

# **Monroe-Livingston Regional EMS Protocols**

## **Section 7**

### **Specialty Care Transport**

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## 7.0 Scope of Practice

The MLREMS Specialty Care Transport Technician provides a level of care above that of the EMT-P in order to safely provide interfacility transport of critically ill patients. These Specialty Care Transport Protocols are to be used only by credentialed MLREMS SCT Technicians and are to be used in concert with the EMT-P scope of practice outlined in the MLREMS Standards of Care when performing an interfacility transport. They are only to be used during interfacility transports.

### SCOPE OF PRACTICE

Specialty Care Paramedics within the Monroe Livingston EMS System are credentialed at three levels:

Infusion Specialty Care Paramedics are trained and credentialed to care for patients as follows:

- Transfer of patient with additional medications (referred to as SCT medications) or devices not used or taught in the NYS EMT-P curriculum and not included in the MLREMS EMT-P protocols.
- Patients that have no more than three SCT IV medications being administered
- Patients that have no more than one vasoactive SCT IV medication being administered
- Patients that are not intubated and/or mechanically ventilated, based on their unstable condition, thus requiring staff with advanced knowledge of ventilator management.
- Patients that are being hemodynamically monitored with invasive monitoring devices, excluding Swan Ganz or similar central access devices.

Respiratory Specialty Care Paramedics are trained and credentialed to care for patients as follows:

- Transfer of patient with additional ventilatory devices not used or taught in the NYS EMT-P curriculum and not included in the MLREMS EMT-P protocols.
- Patients who are mechanically ventilated with tracheotomy tubes (and have been for a minimum of one month) and therefore require a knowledge of ventilator management. These patients shall not be continuously medicated with any IV medications, not sedated and not potentially hemodynamically or cardiovascularly unstable in the opinion of the sending facility.
- Patients that are not intubated and mechanically ventilated, based on their unstable condition, thus requiring staff with advanced knowledge of ventilator management.

Senior Specialty Care Paramedics are trained and credentialed to care for all patients according to the current MLREMS SCT Protocols, including, but not limited to:

- Transfer of patient with additional medications (referred to as SCT medications) or devices not used or taught in the NYS EMT-P curriculum and not included in the MLREMS EMT-P protocols including all patients who qualify under Infusion or Respiratory Specialty Care Paramedics as above.
- Patients that have multiple IV medications being administered including vasoactive medications.
- Patients that are intubated, or have a tracheotomy tube, and mechanically ventilated based on their unstable condition, thus requiring staff with advanced knowledge of ventilator management.
- Patients that are being hemodynamically monitored with invasive monitoring devices, including Swan Ganz or similar central access devices.
- Rapid Sequence Intubation (If credentialed as an RSI Technician in the Monroe-Livingston Region)

The following protocols are considered standing order for the indicated level of care except if notation is made to contact medical control, which is considered Absolute On-Line with no exception for radio or phone failure. All MLREMS EMT-P Standards of Care are standing order for the Senior Specialty Care Paramedic except in cases identified as Absolute On-Line with no exception for radio or phone failure.

## 7.1 Care Expectations

The specialty care transport team will work collaboratively to achieve the following objectives:

1. Introduce yourself and the team members to the patient, family and hospital staff.
2. Utilize full universal precautions.
3. Provide a primary and secondary assessment prior to transport on every patient transported including a history and review of interventions by the sending facility including x-ray results and lab information when applicable.
4. Treatment for life-threatening problems detected during the primary and secondary assessment must be initiated before transport unless the patient is being transported for management of that problem.
5. Establish and maintain a patent airway. If the patient is on a ventilator, maintain the ventilator settings as per the sending facility unless otherwise indicated by the clinical condition of the patient.
6. Contact the SCT Medical Control unless all the following criteria are met.
  - a. The patient's condition is stable and an accurate report of the patient's condition has been given to the Specialty Care Transport Paramedic.
  - b. The written protocols and any written orders currently address the immediate and foreseeable needs of the patient.
  - c. There is clear evidence of discussion between the sending and receiving facilities and the receiving facility has accepted care of the patient.
  - d. There is a completed hospital transfer form with the name of the accepting physician.
7. Before leaving the hospital, have the patient and family visit and, if possible, explain the patient's condition and probable course.
8. A phone report should be given to the receiving facility should any significant changes occur enroute. Before leaving the sending facility, try to obtain a contact person responsible for patient care at the receiving facility.
9. In the event of cardiac arrest of the patient during transport the Specialty Care Transport Unit will proceed to the nearest appropriate emergency department. The transporting paramedic should notify the SCT Medical Control as soon as practical. The Emergency Department should also be notified by the most appropriate means.
10. Patients carrying a "Do Not Resuscitate" order will not be transported until limitations of treatment in the form of a written order from the sending physician have been secured. This should be discussed with the SCT Medical Control before transport.
11. The Specialty Care Paramedic will give a complete report to the staff on arrival at the receiving facility.
12. ALL PROCEDURES MUST BE DOCUMENTED.

