

# BAY AREA

## CRITICAL CARE PARAMEDIC (BACCP)



## 2022 FIELD MANUAL TREATMENT GUIDELINES

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## 2022 Bay Area Critical Care Paramedic (BACCP) Field Manual

*CCP policies and protocols should be used as guidelines and are not intended as a substitute for sound medical judgement. Unusual patient presentations make it impossible to develop a policy or protocol for every patient situation.*

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# CRITICAL CARE PARAMEDIC (CCP) – PROGRAM STANDARDS

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## 1. PURPOSE

The Critical Care Paramedic Program has been developed to provide a means of transporting patients who require, or who may require, care within the CCP Scope of Practice during care. CCP units may be used to transfer patients from or to acute care facilities, scene calls, or other medical facilities approved by the EMS Medical Director.

The local EMS agency authorizes and contracts with interested ambulance providers that meet the training, staffing, equipment, and oversight requirements for providing this level of service and that agree to comply with program standards. Program authorization may be denied or withdrawn for failure to comply with program standards or failure to submit required fees.

**(California Health and Safety Code, Division 2.5, 1797.214; California Code of Regulations, Title 22, Chapter 4 § 100142, 100144, 100145, 100148, 100155, 100166, 100168, 100172, 100173; Alameda County EMS, Policy# 2000; San Francisco EMS, Policy# 4070).**

## 2. STAFFING

A CCP unit is a fully equipped advanced life support Quick Response Vehicle “QRV” vehicle and/or ambulance, staffed with A) a minimum of one (1) qualified staff of a Critical Care Transport Paramedic; and/or B) a minimum of two (2) qualified staff with one (1) Critical Care Transport Paramedic and (1) another local EMS agency accredited EMT/EMTP.

### 2.1. Critical Care Paramedic Accreditation

Paramedics assigned to CCP units shall meet the following minimum qualifications:

- 2.1.1. Current California Paramedic License
- 2.1.2. Current Board of Critical Care Paramedic Certification CCP-C (BCCTPC/IBSC)
- 2.1.3. At least two (2) years full time field experience as a paramedic in an ALS system within the past five (5) years
- 2.1.4. Completion of an approved CCP training program (Title 22, Ch. 4 §100137) OR at the discretion of the EMS Medical Director, equivalent education (as specified in Title 22, Ch. 4, §100155 (b)) and/or experience in critical care transport
- 2.1.5. Accreditation as required by local EMS agency
- 2.1.6. Successful completion of a local EMS agency approved provider education orientation and skills competency testing specific scope of practice skills used on critical care interfacility transfers (Title 22, Ch. 4, §100146(1)(S))

### 2.2. Emergency Medical Technician (EMT)

EMT's regularly assigned to CCP units shall meet the following minimum qualifications:

- 2.2.1. Current and valid California EMT certification
- 2.2.2. Current provider status in Healthcare Provider BLS
- 2.2.3. Successful completion of the local EMS agency approved training program specific to skills used to assist the CCP with patient care during interfacility transfer

2.3. Employer shall provide the local EMS agency with a list of all regular staff working on a CCP unit and shall see that the list is updated whenever there is a change in personnel.

2.4. Employer shall retain on file, always, copies of current and valid credentials for all personnel performing services under this program.

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### 3. MEDICAL DIRECTION

Personnel assigned to a CCP unit work under the existing medical control system and follow local EMS agency policies and procedures as approved by the EMS Medical Director.

#### 3.1. CCP Scope of Practice

The CCP scope of practice includes the local EMS agency's basic and local optional scopes of practice for paramedics listed in the agency's EMS protocols. In addition, CCP's have an expanded scope that includes the administration of medications and procedures as outlined in the CCP Treatment Guidelines:

- Set up and maintain thoracic drainage systems
- Set up and maintain mechanical ventilators
- Set up and maintain IV fluid delivery pumps and devices
- Calcium channel blockers
- Blood and blood products\*
- Fluid Administration
- Glycoprotein IIB/IIIA inhibitors\*
- Heparin IV\*
- Nitroglycerin IV\*
- Norepinephrine\*
- Thrombolytic agents\*
- Maintain total parental nutrition\*

\*These medications are CCP basic scope of practice if the CCP has completed a Critical Care Paramedic training program as specified in (*Title 22, Ch.4, §100146(1)(S), §100155 (b)*).

#### 3.2. Transferring Physician Orders/Scene Medical Direction

##### 3.2.1. For interfacility transfers:

- 3.2.1.1. Standing orders approved by the CCP provider's Medical Director is the gold standard of patient care
- 3.2.1.2. When the transferring physician or base hospital physician is contacted, specific orders must be based on skills and medication that are in accordance with the local EMS agency's CCP scope of practice
- 3.2.1.3. Clearly written physician orders are preferred and must be uploaded into the electronic patient care record (ePCR)
- 3.2.1.4. Clearly written physician orders may be obtained from the hospital's medication administration record and uploaded into the ePCR

3.2.2. In special circumstances (e.g., scene/private residence responses) verbal physician orders may be written down and read back to assure clarity. Document physician orders in the ePCR.

3.2.3. When radio communications are not possible, the CCP will provide care per the local EMS agency's ALS protocols and CCP field manual treatment guidelines until radio contact can be made with the base hospital physician.

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### **3.3. Patient Care Outside of the Paramedic Scope of Practice**

- 3.3.1. When a patient's treatment/care is beyond the CCP scope of practice, that patient may be transported by a CCP unit only when:
  - 3.3.1.1. A licensed medical professional (e.g., RN, NP, Nurse midwife, PA, or MD) is in attendance and assumes control and responsibility for providing patient care outside the CCP scope of practice; AND:
  - 3.3.1.2. Medication and/or equipment needed by the patient, that is not stocked on the unit, is provided by the sending facility or CCP program.
- 3.3.2. Accompanying licensed medical personnel providing care function under their own written standing orders/protocols and document any care provided.

### **3.4. Exceptional Situations**

#### **3.4.1. Critical Patients and "on views":**

If the CCP unit either responds to a private request for transport and finds a patient that requires immediate ALS care, or "on views" an emergency scene, the CCP:

- 3.4.1.1. Shall notify the appropriate dispatch communication center
- 3.4.1.2. Shall provide appropriate patient care, which may include any indicated ALS interventions following appropriate EMS agency protocols
- 3.4.1.3. May initiate transport of acute patients in accordance with local EMS agency policy
- 3.4.1.4. An exception report shall be filed per jurisdictional EMS agency policy

#### **3.4.2. Patient Deterioration During Transport:**

If the CCP unit responds to a private request for transport, and the patient begins to deteriorate after transport has begun, personnel shall:

- 3.4.2.1. Provide appropriate care that may include any indicated BLS, ALS, and CCP interventions following appropriate EMS protocols
- 3.4.2.2. Make base hospital contact for any patient deterioration
- 3.4.2.3. Divert to a closer facility, if necessary and appropriate, based on patient condition and base hospital direction
- 3.4.2.4. CCP personnel shall submit a written report fully explaining the circumstances of any exceptional situations including those described above together with a copy of the patient care report and related dispatch records to the local EMS agency within 24 hours of the incident

## **4. STANDARD OF CARE**

- 4.1. All patients shall be placed on continuous EKG, NIBP, and SpO2 monitoring.
- 4.2. End-Tidal CO2 monitoring shall be utilized for:
  - 4.2.1. All invasive and non-invasive ventilated patients
  - 4.2.2. All patients receiving sedation and/or pain medications
  - 4.2.3. Strongly recommended for non-intubated patients at high risk for airway, ventilatory, and/or circulatory compromise
- 4.3. Vital signs shall be recorded at a minimum of every 15 minutes for all stable patients and a minimum of every 5 minutes for unstable patients or patients on titrating vasoactive medications.

