive physician as well as taken from send physician.

SPECIAL NOTES

1. Adverse effects – hyperglycemia; psychosis
2. High dose methylprednisolone is no longer given routinely for spinal cord injury but may occasionally be ordered by a neurosurgeon.

Midazolam – (Versed®)

INDICATIONS

1. Control of seizures
2. Reduction of anxiety in agitated or violent patients
3. Maintenance of sedation for an already intubated patient

CONTRAINDICATIONS

1. Hypersensitivity
2. Severe respiratory depression

DRUG INTERACTION

1. Additive effect to other CNS depressants such as alcohol, narcotics, etc

ADMINISTRATION

1. Adult:
   i. 5-mg IN/IM. Max single dose is 10mg. May repeat once after 10 minutes
   ii. 2 mg slow IV/IO Repeat every 5 minutes as needed up to 10mg
   iii. 1-8mg/hr for maintenance of sedation on an already intubated patient
2. Pediatric:
   i. 0.2 mg/kg IN/IM. Max single dose is 5mg. May repeat once after 10 min.
   ii. 0.1 mg/kg slow IV/IO. Repeat every 5 minutes as needed, up to 10mg.

SPECIAL NOTES

1. **If medication is being used to assist with sedation of a ventilated patient who is on another sedative medication, contact Medical Control after use of this medication to obtain orders to adjust the sedation medication infusion rate.**
2. Should not be mixed with other agents or diluted with intravenous solutions. Give through the proximal end of IV tubing, then flush well.
3. Most likely to produce respiratory depression in patients who have taken other depressant drugs, especially alcohol and barbiturates.
4. It can cause local venous irritation. Use relatively large veins.
5. Versed has short half- life. Additional doses may be necessary.
6. Utilization of pharmacological agents for the primary purpose of sedation, induction, or muscle relaxation to facilitate placement of an advanced airway requires Medical Direction Committee Special Skills approval.

WARNING: May cause respiratory depression, arrest, or apnea

MORPHINE

Indications:

1. Analgesia for patients with moderate to severe pain
2. Treatment of acute pulmonary edema (Paramedic only)
3. Sedation for procedures (Paramedic only)

Contraindications:

1. Hypersensitivity
2. Hypotension
3. Respiratory depression, acute or severe bronchial asthma, upper airway obstruction
4. In the presence of major blood loss, the body's compensatory mechanisms may be suppressed by the use of morphine, and the hypotensive effect will become very prominent. Do not use it in these circumstances.
5. Heart failure due to chronic lung disease
6. Deliriums tremens, seizure disorders
7. During labor when premature birth anticipated

Drug Interactions:

1. Additive effects with other CNS depressants
2. MAO inhibitors can cause unpredictable and severe reactions, reduce dose to 25% of a usual dose.

Dosage and Administration:

1. May be given IV push per PAIN MANAGEMENT Protocol.
2. Morphine infusions must be administered through an infusion pump or MS PCA through a PCA pump.
3. Monitor vital signs every 5 minutes: if respiratory depression, somnolence or hypotension occur; contact Medical Control and administer NARCAN per the ALTERED LEVEL OF CONSCIOUSNESS Protocol.
4. Refer to compatibility chart before using any drug through the morphine drip.
5. Consult with Medical Control for dose adjustment if morphine drip is not effective in managing pain.
6. Evaluate pain scale before and after administration.

MULTI-VITAMIN IV ADDITIVE (BANANA BAG)

Adverse Reactions: Thiamine and folic acid can cause irritation at IV site, syncope and dizziness with undiluted drug administration, hepatotoxicity (vitamin A toxicity) and tissue calcification (vitamin D toxicity).

Dosage and Administration:

1. Infusion containing MULTI-VITAMIN is to be initiated at the transferring hospital. Rate of infusion will be documented before transfer.
2. Refer to compatibility chart before administering and IV medication through the IV infusion containing the MVI additive.
3. The MVI must be diluted in a solution of 500 – 1000 ml of NS, LR or D5/0.45NS.
4. MVI is compatible with Potassium.
5. Assess IV site for any redness, swelling or tenderness. If occurs, immediately stop the infusion and reestablish IV site and restart the infusion. Notify the receiving hospital to monitor the previous IV site.
6. Infusion rates will vary from 100/hr to 999ml/hr. Should be infused with infusion pump.