## 7.2 Routine Standard of Care

These “Specialty Care Transport Protocols” are only to be used by personnel assigned to units that have been designated as a “Specialty Care Transport Unit” by the MLREMS Medical Director. The protocols are NOT to be used for routine Advanced Life Support care. Routine advanced life support care is directed by the “Monroe-Livingston REMAC EMS Protocols”. They are meant to act as general guidelines for rendering medical care and/or treatments and may not be inclusive for every situation. The protocols should be regarded as the prevailing norms of treatment and should be considered prudent in the delivery of medical care. Deviation from these protocols may be necessary based on patient need and must be documented.

All patients being transported by the Specialty Care Transport Team must have the following in place prior to leaving the referring facility:

- Stable airway.
- Cardiac monitor – 3-lead with 12-lead capability immediately available for cardiac patients.
- Minimum of two intravenous lines (peripheral or central), large bore if clinically indicated.
- Continuous pulse oximetry, cardiopulmonary monitoring including blood pressure (Invasive or noninvasive), and capnography (when clinically indicated)
- Vital signs taken a **minimum** of every 15 minutes unless a change occurs which requires immediate repetition of them.
- Confirmation that any medications being infused in the same IV line are compatible.
- Any continuous infusion requires the use of a flow limiting/controlling device.

All patients should be maximally stabilized prior to transport, including intubation and peripheral or central venous access if necessary. It is the responsibility of the sending hospital to ensure that stabilization is complete. In the event the Specialty Care Transport Team does not feel the patient is stable for transport, they must communicate with both the sending hospital and the SCT Medical Control before transport is initiated.

## 7.3 Medical Control

Specialty Care Transport Medical Control is provided by the SCT Agency performing the transport. The SCT Technician must have a means of direct communication to SCT Medical Control at any time during their care of the patient. SCT Medical Control Physicians must be approved by the Agency Medical Director prior to performing any direct on-line medical control for SCT interfacility transports.

### **Specialty Care Transport Medical Control/Communication Failure:**

Contact with medical control will be dictated by protocol and should be available at all times. For the Specialty Care Transport unit the preferred medical control is the designated SCT Medical Control. In the event of being unable to contact the SCT Medical Control the following mechanism will be instituted.

1. Direct contact with a designated back-up MLREMS approved SCT Medical Control (if available).
2. Direct contact with standard medical control.
3. In the event of failure of all the above, treatment protocols will be regarded as standing order however procedures requiring absolute on-line medical command should not be undertaken unless in a life threatening emergency.
4. In the event of a procedure requiring absolute on-line direction being undertaken without medical control, the procedure and events surrounding it will be reviewed within 24 hours by the agency Specialty Care Medical Director to determine if retroactive approval is warranted.

### **Orders from transferring/ receiving physicians:**

During inter-hospital transport, medical crews will be asked to continue treatment initiated at the transferring hospital. These orders must be written and signed by the referring physician. If, at any time the Specialty Care Transport Crew questions orders from a referring or receiving physician, Specialty Care Medical Control MUST be contacted. Likewise, anytime a transferring or receiving physician asks the Specialty Care Transport crew to carry out medical treatment for which they have not been trained, or which appears to be in conflict with established treatment protocols, Specialty Care Medical Control MUST be contacted before initiating care.