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- 4.4. All medication infusions shall be crosschecked with hospital staff and/or CCT crewmembers.
- 4.5. Infusions must be regulated by a mechanical pump familiar to the CCP. If a pump failure occurs, and cannot be corrected, the CCP is to notify the transferring physician or, the base physician if the transferring physician is unavailable, to discuss alternative options.
- 4.6. Medications within the paramedic's scope of practice and protocols normally given by IV push but, are being administered via infusion pump, may be transported if parameters for the infusion are obtained and understood by the CCP.
- 4.7. If medication administration is interrupted (infiltration, accidental disconnection, malfunctioning pump, etc.), the CCP may restart the line and continue use.

### 5. DOCUMENTATION

#### 5.1. **Electronic Patient Care Report (ePCR)**

An ePCR format of which has been approved by the local EMS agency shall be accurately completed on each patient in accordance with the jurisdictional EMS agency (origin of transport).

- 5.1.1. The ePCR shall contain available and relevant information regarding call demographics, patient assessment, care rendered, and patient response to care.
- 5.1.2. A copy of, or access to, the patient's ePCR shall also be available to the receiving facility prior to departing the facility.
- 5.1.3. If base contact is initiated, a copy of, or access to, the patient's ePCR shall be available to the base hospital within 24 hours.

### 6. CCP STAFF PREPARATION AND COURSE APPROVAL PROCESS

- 6.1. Submit a Paramedic Interfacility Transfer Program form, complete checklist, and supporting documentation to the local EMS agency for approval at least two (2) weeks prior to the course start date.
- 6.2. CCP didactic and clinical education requirements shall be conducted in accordance with the standards for CCP's as specified in Title 22, Chapter 4, §100155 (b).

#### 6.3. **Critical Care Emergency Medical Technician:**

- 6.3.1. A minimum of 750 hours of clinical field experience as an EMT must be achieved before working as a Critical Care Transport EMT.
- 6.3.2. Minimum of eight (8) hours didactic and clinical instruction specific to the skills needed to assist a single paramedic in-patient care delivery during Expanded Scope of Practice Paramedic Interfacility Transfer calls.
- 6.3.3. Method for assessing successful course achievement/evaluation must be described.
- 6.3.4. Principal instructor of paramedic training must be CCP, registered nurse, or physician knowledgeable in the subject matter.
- 6.3.5. **Instruction course to include:**
  - 6.3.5.1. **Role of the Critical Care EMT:**
    - Critical Care vs. BLS system
    - EMTALA
    - COBRA
    - EMT scope of practice
  - 6.3.5.2. **Infusion Pumps:**
    - Operation of and troubleshooting
    - Discussion of various pumps that may be encountered

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### 6.3.5.3. **Indwelling Tubes/Catheters:**

- Discuss, describe, demonstrate, and/or view:
  - Urinary Foley Catheters
  - Suprapubic Catheters
  - Nasogastric Tubes
  - Orogastric Tubes

### 6.3.5.4. **Non-Invasive Monitoring:**

- NIBP
- Pulse Oximetry
- Capnography

### 6.3.5.5. **12-Lead EKG**

- Correct lead placement and importance of same

### 6.3.5.6. **Recognition of proper equipment for procedural assisting the CCP during:**

- Intubation
- Emergent Synchronized Cardioversion or Defibrillation
- Pleural Decompression

### 6.3.5.7. **Infectious Disease Precautions:**

- Common Pathogens to include:
  - HIV
  - Hepatitis
  - VRE
  - MRSA
  - TN
  - C-Diff
- Procedures for self-protection, decontamination, and exposures

### 6.3.5.8. **Documentation**

- Patient Consent Forms
- EMTALA Forms

### 6.3.5.9. **Dispatch, Deployment, Operational, and County Policy and Procedure Review**

## 7. CONTINUOUS QUALITY IMPROVEMENT (CQI) PLAN

7.1. A CCP program shall have a written CQI plan approved by the local EMS agency. This plan shall complement the EOA provider's existing CQI plan. CQI plans shall include provisions for continuing education including types of activities, frequency, and required hours.

7.2. A registered nurse or physician shall have clinical involvement and oversight of the CCP CQI plan.

7.3. Provider's CQI staff shall evaluate CCP transfers for appropriateness.

7.4. Specific review for use of intravenous expanded scope medications will include:

- Review of transferring physician orders and evidence of compliance with orders
- Documentation of vital signs per policy including frequency
- Documentation of any side effects/complications including hypotension, bradycardia, increasing chest pain, arrhythmia, altered mental status, and interventions with these events

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- Documentation of unanticipated discontinuation or rate adjustments of infusions along with rationale and outcome
- Review of any base hospital or transferring physician contact for orders during transport

7.5. The CCP provider shall provide to EMS, at its sole expense, all hardware and software necessary for reviewing and monitoring ePCR.

7.6. The CCP provider shall use software in the ePCR and Data Collection System to allow for real-time access in the format specified by the local EMS agency. The software shall also provide detailed operations, clinical, and administrative data in a manner that facilitates retrospective analysis.

7.7. The local EMS agency will receive quarterly reports summarizing CQI activity and identified trends and resolutions.

### **8. CCP COMPETENCY STANDARDS**

All critical care transport paramedics shall meet the following requirements to maintain their local EMS agency approval in order to function with their advanced CCP scope of practice:

8.1. Minimum of six (6) shifts per quarter on a CCP unit unless specifically waived by the local EMS agency.

8.2. Completion of annual CCP policy and skills competency education with evaluation including the following:

- Oral intubation (Adult)
- Supraglottic airway insertion
- Bougie insertion
- Needle thoracostomy
- Intraosseous insertion
- Ventilator application
- CCP drip calculations
- CCP clinical policies

8.3. Compliance with Paramedic and CCP policy and skills competency standards is required to maintain standing as an active CCP. Any variance requires approval of the local EMS Medical Director. Skill list may be expanded at the discretion of the local EMS agency. Educational standards time requirements must be approved by the local EMS agency for all CCP unit staff.

### **9. CCP UNIT EQUIPMENT**

9.1. CCP units are required to comply with the local EMS agency's local ordinances, service provider agreements, etc.

9.2. CCP units are required to comply with ALS Transport Equipment and Supply Standards, Inspections and Specifications defined in the local EMS agency's EMS policies.