*Usual preparation of a "Banana Bag":

1000 ml of NS, LR or D5/0.45NS
1 mg folic acid
100 mg Thiamine
1 AMP of MVI
Some physicians will add Magnesium to the bag.

NARCAN INFUSION

Indications:

1. Reversal of narcotic effects, particularly respiratory depression, due to narcotic drugs, whether ingested, injected, or administered in the course of treatment. Narcotic drugs include agents such as morphine, Demerol®, heroin, Dilaudid®, Percodan®, codeine, Lomotil®, propoxyphene (Darvon®), pentazocine (Talwin®).

Contraindications:

1. Hypersensitivity
2. Absences of indication

Drug Interaction:

1. Administration of naloxone can result in the sudden onset of opiate withdrawal (agitation, tachycardia, pulmonary edema, nausea, vomiting, and, in neonates, seizures)

Dosage and Administration:

1. *Routine ALS Care.*
2. Verify infusion rate as well as total time at the transferring facility prior to departure.
3. Monitor patient closely enroute.
4. Notify Medical Control if heart rate greater than 150 or persistently less than 60 or B/P less than 90.
5. Consider 2mg IV bolus if hypotension occurs. If bolus is needed, contact medical control to adjust rate of infusion
6. -Any change in rate/dosage of Narcan during Interfacility transfer requires Medical Control Order.
7. If perceived life threatening reaction, infusion may be stopped while contacting Medical Control.
8. Must be infused by IV infusion pump.

Nicardipine (Cardene IV)

CLASS OF DRUG

Calcium Channel Blocker; Coronary Vasodilator

INDICATIONS

1. For management of high blood pressure

CONTRAINDICATIONS

1. Documented hypersensitivity
2. Symptomatic severe hypotension (systolic BP < 90 mm Hg),
3. Contraindications for IV administration
   a. Use in newborns (because of benzyl alcohol)
   b. concomitant beta-blocker therapy
   c. cardiogenic shock
   d. ventricular tachycardia (must determine whether origin is supraventricular or ventricular)

DRUG INTERACTION

1. Additive effects in prolonging AV conduction when using beta-blockers or digitalis concomitantly with diltiazem HCl.

ADMINISTRATION

1. Infusion must be started at sending facility
2. Sending physician should provide a single titration order
   a. One dose change is allowed, further changes requires medical control order
3. Adult:
   a. 15mg/hr; typically increase by 2.5mg/hr
4. Pediatrics:
   a. 0.5-1mcg/kg/min

NITROGLYCERIN INFUSION

Indications:

1. Chest pain, anginal pain
2. Congestive heart failure with severe pulmonary edema

Contraindications:

1. Hypersensitivity
2. Severe hypotension (SBP < 90 mm Hg or ≥30 mm Hg below baseline)
3. Increased intra-cranial pressure
4. Severe anemia
5. Extreme bradycardia (< 50 bpm)
6. Tachycardia in the absence of heart failure (> 120 bpm)
7. Confirmed right ventricular infarction

Drug Interactions:

1. Additive hypotension with beta-adrenergic blockers, antihypertensives, calcium channel blockers, and phenothiazines.
2. Tricyclic antidepressants and antihistamines may interfere with buccal absorption.
3. Can cause a lethal drop in blood pressure in patients taking Sildenafil citrate (Viagra) within 24 hours of ingestion, tadalafil (Cialis®) within last 48 hours, vardenafil (Levitra®) within last 48 hours, or other phopsphodiesterase-5 inhibitors.

Dosage and Administration:

1. Verify concentration and dosage and V/S parameters on physician's order sheet from the transferring hospital.
2. Obtain Titration order from sending physician for single dose adjustment if BP changes to < 100
3. NITROGLYCERIN infusions must be in a glass bottle and polyethylene tubing.
4. Monitor vital signs: B/P heart rate at least every 15 minutes when transporting a patient with a nitro drip.
5. Notify Medical Control if chest pain reoccurs while transporting
6. Infusion must have its separate IV site. No IV push drugs can be administered through this line.
7. Common side effects may include: throbbing headache, flushing, dizziness, hypotension.

OCTREOTIDE (SANDOSTATIN)

Indications:

1. Treatment of active GI bleeds during transport

Contraindications:

1. Hypersensitivity

Drug Interactions:

1. May alter insulin and oral hypoglycemic agent requirements.
2. May interfere with beta-adrenergic blocking agents, calcium channel blockers, and agents to control fluid and electrolyte balance.