### **Potentially Unstable Transports:**

It is the requirement of the transferring hospital to provide sufficient interventions to stabilize the patient prior to transport. If, in the opinion of the Specialty Care Paramedic, the patient is not stable for transport, discussions with the transferring hospital and possibly Specialty Care Transport Medical Control should occur to determine how best to stabilize the patient for transport. Potential solutions include further interventions (such as intubation) at the transferring hospital or use of another Specialty Care Transport unit or agency with additional capabilities.

## 7.4 Intubated and Chemically Paralyzed Patients

### Senior SCT Paramedic

1. ALL PATIENTS WHO ARE CHEMICALLY PARALYZED MUST HAVE ALSO RECEIVED A SEDATIVE AND AN ANALGESIC BY THE SENIOR SCT PARAMEDIC UNLESS SPECIFICALLY CONTRAINDICATED.

More than two doses or incremental increases of the following medications necessitate Specialty Care Transport Medical Control.

- Morphine - 0.05-0.1 mg/kg IV titrate to continued pain control every 5-10 minutes to a maximum of 50 mg or hemodynamic instability
  - Propofol - titrate to continued sedation or hemodynamic instability, by increasing rate 5 mcg/kg/min to a total of six (6) times or 30 mcg/kg/min max total increase; 0.5-1 mg/kg bolus may be administered once while increasing rate
  - Valium - titrate to continued sedation with 5-10 mg IV every 10-15 minutes to a maximum of 50 mg or hemodynamic instability
  - Versed - titrate to continued sedation with 2.5-5 mg IV every 10-15 minutes to a maximum of 20 mg or hemodynamic instability.
2. Soft restraints should be used for patient safety.
  3. All intubated patients may be re-dosed with Vecuronium at 0.1mg/kg IV if needed to maintain paralysis. Vecuronium may be given as needed every 40 minutes.
  4. If unable to sedate/paralyze, ensure IV lines are in place and patent. In the event of continued failure to paralyze, Specialty Care Transport Medical Control should be contacted.

## 7.5 Pericardial Effusion and Cardiac Tamponade

If evidence of symptomatic pericardial effusion:

1. Treat hypotension with repeated fluid boluses
2. Confirm equal bilateral breath sounds and chest rise with breaths

In cardiac arrest requiring the initiation of chest compressions (pericardial tamponade):

1. Specialty Care Transport Medical Control must be contacted immediately
2. The patient must be taken to the nearest Emergency Department

### Senior SCT Paramedic

3. Perform Pericardiocentesis
  - A. Identify landmarks (costal margin, xiphoid process).
  - B. Prepare site to maintain sterility and cleanse site with povidone-iodine.
  - C. Use a 16 or 18 gauge cardiac/spinal needle (3 ½") attached to a 20-50 cc syringe. A 6" needle should also be available for adults with large chests.
  - D. Insert the needle at the xiphocostal angle approximately 45 degrees to the chest.
  - E. Advance the needle toward the left shoulder (aiming for the left scapular tip) while applying a slight negative pressure on the syringe.
  - F. As the needle is advanced into the pericardial sac you should feel a slight give. Begin to withdraw blood or fluid. Keep any fluid removed.
  - G. If successful keep the needle in place until all fluid is removed.
  - H. Once completed, remove the needle and apply a sterile dressing.
  - I. Monitor patient for cardiac ectopy.
  - J. Assess for any improvement in hemodynamic status.

## 7.6 Pre-Transport Endotracheal Intubation

### Respiratory and Senior SCT Paramedic

#### CRITERIA

Endotracheal intubation should be performed **before** transport in the following patients:

- Patients with a decreased level of consciousness (GCS of < 8)
- Patients with acute medical or surgical conditions that could lead to airway obstruction (burns, facial trauma) or acute respiratory distress/compromise

Endotracheal intubation should be performed by following the Rapid Sequence Intubation Protocol, by approved RSI technicians, when conventional orotracheal intubation is impossible due to the presence of a gag reflex.

### Senior SCT Paramedic

#### POST-INTUBATION MEDICATIONS

- All newly intubated patients should be given a sedative, an analgesic, and if necessary, a long acting paralytic per the Intubated and Chemically Paralyzed Patient Protocol.