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9.3. The following additional equipment is required and must be approved by the local EMS agency's Medical Director:

- AC Power Inverter (if applicable)
- Mechanical Ventilator (with associated accessories including HME and extra power source)
- Mechanical Infusion Pump (multiple channels and/or a back-up device)
- Portable Doppler
- Oral Thermometer (or other temperature monitoring device such as a cardiac monitor temp cable)
- Additional equipment as required by the local EMS agency and/or EMS provider's EMS Medical Director(s)

# AMIODARONE HYDROCHLORIDE

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## 1. PURPOSE

To authorize CCP's to initiate or monitor existing intravenous Amiodarone Hydrochloride infusions

## 2. POLICY

2.1. CCP's are permitted to initiate or monitor Amiodarone Hydrochloride infusions

## 3. PRECAUTIONS

3.1. Y injection incompatibility with the following will precipitate with Amiodarone Hydrochloride:

3.1.1. Heparin Sodium

3.1.2. Sodium Bicarbonate

3.2. Amiodarone should not be given in the presence of ventricular escape rhythm or other bradycardias.

3.3. Amiodarone concentrations should not exceed 2 mg/ml unless a preexisting central venous catheter is used in infusions being administered greater than 1 hour in duration.

## 4. PROCEDURE

4.1. The following parameters shall apply to all patients with Amiodarone infusions:

4.1.1. Due to initial bolus given over time an IV infusion pump must be used

4.1.2. Vital signs must be monitored more frequently than every 15 minutes

## 5. ADMINISTRATION

5.1. **Pulsing monomorphic V-Tach:**

5.1.1. **Adults** – 150 mg mixed in 100 ml NS over 10 minutes and may repeat q 10 minutes prn.

5.1.2. **Peds** – 5 mg/kg (max 300 mg) mixed in 100 ml NS over 20 mins. Pediatric patients with a pulse, bolus and/or continuous infusion, requires a physician consult to obtain direction and dosing.

5.2. For patients who have received bolus doses of Amiodarone, it may be appropriate to establish an infusion by mixing 450 mg in 250 ml D5W (not NS) and initiate at 1 mg/min to a maximum cumulative dose of 2.2 grams IV over 24 hours.

# BLOOD/BLOOD PRODUCTS

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## 1. PURPOSE

To authorize CCP's to monitor existing blood/blood product infusions during transport

## 2. POLICY

- 2.1. CCP's are permitted to monitor/infuse blood and blood products during interfacility transports.
- 2.2. CCP's may not adjust blood/blood product infusions without specific transferring physician parameters or base hospital physician consult.
- 2.3. Use of a buddy light or other warming measure is preferred.

## 3. ADVERSE REACTIONS

- 3.1. **Hemolytic Reactions:** The most life-threatening and manifestations may vary considerably as: fever, headache, chest or back pain, pain at the infusion site, hypotension, nausea, generalized bleeding or oozing from surgical site, or shock. The most common cause is from ABO incompatibility due to clerical error or transfusion to the wrong patient. Chances of survival are dose dependent; therefore, it is important to stop the transfusion immediately if a hemolytic reaction is suspected.
- 3.2. **Febrile Non-Hemolytic Reaction:** Chills and fever with a rise from baseline temperature of 1° C or 1.8° F.
- 3.3. **Allergic Reaction:** Characterized by appearance of hives, urticaria, and itching.
- 3.4. **Anaphylaxis:** May occur after administration of only a few ml's of a plasma containing component. Symptoms include coughing, bronchospasms, respiratory distress, vascular instability, nausea, abdominal cramps, vomiting, diarrhea, shock, and altered mental status.
- 3.5. **Volume Overload:** Characterized by dyspnea, headache, peripheral edema, coughing, frothy sputum or other signs of congestive heart failure occurring during or soon after transfusion.

## 4. PROCEDURE

- 4.1. Identify the patient and blood by checking the patient ID band against the blood/blood product label and the actual order for name, blood type, unit identifying number, and expiration date.
- 4.2. Monitor the patient's condition and vital signs before, during, and after blood product infusion.
- 4.3. **Blood/blood products infusion parameters:**
  - 4.3.1. Infusion will be through filtered blood tubing. Stable patients shall have blood infused via IV infusion pump. Unstable patients may have blood infused via a pressure bag without a pump.
  - 4.3.2. Infusion rate will occur within the parameters as defined by the transferring physician. No other flow adjustments may be made by the CCP other than to discontinue the infusion in the event of complications.
- 4.4. In cases of a suspected adverse transfusion reaction, discontinue the blood/blood product infusion. Notify the transferring physician and/or base hospital. Treat signs/symptoms per local EMS agency protocol as needed. Keep blood/blood products and deliver with the patient for possible testing.

# CALCIUM CHANNEL BLOCKERS

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## 1. PURPOSE

To authorize the CCP to monitor and adjust existing Calcium Channel Blocker (CCB) infusions

## 2. POLICY

- 2.1. CCP's are permitted to monitor and adjust Calcium Channel Blocker infusions.
- 2.2. CCP's may not initiate Calcium Channel Block infusions.

## 3. PRECAUTIONS

- 3.1. Use caution with patients with liver and renal disease.
- 3.2. Side effects can include dizziness, palpitations, fatigue, headache, and nausea.

## 4. PROCEDURE

- 4.1. Calcium channel blockers are used for a variety of reasons to include lowering blood pressure, relaxation of blood vessels, slow and/or regulate heart rate, relieve angina, and for CAD.
- 4.2. CCB's prevent calcium from entering the cells of the heart and arteries. Calcium causes the heart and arteries to contract more strongly. By blocking calcium, CCB's allow blood vessels to relax and open. Some CCB's are also used to slow down and regulate the heart rate.
- 4.3. Regulation of the infusion rate will occur within the parameters as defined by the transferring physician or base hospital orders.

## 5. ADMINISTRATION

- 5.1. Common Calcium Channel Blockers and doses include, but not limited to, the following:
  - Cardizem: 5 -15 mg/hr
  - Nicardipine: 5 mg/hr and titrate q 10 mins by increments of 2.5 mg/hr for desired MAP
  - Nifedipine: 10 mg PO q 20 mins and may repeat up to a max of 30 mg
  - Clevidipine: 1-2 mg/hr with a max of 16 mg/hr
- 5.2. These medications and doses are for reference only. Transferring physician will select the medication and dose for infusions with orders for transport guidelines and titration, if applicable.

# DOPAMINE HYDROCHLORIDE

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## 1. PURPOSE

To authorize CCP's to initiate, monitor and adjust existing intravenous Dopamine infusions

## 2. POLICY

- 2.1. CCP's are permitted to monitor and adjust Dopamine infusions.
- 2.2. CCP's may not initiate Dopamine infusions without transferring or base physician consult.

## 3. PRECAUTIONS

- 3.1. Use caution in patients who may be volume depleted. Focus is on sufficient volume replacement first.
- 3.2. Patients on Dopamine may experience tachydysrhythmias and treat as indicated.