Adverse Reactions:

1. Abdominal or stomach pain,
2. blurred vision,
3. dizziness,
4. dry mouth,
5. syncope,
6. irregular heartbeat,
7. hyperglycemia,
8. sweating and
9. nausea.

Dosage and Administration:

1. Use with caution in diabetics, patients with gallbladder disease, severe renal failure requiring dialysis and during lactation
2. **Verify** initial dose and infusion rate as well as total time at the transferring facility prior to departure.
3. Verify lab values (platelet count, coagulation studies) prior to departure (if available).
4. Monitor patient closely en route.
5. If uncontrolled bleeding or allergic reaction develops, immediately discontinue the infusion, provide necessary treatment and contact Medical Control.
6. Any other change in rate/dosage of Octreotide during interfacility transfer requires Medical Control order.
7. If perceived life threatening reaction, infusion may be stopped while contacting Medical Control.
8. Administered at a 25-100mcg/hr rate.

OXYTOCIN (PITOCIN)

Indications:

1. Control of post-partum hemorrhage, when other methods fail.
2. To induce labor.

Contraindications:

1. Potential of a remaining fetus (twins or more).

Drug interactions:

1. Hypertension with vasopressors

Dosage and Administration:

1. IV dose: 10-20 USP units in 500 ml NS or LR. Infusion rate of 10 – 15 gtts/min titrated to severity of hemorrhage and uterine response.
   b. IM dose: 10 USP units IM only if unable to start.
2. Must infuse with IV infusion pump
3. Must be started at transferring facility prior to transport.

PRALIDOXIME (2 PAM)

Indications:

1. Organophosphate pesticide or nerve agent poisoning after Atropine has been administered.
2. Unknown cholinesterase inhibitor after poisoning.

Adverse Reactions:

None

Contraindications:

Documented hypersensitivity.

Dosages and Administration:

1. Ensure that you have proper PPE on and the patient has been properly decontaminated
2. Adults or children > 40kg
   a. 600mg IM by auto injector such as the "Mark I" antidote kit. May be repeated in 3 to 5 minutes after the first dose, if weakness or fasciculations have not been resolved.
3. Children < 40kg: 15mg/kg/dose
4. Neuromuscular blockade, laryngospasm, muscular rigidity and tachycardia have occurred with rapid IV administration, or with doses higher than those usually given.
5. Unlikely to work for pesticides of the carbamate class.
6. Morphine, aminophylline, succinylcholine and phenothiazine-type tranquilizers should be avoided in patients with organophosphate poisoning.

PHENOBARBITAL

Indications:

1. Generalized tonic-clonic -seizures that do not respond to benzodiazepines
2. Cortical-focal seizures–

Contraindications:

1. Patients with a known hypersensitivity to barbiturates

Adverse Reactions:

1. Agitation
2. Confusion
3. Ataxia
4. Vertigo
5. Respiratory depression.
6. Bradycardia
7. Hypotension
8. Nausea and vomiting
9. Syncope

Dosage and Administration:

1. Verify orders, dose and route of administration.
2. For IV administration, do not infuse faster than 60 mg/min
3. Monitor for respiratory depression.
4. Infusion must be initiated at transferring hospital.
5. Must be infused by IV infusion pump.

PATIENT-CONTROLLED-ANALGESIA (PCA) PUMPS

Usage:

PCA is proven to control pain better by allowing the patient to control when to administer pain medications in a pre-determined dose and time period.

Adverse Reactions:

Sedation, somnolence, clouded sensory, euphoria, convulsions with large doses, hypotension, bradycardia, respiratory depression, nausea, vomiting, diarrhea, constipation, urinary depression.

Drugs may interfere with evaluation of CNS by masking symptoms. May decrease the effects of diuretics in CHF. Physical and psychological dependence.

Dosage and Administration:

1. Usually administer opioid pain medication.
2. Patient controls when medication is administered.
3. Preset dosage and lock-out time period with each button push.
4. Infusion pump is locked and cannot be adjusted by paramedic.
5. PCA pumps must be plugged into Auxiliary power source in ambulance.