#### SPECIAL NOTES

- Specialty Care Transport Medical Control should be contacted in the event of any deviation from the above protocol before the transport of the patient is initiated.
- Intubation before transport is the responsibility of the sending facility and should be done by them. SCT Paramedics will not begin a transport until the sending facility has successfully managed to create a stable airway. In the event that they refuse, contact Specialty Care Transport Medical Control.

## 7.7 Thoracostomy (Chest) Tubes

### SPECIFIC TRANSPORT PRINCIPLES

- All thoracostomy tubes must be securely attached to patient before transport. This should include: confirmation of suturing to the skin, occlusive dressing to thoracostomy site, and secure taping of the thoracostomy tube to the patient.
- All thoracostomy tubes should be connected to a commercially available Pleur-Evac or a Heimlich valve.
- If suction was being applied to the Pleur-Evac at the sending facility, it will be maintained during the transport at the same setting.
- In the event of a sudden deterioration in the patient's status, all thoracostomy tubes will be placed to suction.
- Thoracostomy tubes should be re-examined every 15 minutes during transport to ensure proper function.
- In the event that a thoracostomy tube becomes dislodged, no attempt will be made to reposition. The thoracostomy tube should be put to suction and the patient observed for signs of tension pneumothorax.
- If tension pneumothorax should develop, initiate appropriate care with needle decompression and contact Specialty Care Transport Medical Control.
- Provide appropriate analgesia to all patients, per MRLEMS Pain Control Protocol.

## 7.8 Transvenous (Temporary) Pacemaker

### MANAGEMENT

- Check to assure the insertion site dressing is clean and dry and the pacing electrode position is anchored securely with tape.
- Secure the pacing generator and place the plastic cover over the pacemaker controls.

### MANAGEMENT OF COMPLICATIONS

#### 1. **Failure to capture** –due to electrode displacement or a high stimulation threshold

- Check and tighten all connections
- Increase the pacemaker output/mA.
- Turn the patient to a left lateral recumbent position
- Call Specialty Care Transport Medical Control immediately and report if effective capture is not regained after the above interventions.
- Place the external pacer on the patient and pace if needed for symptomatic bradycardia following the MLREMS Bradycardia Protocol.
- Turn off any internal pacer if one is present.

#### 2. **Failure to pace with no spike present** –caused by a broken or loose connection, electrode fracture, inhibition of pacemaker output, battery or circuit failure.

- Check and tighten all connections.
- Check for any equipment that might cause electrical interference and remove if possible.
- Replace the battery and/or pacing generator.
- Call Specialty Care Transport Medical Control immediately and report if effective pacing is not regained after the above interventions.
- Place the external pacer on the patient and pace if needed for symptomatic bradycardia following the MLREMS Bradycardia Protocol.
- Turn off any internal pacer if one is present.

#### 3. **Failure to sense** – occurs when the pacemaker does not sense an intrinsic beat.

- Check and tighten all connections.
- Increase the sensitivity of the pacing unit.
- Place the patient in a position where adequate sensing was last observed. A left lateral recumbent position is usually best.
- Increase the pacing rate to override the intrinsic rhythm if possible
- Turn the pacemaker off if it is not needed, but do not disconnect from the electrode wires.
- Call Specialty Care Transport Medical Control immediately and report if effective pacing is not regained after the above interventions.
- Place the external pacer on the patient and pace if needed for symptomatic bradycardia following the MLREMS Bradycardia Protocol.
- Turn off any internal pacer if one is present.

#### 4. **Over-sensing** –occurs when the pacemaker sensitivity is set too high. (It should be suspected when pauses are seen intermittently on the ECG or when the paced rate falls below that set on the pacemaker generator. The pacemaker-induced problem may be mistaken for electrode fracture or impending generator failure. Over-sensing leads to under-pacing.)

- Decrease the sensitivity on the pacemaker.
- Replace the pacemaker generator if the problem continues.
- Call Specialty Care Transport Medical Control immediately and report if effective pacing is not regained after the above interventions.
- Place the external pacer on the patient and pace if needed for symptomatic bradycardia following the MLREMS Bradycardia Protocol.
- Turn off any internal pacer if one is present.