## 4. PROCEDURE

- 4.1. Indications include cardiogenic and/or distributive shock. Norepinephrine is preferred first line vasopressor over Dopamine.
- 4.2. For septic shock, Dopamine is used only as an alternative to Norepinephrine in a select group of patients, specifically those with a low risk of tachyarrhythmias and absolute or relative bradycardia.
- 4.3. Regulation of the infusion rate will occur within the parameters as defined by the transferring physician, but in no instance, will rate changes be greater than 5 mcg/kg/min increments q 5 mins.
- 4.4. Typical concentration for Dopamine is 400 mg/250 ml D5W. Caution that double strength concentrations do exist in some hospitals.
- 4.5. Typical Dopamine infusion dose range is 5-20 mcg/kg/min.
- 4.6. The maximum Dopamine dose is 20 mcg/kg/min in most circumstances.
- 4.7. In cases of severe hypertension, the medication infusion will be slowly titrated down and, if necessary, discontinued and the transferring physician or base hospital physician notified.

## 5. ADMINISTRATION

- 5.1. CCP's may initiate Dopamine infusions in conjunction with transferring or base physician consult.
- 5.2. Titrate to achieve a MAP of >65 mmHg or heart rate > 70 bpm depending on indication of use

# EPINEPHRINE

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## 1. PURPOSE

To authorize CCP's to initiate, monitor, and adjust existing intravenous Epinephrine infusions

## 2. POLICY

- 2.1. CCP's are permitted to initiate, monitor, and adjust Epinephrine infusions.
- 2.2. CCP's are permitted to administer push dose Epinephrine.

## 3. PRECAUTIONS

- 3.1. Use caution in patients who may be volume depleted.
- 3.2. Use caution in patients who are on multiple vasopressors.

## 4. PROCEDURE

### 4.1. Epinephrine Infusion Parameters

- 4.1.1. Regulation of the infusion rate will occur within the parameters as defined by the transferring or base hospital physician or by standing orders.
- 4.1.2. CCP's may titrate Epinephrine to achieve a MAP > 65 mmHg q 5 mins increments.
- 4.1.3. Typical initial Epinephrine dose range is 0.03 mcg/kg/min to 1 mcg/kg/min.
- 4.1.4. The maximum Epinephrine dose is 1 mcg/kg/min.
- 4.1.5. **Adult Infusion**: Mix by adding 10 mg Epi 1:1,000 (10 ml) to 90 ml NS, D5W, or D10W. This will provide a total volume of 100 ml and a concentration of 100 mcg/ml.
  - For patient's in excess of 100 kg, consideration for the length of transport should be made to determine the amount of infusion necessary to complete the transport.
    - Example - 40 kg patient at a rate of 1 mcg/kg/min and the 100 ml infusion will last ~ 80 mins
- 4.1.6. **Pediatric Infusion**: Mix by adding 2 mg Epinephrine 1:1,000 (2 ml) to 98 ml of NS, D5W. This will provide a total volume of 100 ml and a concentration of 20 mcg/ml.
- 4.1.7. In cases of severe hypertension, the infusion will be titrated down and, if necessary, discontinued, and notify the transferring physician or base hospital.

## 5. ADMINISTRATION

- 5.1. Epinephrine infusion initiation should be considered for hypotensive shock states after ensuring adequate patient ventilation, oxygenation, and volume repletion.
- 5.2. Initiate Epinephrine at 0.03 mcg/kg/min and titrate to achieve a MAP > 65 mmHg.
- 5.3. Infusion alternate is to administer push dose Epi per EMS ALS treatment guidelines OR as follows:
  - 5.3.1. Must ensure patient preload has been optimized with crystalloid and/or colloid prior to utilization of push dose Epi
  - 5.3.2. Dilute Epinephrine by mixing 1 ml Epi 1:10,000 in 9 ml NS to equal a concentration of 10 mcg/ml. This will yield 10 doses in a 10 ml syringe as each dose is 10 mcg or 1 ml
  - 5.3.3. **Adult Dose**: 10 mcg (1 ml) q 5 min
  - 5.3.4. **Peds Dose**: 1 mcg/kg q 5 mins with a max single dose of 50 mcg

# FLUID MANAGEMENT

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## 1. PURPOSE

To authorize CCP's to initiate, monitor, and adjust existing intravenous fluid administration

## 2. POLICY

- 2.1. CCP's are permitted to initiate, monitor, and adjust fluid administration infusions.
- 2.2. CCP's may utilize fluids to mix medication infusions as needed per protocol.

## 3. PRECAUTIONS

- 3.1. Use with caution in patients who may be volume overloaded.
- 3.2. Use with caution in patients with congestive heart failure.
- 3.3. Use with caution in patients with renal failure.

## 4. PROCEDURE

### 4.1. Fluid Infusion Parameters

- 4.1.1. CCP's may use dextrose and balanced solutions per Title 22 for fluid administration and for mixing necessary medication infusions.
- 4.1.2. CCP's may administer, or mix medication infusions, in the following fluid types: 0.45% NS, 0.9% NS, 3% NS, Lactated Ringers, Plasmalyte, and dextrose-based fluids such as D5%, D5½ NS, D5NS, and D10%. Other fluid types require transferring physician or base hospital orders.
- 4.1.3. For patients receiving a dextrose-based fluid a blood glucose level should be checked every 30 mins.
- 4.1.4. See each individual medication policy for mixing of infusion guidelines.

# GLYCOPROTEIN IIB/IIIA INHIBITORS

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## 1. PURPOSE

To authorize CCP's to monitor existing glycoprotein receptor inhibitor infusions

## 2. POLICY

2.1. CCP's are permitted to monitor glycoprotein receptor inhibitor infusions.

2.2. CCP's may not initiate glycoprotein receptor inhibitor infusions.

## 3. PRECAUTION

3.1. Glycoprotein IIb/IIIa receptor inhibitors are incompatible with Diazepam if given in the same line.

## 4. PROCEDURE

4.1. Medication concentration will not exceed the standard manufacturer concentrations.

4.2. Infusion rates must remain constant during transport with no regulation of rates being performed by the CCP, except for the discontinuation of the infusion (e.g., as in the case of bleeding).

4.3. Documentation of calculation of the physician ordered infusion rate based on recent patient weight(kgs).

4.4. Documentation of the following lab values: Blood Urea Nitrogen, Creatinine, Hemoglobin, Hematocrit, Platelet count, and Coagulation studies at a minimum.

4.5. Vital Signs are to be monitored as indicated in transfer or physician orders. If no specific orders are obtained, document per protocol.

## 5. ADMINISTRATION

5.1. Common glycoprotein IIb/IIIa receptor inhibitors and doses include, but not limited to:

- Integrillin – 2 mcg/kg/min
- Aggrastat – 0.1 mcg/kg/min
- Reopro – 0.125 mcg/kg/min

5.2. These medications and doses are for reference only. Transferring physician will select medication and dose for infusion with orders for transport guidelines, if applicable.



# HEPARIN

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## 1. PURPOSE

To authorize CCP's to monitor existing intravenous Heparin infusions

## 2. POLICY

- 2.1. CCP's are permitted to monitor Heparin infusions during transport and care.
- 2.2. CCP's may not initiate Heparin infusions.