POTASSIUM INFUSION

Indications:

1. IV preparations are used for treatment or prophylaxis of hypokalemia.

Contraindications:

1. Severe renal impairment
2. Hyperkalemia
3. Untreated Addison's disease
4. Severe tissue trauma

Drug Interactions:

1. None

Adverse Reactions:

1. Local irritation, burning along the vein of infusion, nausea, vomiting, abdominal pain. leg weakness.
2. In high concentrations: flushing, agitation, hypotension and diaphoresis, Peripheral vascular collapse.
3. EKG changes associated with potassium intoxication.
   a. Tall tented T-waves
   b. Depressed S –T segments.
   c. Prolonged P – R interval, loss of P – wave.
   d. Heart block, v-fib, cardiac arrest.

Dosage and Administration:

1. POTASSIUM infusion must be initiated at the transferring hospital and may be run through either central or peripheral line (limit of 10meq/hr rate if infusing through a peripheral line 20meq/hr if infusing through a central line.
2. POTASSIUM concentration may not exceed 40 mEq in 1 liter of IV solution.
3. POTASSIUM will not be initiated in the field.
4. Refer to compatibility chart before administering any IV medications through an IV containing POTASSIUM.
5. Monitor urinary output. Contact Medical Control is urinary output is less than 30 ml / hour for two consecutive hours.
6. Asses IV insertion site for any redness, swelling or tenderness. If any of the above occurs, stop infusion and discontinue IV site. Restart infusion after a new IV site has been established. Notify receiving hospital of the area of the previous IV site.

PROPOFOL (DIPROVAN)

Indications: Maintenance of sedation in intubated, mechanically ventilated patients.

Contraindications: Not recommended in children ≤ 3 years old.

Dosage and Administration:

1. Must be initiated at sending facility.
2. Obtain titration orders for decreasing sedation or hypotension from the sending facility. One dose adjustment is allowed. Further adjustment require discussion with Medical Control or sending physician.
   a. Typical dosing: 5-10 mcg/kg/min for 5 minutes. Increase rate 5-10 mcg/kg/min no more than every 5-10 minutes until desired level of sedation is achieved. Max rate of 40 mcg/kg/min unless patient has been stable at higher rate for greater than one hour.
3. Ensure that patient has had pain control as well. Typically this is with intermittent fentanyl boluses or a continuous infusion.
4. Has short half-life. Patient will be responsive within 2-5 minutes after stopping medication.
5. Must be administered by IV infusion pump.
6. Monitor vital signs every 5 minutes.
7. Medication cannot be given as a bolus under Tier 1 protocols.

PROTON PUMP INHIBITORS (PROTONIX, NEXIUM, PREVACID)

Indications:

1. Acid related gastrointestinal disorders
2. Reduce risk of upper GI bleeding in critically ill patients

Contraindications:

1. Hypersensitivity

Drug Interaction:

1. Reduced clearance of diazepam
2. Reduced bioavailability of drugs dependant on gastric pH
3. Interacts with warfarin and cyclosporin

Adverse Reactions:

1. Jaundice,
2. GI upset,
3. -CNS symptoms in the elderly,
4. anaphylaxis,
5. Rash.

Contraindications: Allergy to drug or drug class.

Dosage and Administration:

1. Some doses may be administered intravenously or orally. Specific doses may vary based on patient weight, presentation, or diagnosis. The sending physician must order dose and route prior to patient transfer.
2. If patient becomes symptomatic during transfer, discontinue medication and contact Medical Control.
3. Commonly administered medications are Protonix, Nexium, and Prevacid.
4. Verify infusion rate as well as total time at the transferring facility prior to departure.
5. Monitor for headache, gastrointestinal bleeding, nausea, diarrhea,

RACEMIC EPINEPHRINE

Indications:

1. Stridor (usually from croup)

Adverse Reactions:

1. Tachycardia
2. Palpitations
3. Muscle tremors.

Dosage and Administration:

1. 0.05mL/kg with max dose of 0.5 ml mixed in 3 mL saline, via nebulizer at 6-8 LPM to create a fine mist and administer over 15 minutes.
2. RACEMIC EPINEPHRINE is heat and photo-sensitive
3. After RACEMIC EPINEPHRINE treatment, the patient should be monitored for 6 -hours due to potential rebound Stridor.
4. Do not confuse the side effects with respiratory failure or imminent respiratory arrest.
5. If no RACEMIC EPINEPHRINE is available, consider 5 mL of 1:1,000 EPINEPHRINE x 1 via nebulizer at 6-8 LPM to create a fine mist and administer over 15 minutes.