## 7.9 Ventilator Management

### Respiratory and Senior SCT Paramedic

#### PROCEDURE

1. Connect ventilator hose to the gas supply
2. Turn on gas supply and check cylinder contents.
3. Set ventilation parameters to suit the patient. Refer to referring or receiving physician orders.
4. The following Specialty Care Transport unit standard (adult) ventilator settings will be initiated unless other physician orders/patient condition dictate:
  - a.  $FIO_2=100\%$
  - b. Respiratory rate=10-12
  - c. Tidal Volume=5-10 mL/kg
  - d. PEEP=5
  - e. Mode = A/C [Volume Control]
5. Briefly occlude the patient connection port of the patient-valve with thumb and check that the peak inflation-pressure reading on the manometer is appropriate for the patient.
6. Connect the patient valve to an endotracheal tube.
7. Monitor the inflation pressure manometer to ensure correct ventilation
8. Make appropriate adjustments per patient's clinical condition.
9.  $ETCO_2$  should be maintained at 38-42.  $ETCO_2$  must be monitored by waveform capnography at all times.
10. Adjustments beyond the following parameters require Specialty Care Transport Medical Control or physician order.
  - a. Respiratory rate <8 or >16
  - b. PEEP >10

# **Specialty Care Transport Medication Data Sheets**

## 7.10 DOBUTAMINE

### Senior or Infusion SCT Paramedic

This medication is to be started by the sending facility. SCT Teams can continue this medication by direct written order and with provision of the medication by the sending facility.

#### a) Pharmacology

- (1) Pure synthetic beta adrenergic agonist, potent inotrope, mild chronotrope, increases cardiac output

#### b) Pharmacokinetics

- (1) Fast acting
- (2) Half life about 2 minutes

#### c) Indications

- (1) Cardiogenic shock

#### d) Contraindications

- (1) Hypertension
- (2) Tachydysrhythmias
- (3) Hypertrophic subaortic stenosis (left ventricular outflow obstruction)

#### e) Adverse Effects

- (1) Hypersensitivity
- (2) Injection site reaction
- (3) Nausea
- (4) Hypokalemia

#### f) Precautions

- (1) Can lead to ventricular tachycardia or ventricular fibrillation
- (2) Can precipitate ACS or AMI.

#### g) Dosage

- (1) 2-20 mcg/kg/min is typical dose range
- (2) In the event of tachydysrhythmias, reduce dose by 5mcg/kg/min (or to a minimum of 2mcg/kg/min)

## 7.11 DOPAMINE HYDROCHLORIDE (INTROPIN)

### Senior or Infusion SCT Paramedic

#### a) Pharmacology

- (1) Alpha and beta adrenergic receptor stimulator
- (2) Dopaminergic receptor stimulator
- (3) Precursor of norepinephrine
- (4) At low doses, less than 2 mcg/kg/min
  - (a) Dilates renal and mesenteric blood vessels
  - (b) Venoconstricts
  - (c) Arterial resistance varies
- (5) At moderate doses, 2-6 mcg/kg/min  
Beta1 stimulating effect on heart, results in increased cardiac output
- (6) High dose, 6-10 mcg/kg/min  
Exhibits alpha1 effects; peripheral vasoconstriction including renal and mesenteric vessels, increases left and right ventricular preload
- (7) Doses greater than or equal to 10 mcg/kg/min  
Alpha1 stimulating effects may reverse mesenteric and renal artery dilatation resulting in decreased blood flow, causing increased preload due to effects on venous system

#### b) Pharmacokinetics

- (1) Extremely rapid onset of action
- (2) Extremely brief duration of action
- (3) The rate of administration may be used to control the effect of dopamine

#### c) Indications

- (1) Cardiogenic shock
- (2) Septic shock
- (3) Anaphylactic shock

#### d) Contraindications

- (1) Pheochromocytoma (adrenal tumor which causes excessive release of epinephrine and norepinephrine)
- (2) Pre-existing tachydysrhythmias
- (3) Uncorrected hypovolemia
- (4) Use in patients with a systolic blood pressure greater than 90 (unless the transferring hospital has different parameters to titrate to)

#### e) Adverse Effects

- (1) Anginal pain
- (2) Tachydysrhythmias
- (3) Nausea and vomiting
- (4) Hypertension
- (5) Undesirable degree of vasoconstriction
- (6) Palpitations
- (7) Dyspnea
- (8) Dilated pupils
- (9) Tissue necrosis at IV site