## 3. PROCEDURE

### 3.1. Heparin Infusion Parameters

3.1.1. Medication concentration will not exceed 100 units/ml. Examples of concentrations used:

- 25,000 units/250 ml
- 50,000 units/500 ml

3.1.2. Infusion rates must remain constant during transport with no regulation of rates being performed by the CCP, except for the discontinuation of the infusion (e.g., as in the case of bleeding).

3.1.3. Typical infusion rate is 12 units/kg/hr.

3.2. In the event of the patient developing bleeding, the CCP shall discontinue the infusion and notify the transferring and/or base hospital physician.

# LIDOCAINE

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## 1. PURPOSE

To authorize CCP's to monitor and adjust existing intravenous Lidocaine infusions during transport

## 2. POLICY

- 2.1. CCP's are permitted to monitor and adjust Lidocaine infusions during transport and care.
- 2.2. CCP's may not initiate Lidocaine infusions.

## 3. PROCEDURE

### 3.1. Lidocaine Infusion Parameters

- 3.1.1. Infuse fluid will be either NS or D5W.
- 3.1.2. Typical concentrations are 1 gm/250 ml or 2 gm/500 ml.
- 3.1.3. Regulation of the infusion rate will occur within the parameters as defined by the transferring physician but no greater than 1 mg/min increments q 3-5 mins.
- 3.1.4. CCP's may institute two (2) infusion rate changes prior to consulting with the transferring physician or base hospital.
- 3.1.5. Any additional changes MUST be made only after contact with the transferring physician or base hospital.

### **Standard Strength**

1 Gram/250 cc D5W or NS or 2 Gm/500 cc

cc/hr	mg/min
15	1
30	2
45	3
60	4

# LORAZEPAM

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## 1. PURPOSE

To authorize CCP's to monitor, adjust, and administer intravenous Lorazepam

## 2. POLICY

- 2.1. CCP's are permitted to monitor and adjust Lorazepam established infusions
- 2.2. CCP's are permitted to administer Lorazepam IV push doses
- 2.3. CCP's may not initiate Lorazepam infusions

## 3. PROCEDURE

- 3.1. The infusion concentration and regulations of the infusion rate will occur within the parameters as defined by the transferring physician, but may be titrated to the individual's response, during transport.
- 3.2. In cases of an adverse event, the medication infusion will be discontinued, and the transferring physician and/or base hospital are to be notified.
- 3.3. Typical Lorazepam infusion concentration is 100 mg/100 ml at a rate of 2-4 mg/hr.
- 3.4. In case of severe alcohol withdraws, significantly higher doses may be required.

## 4. ADMINISTRATION

- 4.1. CCP's shall be permitted to administer Lorazepam as a second line medication in situations where Midazolam is contraindicated, has been ineffective, or is preferred over Midazolam by the transferring, receiving, or base hospital physician.
- 4.2. **Standard Dose:**
  - 4.2.1. 1 mg IV/IM q 5 mins to a max of 5 mg prn. IN preferred dose volume 0.25-0.5 ml per nare not to exceed 1 ml of volume per nare per dose.
  - 4.2.2. If concern for hypotension or respiratory depression you may administer ½ dose (0.5mg).
- 4.3. **Weight-Based Dose – Pediatrics less than 25 kg:**
  - 4.3.1. Administer 0.1 mg/kg IV/IM/IN as q 5 mins prn.
  - 4.3.2. Maximum single dose is 2 mg.
  - 4.3.3. Larger doses may be needed than typical adult dosing.
  - 4.3.4. Must be diluted with NS for IV administration to a strength of 1 mg/ml for all patients weighing less than 25 kg.

# MAGNESIUM SULFATE

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## 1. PURPOSE

To authorize CCP's to initiate, monitor, and adjust existing intravenous Magnesium Sulfate infusions

## 2. POLICY

2.1. CCP's are permitted to initiate, monitor, and adjust existing Magnesium infusions

## 3. PRECAUTIONS

- 3.1. Patients who have rhythm disturbances with hemodynamic instability should be cardioverted prior to initiation of Magnesium Sulfate infusion.
- 3.2. Magnesium Sulfate attenuates catecholamine release augmenting its antidysrhythmic properties.
- 3.3. CCP's should record FHT's, if applicable, using a handheld doppler along with vitals per protocol.
- 3.4. Magnesium Sulfate overdose signs include hypoventilation and hyporeflexia
- 3.5. If signs of overdose develop, discontinue the infusion and administer 500 mg Calcium Chloride slow IV push.

## 4. PROCEDURE

- 4.1. Infusions shall be maintained at the rate specified by the transferring physician for interfacility transfers. Any changes in rate or a bolus necessary, and no orders obtained, contact transferring physician or base hospital for direction.
- 4.2. Do not use one (1) liter volumes for Magnesium Sulfate infusions.

## 5. ADMINISTRATION

### 5.1. Pre-Eclampsia:

- 5.1.1. Initial bolus dose is 4 gm in 100 ml LR or NS over 15-30 minutes.
- 5.1.2. After initial bolus is completed, initiate an infusion at the rate of 2 gm/hr. To mix add 20 gm to 500 ml LR or NS.

### 5.2. Torsades de Pointes (Polymorphic V-Tach):

- 5.2.1. Dilute 2 grams Magnesium Sulfate in 10 ml LR or NS and administer over 5 mins.

### 5.3. Severe Asthma/Reactive Airway Disease:

- 5.3.1. Administer 50 mg/kg Magnesium Sulfate diluted in 50 ml NS over 20 mins. Maximum dose is 2 grams. Consult with transferring physician or base hospital if a higher dose is needed.

### 5.4. Eclampsia Seizures:

- 5.4.1. Administer 2 grams Magnesium Sulfate IV/IO/IM/IN. Repeat q 5 mins x 2 to a max of 6 mg.
- 5.4.2. Initiate Magnesium Sulfate infusion at 2 gm/hr and contact transferring physician or base hospital.

# NITROGLYCERIN

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## 1. PURPOSE

To authorize CCP's to initiate, monitor and adjust existing Nitroglycerin infusions

## 2. POLICY

- 2.1. CCP's are permitted to monitor and adjust Nitroglycerin infusions during interfacility transports.
- 2.2. CCP's may initiate Nitroglycerin infusions with a physician consult.

## 3. PROCEDURE

- 3.1. Regulation of the infusion rate will occur within parameters as defined by the transferring or base hospital physician, but in no case will changes be greater than 10 mcg/min increments q 5 mins.
- 3.2. In cases of severe hypotension, the medication infusion will be discontinued, and the transferring or base hospital physician notified.
- 3.3. Severe hypotension (MAP<65 mmHg) that does not improve following discontinuation of the infusion should be treated with a 500-1,000 ml fluid bolus as appropriate based on patient condition.

## 4. ADMINISTRATION

- 4.1. Initiate infusion at 10 mcg/min and increase dose by 5-10 mcg/min q 5 mins until marked decrease or elimination of pain while maintaining MAP > 65mmHg.
- 4.2. To mix the infusion add 50 mg Nitroglycerin in 250 ml D5W or NS to equal concentration of 200 mcg/ml.