REMDESIVIR

Class:

Antiviral Agent

Action:

FDA approved antiviral therapy for treatment of COVID-19 in hospitalized patients ≥ 12 years old. Early studies suggest therapy is most effective in those hospitalized patients with moderate to severe disease. Efficacy has not been proven in those with mild disease or critical illness (ventilator or ECMO patients).

Indication:

1. Laboratory confirmed diagnosis of COVID-19 with evidence of lower respiratory tract disease.
2. Patients hospitalized for COVID-19.

Contraindication:

1. Known allergy or other previous adverse reaction to the medication
2. Age < 12 years old, less than 40 kg actual body weight
3. Renal dysfunction with eGFR < 30 mL/minute

Complications/Adverse Reactions:

1. Allergic reactions / hypersensitivity reactions
2. Respiratory decompensation / respiratory failure
3. Liver toxicity / acute hepatic failure
4. Acute renal failure

Precautions:

1. Drug may accumulate in patients with renal impairment

Side Effects:

1. Fever
2. Nausea/vomiting
3. Hyperglycemia
4. Anaphylaxis (rare)

Equipment:

1. Administered by pump

How Supplied:

1. IV administration only

Dose:

1. Standard dosing: 200mg IV on day 1, 100mg IV on days 2 – 5

Standing Orders:

1. Routine ALS Care.
2. Medication must be started 15 minutes or more before the start of the transport.
3. Verify infusion rate as well as total time at the transferring facility prior to departure.
4. Monitor patient closely enroute.
5. If signs of allergic reaction, pause infusion and Notify Medical Control.
6. Follow Anaphylaxis Protocol if needed for signs of allergic reaction and/ or shock.
7. If infusion is completed during transport, medication should be discontinued and line kept open by infusing .9% Normal Saline at TKO rate.
8. Consider IV bolus if hypotension occurs.
9. Any change in rate/dosage of medication during interfacility transfer requires Medical Control Order.
10. If perceived life threatening reaction, infusion may be stopped while contacting Medical Control.

ADDITIONAL REQUIREMENTS:

This is an Advanced Scope of Practice Protocol. Only providers who have completed additional system training are authorized to perform. The protocol is only designed for patients who are being transferred from one medical facility to another. A medical command physician must be contacted prior to the EMS crew taking transfer of care of the patient if any of the following conditions apply:

1. Patient is hypotensive at the time of transfer.
2. An acute deterioration or change in the patient's status is noted.
3. Medications ordered are outside of the concentrations or infusion rates that are permitted by the current prehospital treatment protocols.
4. The prehospital provider has any concern that the provider's experience or abilities, or the available equipment, may not meet the patient's anticipated needs during the transport.

SODIUM NITROPRUSSIDE (NITROPRESS)

Indications:

1. Hypertensive emergencies
2. Reduction of cardiac pre-load and after-load
3. It is often used with vasopressor agents to maintain a blood pressure while decreasing the pre-load and after-load.

Contraindications:

1. Hypersensitivity
2. Decreased cerebral perfusion

Cautions:

Nitroprusside can cause precipitous decreases in blood pressure. In patients not properly monitored, these decreases can lead to irreversible ischemic injuries or death. Use only when available equipment and personnel allow blood pressure to be continuously monitored."

Dosage and Administration:

1. Must be initiated at sending facility.
2. Typical dosing of 0.3 to 10 mcg/kg/min. Titrated carefully to desired effect.
3. Obtain titration orders from sending physican.
   a. Single dose adjustment is allowed, further adjustments require approval of medical control.
3. Maintain appropriate delivery by IV infusion pump.
4. Monitor vital signs every 5 minutes.
5. Solution bag should be in overwrap due to light sensitivity.
6. If an invasive arterial line monitoring device is present and compatible with unit's equipment,- continue monitoring during transport.

TPA INFUSIONS (ACTIVASE, ALTEPLASE)

Indications:

1. Myocardial infarction
2. CVA – non-hemorrhagic
3. Pulmonary embolus
4. Femoral occlusion

CONTRAINDICATION:

1. Hypersensitivity
2. Recent surgery (within 10 days)
3. GI/GU bleeding
4. Uncontrolled hypertension (systolic BP >180, or diastolic BP > 110)
5. Active internal bleeding
6. History of CVA (within 2 months)
7. Recent brain, or spinal surgery (within 2 months)
8. Recent trauma

ADVERSE REACTIONS:

1. Bleeding-
2. Angioedema
3. Reperfusion arrhythmias
4. Elevated temp
5. Hypotension
6. Anaphylactic Reaction

PRECAUTIONS:

1. tPA must be started within 4.5 hours of onset of symptoms of stroke.
2. Do not take blood pressure in the arm tPA is infusing in.
3. Patient must be NPO for 24 hours and until swallow study is done.