#### f) Precautions

- (1) Extravasation should be reported to the hospital staff on arrival
- (2) Patients receiving monoamine oxidase (MAO) inhibitors are extremely sensitive to the effects of dopamine and should receive a much lower dosage than is usually given
- (3) Patients with pheochromocytoma are extremely sensitive to dopamine and may develop profound hypertension in response to minimal doses

#### g) Dosage

- (1) For IV infusion use only
  - (2) 2-5 mcg/kg/min – Vasodilator effect increasing renal perfusion
  - (3) 5-15 mcg/kg/min – Increased cardiac contractility and heart rate
  - (4) >15 mcg/kg/min – Vasoconstricts vascular beds to maintain blood pressure
- Maximum dose 20 mcg/kg/min; doses greater than 10mcg/kg/min must be administered via a central line  
If infiltration occurs, discontinue medication and notify physician at receiving hospital immediately upon arrival.

## 7.12 FIBRINOLYTIC AGENTS

### Senior or Infusion SCT Paramedic

This medication is to be started by the sending facility. SCT Teams can continue this medication by direct written order and with provision of the medication by the sending facility.

#### a) Pharmacology

- (1) To promote lysis of the clot allowing return of blood flow to the infarct related vessel

#### b) Pharmacokinetics

- (1) Depends on agent used – dosing varies
- (2) Approximately 24 hour half-life

#### c) Indications

- (1) Acute myocardial infarction
- (2) Acute stroke (within 3 hours of onset)

#### d) Contraindications

- (1) Active internal bleeding (i.e. GI Bleed)
- (2) Previous hemorrhagic stroke
- (3) History of ischemic stroke or TIA (for MI use) in past 6 months
- (4) Intracranial or intraspinal surgery (<2 months)
- (5) Known intracranial neoplasm, AV malformation, or aneurysm
- (6) Trauma or surgery at non-compressible site <10 days
- (7) Suspected aortic dissection
- (8) Prolonged CPR
- (9) Pregnancy
- (10) Hypertension >180/110

#### e) Adverse Effects

- (1) Bleeding
- (2) Hypersensitivity reactions
- (3) Angioedema

#### f) Precautions

- (1) Systolic blood pressure >180 or diastolic blood pressure > 110, not resolving with therapy
- (2) Known history of bleeding disorder or current use of anticoagulants
- (3) Stroke >6 months in past
- (4) Recent trauma or major surgery (within 2-8 weeks)
- (5) Pregnancy
- (6) Active peptic ulcer disease
- (7) If bleeding or severe angioedema – stop infusion after contact Specialty Care Transport Medical Control
- (8) Subclavian line (non-compressible site)

#### g) Dosage

The dose varies based upon the type of agent used. If a patient is receiving thrombolytics during transport, ensure that proper physician orders have been written detailing dosing and timing of doses.

## 7.13 GLYCOPROTEIN IIb / IIIa INHIBITORS

### Senior or Infusion SCT Paramedic

This medication is to be started by the sending facility. SCT Teams can continue this medication by direct written order and with provision of the medication by the sending facility.

#### a) Pharmacology

- (1) Inhibit platelet activation in unstable angina or percutaneous coronary interventions (PCI)

#### b) Pharmacokinetics

- (1) Long half life, approximately 48 hours up to 10 days
- (2) Depends on agent

#### c) Indications

- (1) Acute coronary syndrome/unstable angina
- (2) Acute myocardial infarction (STEMI)

#### d) Contraindications

- (1) Active bleeding
- (2) Surgery or severe trauma < 6 weeks ago
- (3) Bleeding diathesis
- (4) History of intracranial bleeding or AV malformation
- (5) CVA < 30 days ago
- (6) Aortic dissection, pericarditis, severe hypertension
- (7) Platelet count <150,000

#### e) Adverse Effects

- (1) Bleeding

#### f) Precautions

- (1) In the event of hemorrhage, stop infusion
- (2) Call receiving hospital if infusion is stopped

#### g) Dosage

- (1) Varies based upon type of inhibitor used.
- (2) Confirm dose and drip rate prior to transport with sending hospital.
- (3) Example doses:
  - Reopro (abciximab):
    - 0.25 mg/kg IV, then 0.125 mcg/kg/min drip (max 10 mcg/min)
  - Integrilin (eptifibatide):
    - 180 mcg/kg IV bolus, then 2 mcg/kg/min drip (ACS)
    - 135 mcg/kg IV bolus, then 0.5 mcg/kg/min drip X 20 - 24 hours (PCI)

## 7.14 HEPARIN

### Senior or Infusion SCT Paramedic

This medication is to be started by the sending facility. SCT Teams can continue this medication by direct written order and with provision of the medication by the sending facility.