# NOREPINEPHRINE

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## 1. PURPOSE

To authorize CCP's to initiate, monitor and adjust existing Norepinephrine infusions

## 2. POLICY

- 2.1. CCP's are permitted to monitor and adjust Norepinephrine infusions during interfacility transports.
- 2.2. CCP's may initiate Norepinephrine infusions with a physician consultation.

## 3. PRECAUTIONS

- 3.1. Use caution in patients who may be volume depleted.
- 3.2. Although Norepinephrine has a lower rate of dysrhythmias than Dopamine, patients on Norepinephrine may still experience tachydysrhythmias.

## 4. PROCEDURE

- 4.1. Regulation of the infusion rate will occur within parameters as defined by the transferring physician, or standing orders, but in no case will changes be greater than 5 mcg/min increments q 5 mins.
- 4.2. CCP's may titrate Norepinephrine by increments of 1-5 mcg/min q 5 mins as needed to achieve a MAP > 65mmHg.
- 4.3. Typical Norepinephrine dose range is 2-12 mcg/min.
- 4.4. The maximum Norepinephrine dose is 30 mcg/min.
- 4.5. In cases of severe hypertension, the Norepinephrine infusion will be titrated down and, if necessary, discontinued, and the transferring physician or base hospital notified.

## 5. ADMINISTRATION

- 5.1. Initiation should be considered for hypotensive shock states after ensuring adequate volume repletion.
- 5.2. Norepinephrine is the first line vasopressor to initiate unless other orders received from the transferring or base hospital physician.
- 5.3. CCP's may initiate Norepinephrine infusions in conjunction with transferring physician or base hospital consultation.
- 5.4. To mix infusion add 4 mg Norepinephrine in 250 ml D5W for a concentration of 16 mcg/ml. Caution – always check concentration since can vary at each facility.
- 5.5. Initiate Norepinephrine infusion at 5 mcg/min and titrate to achieve a MAP > 65 mmHg or to a target MAP per transferring or base hospital physician orders.

# POTASSIUM CHLORIDE

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## 1. PURPOSE

To authorize CCP's to monitor existing Potassium Chloride infusions

## 2. POLICY

- 2.1. CCP's are permitted to monitor Potassium Chloride infusions during interfacility transports.
- 2.2. CCP's may not initiate Potassium Chloride infusions.

## 3. PROCEDURE

- 3.1. In all instances a Potassium Chloride infusions must be regulated by a mechanical pump.
- 3.2. Medication concentration will **NOT** exceed 40 meq per liter of IV fluid.
- 3.3. A more concentrated solution that contains no more than 10 meq Potassium Chloride total in the infusion bag is allowable.
- 3.4. Infusion rates may not exceed 10 meq/hr.
- 3.5. Infusion rates must remain constant during transport with no regulation of rate allowed unless per specific transferring or base hospital physician.

# SEDATION AND ANALGESIA

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## 1. PURPOSE

To provide chemical sedation and analgesia for ventilator dependent and agitated patients

## 2. POLICY

- 2.1. CCP's are permitted to administer chemical sedation and analgesia without transferring physician or base hospital contact.
- 2.2. CCP's are permitted to monitor, **NOT** initiate, Fentanyl, Midazolam, and Morphine infusions.
- 2.3. CCP's may administer Fentanyl, Midazolam, and Morphine boluses.
- 2.4. **Fentanyl, Midazolam, and Morphine will be used, as appropriate, for:**
  - 2.4.1. Ventilator dependent and/or agitated patients requiring chemical sedation, analgesia, or restraint due to agitation, restlessness, and/or anxiety that is compromising patient stability
  - 2.4.2. Patients requiring pain management
  - 2.4.3. Other objective patient considerations:
    - Need for an invasive procedure
    - Increase in level of distress
    - Change in vital signs
    - Change in pulse oximetry and/or EtCO<sub>2</sub>
    - Change in cardiac monitor

## 3. PROCEDURE

### 3.1. **Ventilator Dependent and/or Agitated Patients**

- 3.1.1. Apply soft, four-point restraints if needed.
- 3.1.2. Continuously monitor oxygen saturation, EtCO<sub>2</sub>, heart rate, blood pressure and GCS.
- 3.1.3. Focus on management of patient's pain and discomfort in conjunction with sedation.
- 3.1.4. Administer Fentanyl and/or Midazolam per physician orders. If no orders obtained, use guidelines below.
- 3.1.5. If the transferring physician discontinues Propofol to allow for a CCP level transport and, initiates other sedation, consider trialing the new infusion at facility to check effectiveness prior to transport.

## 4. ADMINISTRATION

### 4.1. Fentanyl

#### 4.1.1. **Fentanyl Bolus Guidelines:**

- Administer Fentanyl boluses in accordance with local EMS agency policy OR guidelines below:
  - **Adult:**
    - Standard dose: 50 mcg IV/IO/IN/IM q 5 mins.
    - Weight-based dose: 1 mcg/kg IV/IO/IN/IM with single dose max 100 mcg q 5 mins.
  - **Pediatric:**
    - Standard dose: 50 mcg IV/IO/IN/IM for patients weighing 50 kg or more.
    - Weight-based dose: 1-2 mcg/kg IV/IO/IN/IM to a max dose of 100 mcg q 5 mins.
- Standard or weight-based dose may be repeated q 5 mins at initial dose or at ½ dose if concern for hypotension. May not switch between standard and weight-based dosing.



## SEDATION AND ANALGESIA

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- For patients weighing less than 25 kg, dilute by taking 2 ml Fentanyl (100 mcg) and 8 ml NS to equal a concentration of 10 mcg/ml.

### 4.1.2 **Fentanyl Infusion Guidelines:**

- Typical dosing range is 25-200 mcg/hr.
- May titrate by 25 mcg/hr q 5 mins as needed.

## 4.2 Midazolam

### 4.2.1 **Midazolam Bolus Guidelines:**

- Administer Midazolam boluses in accordance with local EMS agency policy OR guidelines below:
  - **Adult:**
    - Standard Dose: 2 mg IV/IO/IN for patients weighing 40 kg or more q 5 mins.
    - Weight-Based Dose: 0.05 mg/kg IV/IO/IN with a max single dose of 5 mg q 5 mins.
    - IM Dose: 0.1 mg/kg IM with a single max dose of 10 mg. May repeat once in 5 mins.
  - **Pediatric: (Not to be used in neonates)**
    - Standard Dose: 2 mg IV/IO/IN for patients weighing 40 kg or more q 5 mins.
    - Weight-Based Dose: 0.05 mg/kg slow IV push q 5 mins with max single dose of 5 mg
- Standard or weight-based dose may be repeated q 5 mins at initial dose or at ½ dose if concern for hypotension. May not switch between standard and weight-based dosing.
- For patients weighing less than 25 kg, dilute IV/IO/IM doses to 1 mg Versed in 1 ml NS. Do not dilute IN doses.

### 4.2.2 **Midazolam Infusion Guidelines:**

- Typical dosing is 2-10 mg/hr.
- May titrate by 2 mg/hr q 5 mins to a maximum of 10 mg/hr.
- Patients requiring rapidly escalating doses of Midazolam should be considered for concurrent Fentanyl administration.