Dosage and Administration:

For Ischemic Stroke

1. Loading dose of 10% of total infusion to be completed at transferring facility.
2. Infusion of 0.9mg/kg to be infused over 60 minutes. Maximum dose is 81mg
3. Must be infused by IV infusion pump.
4. Verify infusion rate as well as total time at the transferring facility prior to departure.
5. Monitor patient closely enroute for signs of hypertension bleeding, tongue swelling.
6. If infusion is completed during transport, tPA should be discontinued and line kept open by infusing .9% Normal Saline at TKO rate.
7. Consider IV bolus if hypotension occurs.

8. Any change in rate/dosage of tPA during Interfacility transfer requires Medical Control Order.
9. If perceived life threatening reaction, infusion may be stopped while contacting Medical Control.

For Acute MI

1. Must be initiated by transferring hospital prior to departure.
2. Monitor pulse, blood pressure and ECG.
3. Watch for reperfusion arrhythmias, treat per appropriate protocol.
4. Usually runs with NITROGLYCERIN INFUSION AND HEPARIN INFUSION. tPA must have a separate IV site.
5. If bleeding occurs or a change in the mental status of the patient, contact Medical Control.
6. Must be infused by IV infusion pump.

TPN

Indications:

1. Undernourished patients who cannot ingest large volumes of oral feedings.
2. Patients being prepared for surgery, radiation therapy, or chemotherapy.
3. Patients with disorders requiring complete bowel rest.

Contraindications:

1. Hypersensitivity

Adverse reactions:

1. Hyperglycemia.
2. Hyperosmolar syndrome.
3. Electrolyte disturbance.
4. Post- infusion syndrome.

Dosage and Administration:

1. Verify solution formula and rate with physician's orders prior to transport.
2. HYPERALIMENTATION is to be considered incompatible with all other medications and Iv solutions. Nothing is to be added to the HYPERALIMENTATION bag or iv tubing.
3. Monitor for signs and symptoms of hyper / hypoglycemia. Obtain blood sugar as needed.
4. Assess for signs and symptoms of hyperglycemia. Contact Medical Control, if present.
5. If an implanted port or central line is leaking or cracked, clamp off line, start peripheral IV and contact Medical Control for further orders.

THORACOSTOMY PATIENT MANAGEMENT

Indications:

1. Evacuation of air or fluid from the pleural space. The chest tubes are placed to a water seal drainage system which provides for escape of air or fluid into a drainage container.

Exclusion Criteria:

1. Mediastinal chest tubes
2. Heimlich Valve
3. Chest tubes in place for less than 4 hours.

Procedure:

1. Document the reason for the placement of the chest tube.
2. Document the name of the doctor who placed the tube and evaluated the chest x-ray for adequate placement. Also document the name of the radiologist who verified the tube placement
3. Make sure the chest tube and tubing are secured to the patient with sutures, tape, and an occlusive dressing.
4. Assess the function of the chest tube and drainage system before initiating patient transport.
   a. Gentle rise and fall of the water level, which corresponds with the patient's respirations is called "tidalling" and indicates that the system is functioning properly.
5. The drainage system should be lower than the patient's chest and remain upright at all times.
6. If chest tube is "to suction" at sending facility, this should be continued during transport with rate of suction to match what it is at the sending facility.
7. Evaluate breath sounds and vital signs and reassess every 10 minutes for development -of a tension pneumothorax with indications such as:
   a. Hypotension
   b. JVD
8. All tubing and connections should be monitored with all patient movements to maintain patency of the system.
   a. Ensure the dressing remains dry and occlusive.
   b. Ensure there are no kinks or dependent loops (e.g., a loop or turn in the tubing that forces the drainage to move against gravity to reach the collection chamber) in the tubing.
   c. Amount of water in the water seal chamber; if the water level appears low ask a staff member if it requires refilling prior to departure.
9. The tubing should not be "milked" as it increases intra pleural pressure.
10. Record drainage volume in chest tube collection device at the sending facility. Document drainage amount during transport every 15 minutes.
11. Assess for pain and treat per PAIN MANAGEMENT Protocol.
12. Ask sending physician for Heimlich valve that came with kit, take with patient if

available.