#### a) Pharmacology

- (1) Inhibit platelet activation in unstable angina or percutaneous coronary interventions (PCI)

#### b) Pharmacokinetics

- (1) After bolus dosing approximately 20 minutes

#### c) Indications

- (1) Unstable Angina
- (2) Myocardial Infarction – adjunct to thrombolytic therapy
- (3) Venous thrombosis / pulmonary embolism

#### d) Contraindications

- (1) Active or recent internal bleeding (<14d)/ including surgery
- (2) Known history of hemorrhagic CVA
- (3) CVA < 6 months
- (4) Suspected aortic dissection
- (5) Platelet count <100,000
- (6) Recent major trauma < 6 months
- (7) Known intracranial aneurysm/atrio-ventricular malformation
- (8) Heparin Induced thrombocytopenia
- (9) Allergy

#### e) Adverse Effects

- (1) Bleeding
- (2) Allergy
- (3) Thrombocytopenia
- (4) Heparin Induced thrombocytopenia

#### f) Precautions

- (1) Bleeding

#### g) Dosage

- (1) Initial IV bolus 60 Units/kg usually a maximum of 5000 Units
- (2) Continuous infusion at 12 Units/kg/hr. Dose will be adjusted according to coagulation study results.

#### **Special Notes:**

If the sending facility has not yet begun heparin therapy in a patient with a diagnosis eligible for it, the Specialty Care Paramedic should attempt to consult with the sending physician prior to transport.

## 7.15 NITROGLYCERIN (NTG)

### Senior or Infusion SCT Paramedic

This medication is to be started by the sending facility. SCT Teams can continue this medication by direct written order and with provision of the medication by the sending facility.

#### a) Pharmacology

- (1) Vasodilator-effect on veins more than arteries
- (2) Decreases right heart return (preload) by venous pooling, thereby decreasing myocardial workload and oxygen consumption
- (3) Inhibit platelet activation in unstable angina or percutaneous coronary interventions (PCI)

#### b) Pharmacokinetics

- (1) Absorbed through oral mucosa
- (2) Anti-anginal and vasodilation effects within 1-2 minutes after administration
- (3) Duration of action is less than 5 minutes

#### c) Indications

- (1) For treatment of angina
- (2) Congestive heart failure, acute pulmonary edema

#### d) Contraindications

- (1) Known hypersensitivity
- (2) Pediatric patient under the age of 12
- (3) Any patient having taken medication for erectile dysfunction (e.g., Viagra™, Levitra™, or Cialis™) within the past 72 hours. Specialty Care Transport Medical Control is required to override this contraindication.
- (4) Asymptomatic hypertension
- (5) Blood pressure below 90 mmHg systolic
- (6) Heart rate less than 60

#### e) Adverse Effects

Headache, hypotension, nausea, vomiting, and dizziness, decreased level of consciousness, reflex tachycardia

#### f) Precautions

- (1) Confirmed right-sided myocardial infarction
- (2) May drop BP rapidly and require fluid bolus
- (3) Known aortic stenosis
- (4) No previous exposure to NTG

#### g) Dosage

##### Route of Administration

- (1) Sublingual
- (2) Intravenous

##### Doses:

- (1) Intravenous:  
10-50 mcg/min, decrease if patient becomes hypotensive

In the event of a sudden hypotensive episode in a patient, NTG treatment should be terminated and a 500mL fluid bolus given if no spontaneous improvement occurs. Once stable and if indicated NTG therapy may be restarted.

#### Special Notes

1. The intravenous dose is titrated from a starting dose of 5 mcg/min.
2. Intravenous treatment should be aimed at keeping the systolic blood pressure above 90 mmHg, keeping the patient pain free, and easing congestive cardiac failure by preload reduction.