## 4.3 Morphine

### 4.3.1 **Morphine Bolus Guidelines:**

- Morphine boluses may be administered as a second line narcotic in situations where Fentanyl is contraindicated, has been ineffective, or Morphine is preferred by transferring, receiving, or base hospital physician AND the CCP unit stocks.
- Administer Morphine boluses in accordance with local EMS policy OR guidelines below:
  - **Adult:**
    - Standard Dose:
    - 4 mg IV/IO/IM unless AMI or ACS patient.
    - 1 mg IV/IO/IM for AMI or ACS patient. If no relief with morphine strongly consider an alternative analgesia.
    - May repeat IV/IO q 5 mins and IM q 10 mins at the initial dose or half dose.
    - Weight-Based Dose: 0.1 mg/kg IV/IO/IM q 5 mins for IV/IO and q 10 mins for IM with max single dose of 10 mg.

## SEDATION AND ANALGESIA

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- **Pediatric:**
  - 0.1 mg/kg IV/IO/IM q 5 mins.
  - For patients weighing less than 25 kg, dilute IV/IO/IM doses to 1 mg Morphine in 1 ml NS.
- 4.3.2 **Morphine Infusion Guidelines:**
  - The infusion concentration and regulation of the infusion rate will occur within the parameters as defined by the transferring physician but may be titrated to the patient response during transport per transferring or base hospital physician orders only.

# SODIUM BICARBONATE

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## 1. PURPOSE

To authorize CCP's to monitor and adjust existing Sodium Bicarbonate infusions

## 2. POLICY

- 2.1. CCP's are permitted to monitor or discontinue Sodium Bicarbonate infusions during transport
- 2.2. CCP's may not initiate Sodium Bicarbonate infusions
- 2.3. CCP's may administer intravenous push dose Sodium Bicarbonate for crush injuries

## 3. PRECAUTIONS

- 3.1. Extravasation into subcutaneous tissues may cause small vein sclerosis and local chemical burns.
- 3.2. Use only 4.2% Sodium Bicarbonate in newborns due to intracranial hemorrhage concerns
- 3.3. In cases of overcompensation resulting in metabolic alkalosis presenting as impaired tissue perfusion, hypokalemia, hypocalcemia, decrease in patient's fibrillation threshold, sodium and water overload, the infusion will be discontinued, and the transferring physician or base hospital notified.

## 4. PROCEDURE

- 4.1. The infusion concentration and regulation of the infusion rate will occur within the parameters as defined by the transferring physician or base hospital.
- 4.2. For crush injuries and transport times >30 minutes, CCP may consider a bolus dose of 50-100 meq.

# THORACOSTOMY TUBES

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## 1. PURPOSE

To authorize CCP's to monitor existing surgically placed thoracostomy tubes

## 2. POLICY

2.1. CCP's are permitted to monitor thoracostomy tubes during interfacility transports.

2.2. CCP's may not perform placement of thoracostomy tubes.

## 3. PRECAUTIONS

3.1. Avoid pulling on the thoracostomy tube to prevent accidental dislodging of the tube.

3.2. Do not permit dependent loops or kinks to form in the tubing, as this will interfere with the flow of drainage leading to increased pleural pressure or formation of clots.

3.3. Do not disconnect the drainage system or puncture the tubing. Tape all connections securely to prevent violation of sterility and loss of negative pressure.

## 4. PROCEDURE

4.1. The collection receptacle must be kept below the level of the chest to prevent drained fluid from re-entering the pleural space. Do not allow the collection receptacle to tip over.

4.2. If hemorrhage occurs through the chest tube, observe for signs and symptoms of shock and treat according to local EMS agency protocols.

4.3. Mechanical suction rates must remain constant during the transport with no regulation of the rate being performed by the CCP.

4.4. Patients shall be placed and maintained on cardiac and pulse oximetry monitors during transport.

4.5. Signed order guidelines from the transferring physician must be obtained prior to transport.

4.6. Transfer order guidelines must provide for specifying the maintenance of the chest tube either to gravity or mechanical suction drainage. The amount of mechanical suction must be specified.

## 5. COMPLICATIONS

5.1. If the thoracostomy tube is partially pulled out:

- Do not push the tube back in the chest
- Secure the site

5.2. If the thoracostomy tube is completely pulled out:

- Place an occlusive dressing over the insertion site.

5.3. If air leaks are present:

- check all connections

5.4. If the patient becomes dyspneic:

- Assess breath sounds
- Contact the base hospital (needle thoracostomy may need to be performed)

# THROMBOLYTIC AGENTS

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## 1. PURPOSE

To authorize CCP's to monitor and discontinue, as needed, thrombolytic agent infusions

## 2. POLICY

### 2.1. Precautions

- Large stroke with NIH Stroke Scale score > 22 as reported by sending facility
- CT shows evidence of large middle cerebral artery (MCA) territory infarction

### 2.2. Function - Thrombolytic agent

### 2.3. Circumstances under which CCPs may perform thrombolytic infusion:

- Interfacility transports
- Infusion must be initiated prior to departure

### 2.4. Setting - Interfacility CCP transports

- A thrombolytic agent is not to be given without written orders from the referring physician. These orders must be specifically followed.
- CCPs must verify that a neurologic exam has been completed prior to administration
- Supervision: The transferring physician must be present at patient's bedside or by telemedicine when facility initiated thrombolytic infusion

### 2.5 Patient Conditions Patients with signs and symptoms of acute ischemic stroke

## 3. PROCEDURE

### 3.1. Definition: Thrombolytic agents are plasminogen activators that convert the zymogen plasminogen to the active enzyme plasmin, which degrades fibrin.

### 3.2. Subjective: Any symptoms communicated by the patient.

### 3.3. Objective:

- Acute ischemic stroke onset within 4.5 hours of drug administration.
- Measurable deficit on NIH Stroke Scale examination as reported by sending facility. The Cincinnati Stroke Scale or EMS agency approved scale can be utilized in transport to monitor patient status.
- Patient's CT scan does not show intracranial hemorrhage or non-stroke cause of deficit.

### 3.4. Diagnosis: Acute ischemic stroke confirmed by physician examination and CT scan.

### 3.5. Plan:

- To monitor thrombolytics: receipt from the transferring physician of specific orders for the continuation of thrombolytic infusion, including remaining dose, route, and time of administration must be obtained.
- If a thrombolytic has been given, or is being administered upon CCP arrival, it is imperative that blood pressure parameters are obtained from the transferring physician.

## THROMBOLYTIC AGENTS

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### 3.6. Discontinue infusion immediately if any of the following occur:

- Acute worsening of neurologic signs/symptoms
- Decline in the level of consciousness
- New onset of headache
- Nausea and vomiting
- Sudden acute rise in blood pressure
- Symptomatic intracranial hemorrhage

### 3.7. Thrombolytic Agent Dose:

- Dose widely varies based on thrombolytic agent ordered by physician and below are common medications/doses for reference only. Administer per transferring physician orders only.
  - **TNKase:** a one-time, weight based IV bolus with a range of 30-50 mg.
  - **Alteplase/tPA:** 0.9 mg/kg (max dose of 90 mg) given over 60 mins with 10% of the total dose given initially as a bolus over 1 min.
  - **Retepase:** 10 units IV over 2 mins and repeat dose in 30 mins.
  - **Streptokinase:** 1,500,000 units infused over 60 mins.