13. Contact Medical Control for any of the following:
    A. Chest tube inadvertently dislodged
        i. If entire chest tube is inadvertently dislodged from the chest, cover with a sterile occlusive dressing closed on 3 sides to allow for air to leave the chest but not ender
        ii. If a tension pneumothorax develops, burp one corner of the dressing. If releasing dressing is unsuccessful and hypotension, consider needle decompression.
    B. Excessive constant bubbling in the water seal chamber
        i. May indicate an air leak -in the drainage system. Leaking and trapping of air in the pleural space may result in tension pneumothorax.
    C. If the drainage system is crushed or broken open or the chest drain becomes detached from the chest tube
        i. Do not reconnect – you may be instructed to -place a Heimlich valve to the end of the chest tube or place the end in a bottle -of sterile water to create a seal.
    D.. Sudden increase in bloody drainage from a hemothorax.

Notes:

1. Continuous air bubbling in the water seal chamber confirms a constant air leak from a tube connection or from the patient's chest (e.g., unresolved pneumothorax).
2. Intermittent bubbling in the water seal chamber confirms an intermittent air leak from the patient's chest.
3. No air bubbling in the water seal chamber confirms no air leak from the patient's chest and no air leak from a tube connection

BiPAP

Indications:

1. CHF
2. COPD
3. Hypoxic respiratory failure

Contraindications:

1. Depressed mental status
2. Patient unable to tolerate the device

Use:

1. Patient must be connected to the device by respiratory therapy at the sending facility
2. Patient must be on the device for at least 60 minutes without changes made to IPAP/EPAP settings.
3. Patient must be responsive to verbal stimuli and able to follow simple commands
4. If patient becomes altered while on BiPAP, remove patient from device and follow "ALTERED LOC/UNCONSCIOUS/UNKNOWN ETIOLOGY" protocol.
5. If patient becomes severely short of breath on device, check breath sounds and consider possible pneumothorax. Disconnect the device and provide supplemental oxygen as indicated. Consider the need for needle decompression ONLY if signs of tension pneumothorax are present. Contact medical control.

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Heart Rate Titration Worksheet

Medication: _____ Intended effect: _____

Indication: _____

Indication for dose adjustment: _____

Parameters:

If HR is greater than _____ increase/decrease medication by _____ every _____ minutes

If HR is less than _____ increase/decrease medication by _____ every _____ minutes

NOTE: MEDICAL CONTROL MUST BE CONTACTED AFTER EACH TITRATION

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Blood Pressure Titration Worksheet

Medication: _____ Intended effect: _____

Indication: _____

Indication for dose adjustment: _____

Parameters:

If Systolic BP is greater than _____ or MAP is greater than _____ increase/decrease medication by _____ every _____ minutes

If Systolic BP is less than _____ or MAP is less than _____ increase/decrease medication by _____ every _____ minutes

NOTE: MEDICAL CONTROL MUST BE CONTACTED AFTER EACH TITRATION

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Sedation Titration Worksheet

Medication: _____

Parameters:

RASS (Richmond Agitation Sedation Scale)		
4	Combative	Overtly combative, violent, immediate danger to staff
3	Very agitated	Pulls or removes tubes or catheters; aggressive
2	Agitated	Frequent non-purposeful mvmt, fights ventilator
1	Restless	Anxious but movements not aggressive or vigorous
0	Alert and calm	
-1	Drowsy	Sustained awakening to voice (≥10sec)
-2	Light sedation	Briefly awakens with eye contact to voice (<10 sec)
-3	Moderate sedation	Movement or eye opening to voice but no eye contact
-4	Deep sedation	No response to voice but movement or eye opening to physical stimulation
-5	Cannot be aroused	No response to voice or physical stimulation

For the safety of the patient and EMS crews, ideal sedation during transport is a RASS of -2 or less. If the patient is more awake than that:

Medication _____ should be given as a bolus of _____ mg and
Infusion of _____ should be increased by _____ to a maximum dose of _____

NOTE: MEDICAL CONTROL MUST BE CONTACTED AFTER EACH TITRATION