## 7.16 PHENYLEPHRINE

### Senior or Infusion SCT Paramedic

This medication is to be started by the sending facility. SCT Teams can continue this medication by direct written order and with provision of the medication by the sending facility.

#### a) Pharmacology

- (1) Pure alpha adrenergic agonist leading to increased blood pressure and increased peripheral vascular resistance.

#### b) Pharmacokinetics

- (1) Half life approximately 15 minutes

#### c) Indications

- (1) Hypotension due to sepsis/hypovolemia (often in conjunction with intravenous fluid therapy)

#### d) Contraindications

- (1) Mesenteric or peripheral vascular disease (ischemia)
- (2) Myocardial infarction
- (3) Tissue necrosis with extravasation

#### e) Adverse Effects

- (1) Hypertension
- (2) Arrhythmia
- (3) CVA

#### f) Precautions

- (1) Use with caution in patients with heart block, hyperthyroidism, bradycardia
- (2) Central lines should be used for infusions due to risk of extravasation

#### g) Dosage

Maintenance drip: 40 - 60 mcg/min or 0.05 - 0.1 mcg/kg/min

## 7.17 SODIUM BICARBONATE

### Senior or Infusion SCT Paramedic

#### a) Pharmacology

- (1) Alkaline solution used to correct acidosis
- (2) Combines with excessive metabolic acids to form carbonic acid, a weak, volatile acid that can be removed with increased ventilation

#### b) Pharmacokinetics

- (1) Rapid onset of action in the blood
- (2) Delayed onset of action in the tissues

#### c) Indications

- (1) Used in cardiac arrest only after adequate ventilation assured
- (2) Hyperkalemia
- (3) Tricyclic and Phenobarbital overdose
- (4) Metabolic acidosis creating hemodynamic compromise

#### d) Contraindications

- (1) Pre-existing alkalosis
- (2) Hypokalemia or hypocalcemia

#### e) Adverse Effects

- (1) Worsened intracellular acidosis due to carbon dioxide formation
- (2) Hyperosmolality
- (3) May precipitate congestive heart failure
- (4) Metabolic alkalosis
- (5) Acute hypokalemia
- (6) Exacerbation of central venous acidosis
- (7) Shifting the oxyhemoglobin dissociation curve, inhibiting the release of oxygen to the tissues

#### f) Precautions

- (1) Inactivates simultaneously administered catecholamines
- (2) Priorities before use:
  - (a) Intubation
  - (b) Hyperventilation
  - (c) Defibrillation
  - (d) Epinephrine
  - (e) Antiarrhythmics

#### g) Dosage

- (1) 1 mEq/kg initial, followed by 0.5 mEq/kg every 10 minutes as indicated by ABG and Medical Control. Not to exceed 100 mEq in single dose.
- (2) For continuous alkalinization, mix 100 - 150 mEq in 1000 ml of D5W, infused at 100-200 ml/hour.

## 7.18 STEROIDS

### Senior or Infusion SCT Paramedic

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#### a) Pharmacology

- (1) Inhibit selective protein expression by cells, resulting in anti-inflammatory actions

#### b) Pharmacokinetics

- (1) Depends on steroid
  - (a) Dexamethasone (Decadron) half life >24 hours
  - (b) Prednisone half life approximately 1 day

#### c) Indications

- (1) Cerebral edema
- (2) Anaphylaxis
- (3) Asthma / COPD
- (4) Spinal trauma
- (5) Auto immune disorders

#### d) Contraindications

- (1) Uncontrolled infections without antibiotics
- (2) Hypersensitivity
- (3) Hypertension

#### e) Adverse Effects

- (1) Euphoria or psychosis
- (2) Delayed wound healing
- (3) Muscle weakness
- (4) Hyperglycemia
- (5) Hypertension

#### f) Precautions

- (1) None.

#### g) Dosage

- (1) Dexamethasone (Decadron): 0.25 - 1 mg/kg IV/IM
- (2) Methylprednisolone (Solu-Medrol): 40 - 125 mg IV
- (3) Spinal Trauma – 30 mg/kg followed by 5.4 mg/kg/hr for 23 hours.

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