# TOTAL PARENTERAL NUTRITION (TPN)

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## 1. PURPOSE

To authorize CCP's to monitor existing Total Parenteral Nutrition (TPN) Infusions

## 2. POLICY

2.1. CCP's are permitted to monitor and infuse TPN during transports.

2.2. CCP's may not initiate TPN infusions.

## 3. PRECAUTION

3.1. When transporting a patient receiving TPM, or who has received TPN within the last hour prior to transport, maintain the head of the bed elevated at a minimum of 30 degrees to minimize the risk of aspiration whenever possible.

## 4. PROCEDURE

4.1. Infusion rates must remain constant during transport with no regulation of rates being performed by the CCP except for the discontinuation of the infusion (e.g., as in the case of infiltration).

4.2. All patients who have insulin as a part of their TPN solution shall have documentation of the most recent blood sugar analysis from the transferring facility.

4.3. The CCP shall check a blood sugar prior to departure from the sending facility.

4.4. TPN solution with lipid emulsion must be infused through special filtered tubing compatible with the CCP infusion device.

4.5. TPN solution intravenous line shall not be used for any medication or fluid administration.

# VENTILATOR MANAGEMENT

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## 1. PURPOSE

To authorize CCP's to initiate, monitor, and adjust ventilators

## 2. POLICY

2.1. CCP's are permitted to initiate non-invasive and invasive ventilator management.

2.2. CCP's are permitted to monitor and adjust ventilator settings in all modes.

## 3. PRECAUTIONS

3.1. The CCP is responsible for all airway management and must frequently reassess ETT placement, breath sounds, and EtCO<sub>2</sub> plus with each patient movement.

## 4. PROCEDURE

4.1. Ventilator support must be regulated by a ventilator familiar to the CCP and approved by local EMS agency.

4.2. In the event of a ventilator failure that cannot be corrected, the CCP will discontinue use of the ventilator and initiate ventilation by BVM with a PEEP valve device and notify the transferring or base hospital physician.

4.3. CCP's may utilize the transport ventilator to initiate BiPAP/CPAP/RAM cannula in NIPPV mode or ventilator support for intubated patients in IPPV mode.

4.4. Personnel shall monitor PSI level in the main and portable oxygen cylinder(s).

4.5. Patients shall be placed and maintained on the cardiac monitor, EtCO<sub>2</sub>, and pulse oximetry monitored during transport. VTE's and PIP's must be documented along with vital signs per protocol.

4.6. CCP's shall continually observe the patient and document patient response to any changes.

4.7. CCP's shall chart the initial vent settings and any subsequent changes.

4.8. CCP's may adjust ventilator settings consistent with the patient's ABG values and current practice standards to maximize oxygenation, ventilation, and compliance. In general, appropriate settings are as follows:

- Consider use of pressure control (PC) at 10-15 for all patients with interstitial lung disease.
- **Mode:** SIMV, not AC, is the preferred mode of transport. AC can cause inadvertent breath stacking/triggering.
- **Rate:** Typically set between 12-20 for adults, 20-40 for peds, and 30-60 for infants. Monitor and adjust for target EtCO<sub>2</sub>.
- **Tidal Volume (V<sub>t</sub>):** Set at 6 ml/kg of ideal body weight. For ARDS or excessive pressure etiologies consider 4-6 ml/kg.
- **Inspiratory Time (I-times):**
  - Neonate 0.30-0.40
  - Infant 0.40-0.50
  - Pediatric 0.60-0.80
  - Adult 0.8-1.0 (max 1.5)
  - Based on age and disease process. Longer I-times can help contribute to recruitment and an increased mean airway pressure (Paw).
- **FiO<sub>2</sub>:** Set to maximize oxygenation and keep SpO<sub>2</sub> between 94-99%. Patients should not routinely be set on, and maintained at, 100% FiO<sub>2</sub>.



- **Alarms:** High pressure set 10 above actual PIPs and low pressure set 10 below PIP's.
- **PEEP:** Set at a minimum of 5cm H<sub>2</sub>O (intrinsic PEEP) for adults/pediatrics and at 3cm H<sub>2</sub>O for infants. Patients with pulmonary edema, ARDS, and poor oxygenation may require higher PEEPS.

## 5. SPECIAL INFORMATION

5.1. The ventilator that the provider is to use should be able to match the existing ventilator settings. The following minimum device features (including circuit) must be present for this category:

- Set rate of ventilations
- Adjustable delivered tidal volume
- Adjustable inspiratory and expiratory ratios (I:E ratio)
- Positive End-Expiratory Pressure (PEEP)
- Peak airway pressure gauge
- **Modes:**
  - Assist Control (AC)
  - Pressure Control (PC)
  - Pressure Regulated Volume Control (PRVC)
  - Synchronized Intermittent Mandatory Ventilation (SIMV)
  - Controlled Mechanical Ventilation (CMV)
  - Continuous Positive Airway Pressure (CPAP)
  - Bi-Level Positive Airway pressure (BiPAP)
- **Alarms:**
  - Peak airway pressure
  - Disconnect
- Strongly recommended option: Blend percentage oxygen

5.2. Agencies using this equipment must be certain to follow the manufacturer's instructions regarding use, maintenance, cleaning, and regular testing of the device.

- The units must be inspected and tested after every patient use.
- The units must be disinfected after use unless a disposable unit is used.
- The units shall undergo preventative resting and maintenance by qualified personnel annually.
  - Agencies shall arrange for (at least) annual inspections and testing of the equipment by a manufacturer's representative (or designee). Documentation of this service shall be maintained in a service log. This record shall be kept by each agency using ATV's.

5.3. CCP's must receive a thorough initial and continual ventilator training. Such training shall occur, at a minimum, annually. Training shall be documented and on file with provider.

BAY AREA CRITICAL CARE PARAMEDIC – LOCAL EMS AGENCY APPROVAL FOR USE BY:

APPROVED: ALAMEDA COUNTY EMS AGENCY

LEMSA  
Designated by:

APPROVED: Dr. Karl Sporer DATE: 10/20/22

EMS MEDICAL DIRECTOR

APPROVED: Lauri McFadden DATE: 10/20/2022

EMS DIRECTOR

APPROVED: SAN FRANCISCO EMS AGENCY

LEMSA

APPROVED: John J. Brun DATE: 10/20/2022

EMS MEDICAL DIRECTOR

APPROVED: AL HLL DATE: 10/19/2022

EMS DIRECTOR

APPROVED: \_\_\_\_\_

LEMSA

APPROVED: \_\_\_\_\_ DATE: \_\_\_\_\_

EMS MEDICAL DIRECTOR

APPROVED: \_\_\_\_\_ DATE: \_\_\_\_\_

EMS DIRECTOR

APPROVED: \_\_\_\_\_

LEMSA

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EMS MEDICAL DIRECTOR

APPROVED: \_\_\_\_\_ DATE: \_\_\_\_\_

EMS DIRECTOR