CENTRAL CALIFORNIA
EMERGENCY MEDICAL SERVICES

A Division of the Fresno County Department of Public Health

Manual Emergency Medical Services Administrative Policies and Procedures	Policy Number 530.02
Subject Paramedic Treatment Protocols **GENERAL PROCEDURES**	Page 1 of 21
References Title 22, Division 9, Chapter 4 of the California Code of Regulations	Effective Fresno County: 01/15/82 Kings County: 04/10/89 Madera County: 06/15/85 Tulare County: 04/19/05

I. OVERVIEW OF HOW TO USE THE PROTOCOLS

This document contains the following:

A. The standard of care and scope of practice for the paramedics in Fresno/Kings/Madera/Tulare Counties, and the procedures for the paramedics to follow.

B. The treatment protocols for both medical and trauma emergencies. Each individual protocol outlines which treatment can be performed as a standing order and which treatment will need Base Hospital contact and/or Base Physician approval.

C. The point where transport should be initiated for each protocol.

D. Advanced Life Support (ALS) procedures which a Paramedic may perform without Base Hospital contact in the event of communications failure. ALS which a paramedic may perform in the event of communications failure is deemed in "lower case type." ALS orders written in "CAPITALIZED TYPE" may **NOT** be performed in the event of communications failure. Any delivery of ALS without Base Hospital contact due to communications failure must be reported according to EMS Policy #545 – Reporting Advanced Life Support without Base Hospital Contact.

E. Procedures with an asterisk (*) may only be implemented by order of a Base Hospital Physician.

F. Procedures without an asterisk may be implemented by order of a MICN without consulting a Base Hospital Physician.

G. All blood pressure references are systolic.

H. Paramedics are not allowed to switch protocols unless the patient needs treatment under an ACLS protocol (i.e., cardiac arrest protocols, PSVT, V-Tach, and Bradydysrhythmias). Protocols where a monitor is suggested allows for the paramedic to treat rhythm if appropriate. Switching protocols due to changes in patient condition should only occur after development of a new patient complaint that changes therapy as designated in the specific protocol or after Base Hospital consultation.

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II. ADVANCED LIFE SUPPORT BEFORE BASE HOSPITAL CONTACT

A Paramedic may initiate ALS prior to or without Base Hospital contact according to each specific treatment protocol. Each treatment protocol consists of a table divided into two parts. The top part is titled **STANDING ORDERS** and outlines the procedures for treating a patient that the paramedic is expected to perform, if indicated, prior to or without Base Hospital contact for a patient with that specific patient condition. All **STANDING ORDERS** are listed in sequential order for each condition, unless otherwise noted.

The bottom portion of the table outlined in bold is titled **BASE HOSPITAL ORDERS** and outlines the treatment procedures which require Base Hospital contact. Treatment which requires Base Hospital contact may be given by Base Hospital Physicians or MICNs. Procedures with an asterisk (*) may only be implemented by order of a Base Hospital Physician. Procedures without an asterisk may be implemented by order of a MICN.

III. FORMAT FOR BASE AND/OR RECEIVING HOSPITAL COMMUNICATIONS

The following formats will be used when transmitting the report of a patient's assessment, notification of therapy that has been completed and any additional therapy needed for treatment of a patient.

A. No Call-In Necessary

Patients that generally do not need a call-in to the Base Hospital:

1. Non-Stat (stable)

2. Patients that have been treated by standing orders and do not need additional therapy.

B. ETA Only Call-In

1. STAT/Non-STAT/Medical or Trauma/Code Blue.

   NOTE: If requesting consultation, further orders, refusal of medical care and/or transportation, Paramedic must contact a Base Hospital using a standard format.

2. ETA notification must be provided when indicated for the "BIG FOUR" - backboard, restraints, active labor, or patients on oxygen.

C. Standard Call-In

Patients that require Standard Call-ins:

1. Refusal of medical care and/or transportation that require Base Hospital contact (EMS Policy #544 – Criteria for Base Hospital Contact).

2. Non-Stat or Stat calls where the patient needs additional therapy not allowed in standing orders.

3. Base Hospital requires additional information and asks for a standard call-in.

4. Paramedics switching or combining protocols when patient's complaint has not changed from original complaint (see Page 1 – H).

5. Patients requesting transport to hospitals on diversion.

5. Paramedics should call the Base Hospital any time they have questions or need help with interpretation of patient's condition.

D. The severity of the patient's problem shall be identified with the following designators when hospital contact is made:

1. "STAT" – Potentially life or limb-threatening conditions where the patient is unstable, in a rapidly changing status, or unstable as identified by the assessment and vital signs (e.g., Acute MI, etc.).

   NOTE: Not necessarily Code 3, Refer to EMS Policy 548.

2. "NON-STAT" – Non-life or limb-threatening conditions, usually indicated by stable vital signs, including refusal of medical care and/or transportation that require Base Hospital contact by EMS Policy #544 – Criteria for Base Hospital Contact.

3. "Medical" or "Trauma" – Depending on the patient's most severe problems. For example, alcohol intoxication causing a fall with severe head injury, would be designated, "STAT Trauma".

4. "Code Blue" – When the patient is pulseless and/or non-breathing.

E. Call-in Format for Patients that Require Call-ins

1. ETA: Steps 1-5 Below (Base or Receiving Facility)

   a. For use with Non-STAT patients with backboard, restraints, active labor, or patients on oxygen. If a receiving hospital does not answer the radio, there is no need to contact a Base to relay an ETA call-in. [May be made by either the Paramedic or EMT and can be received by any hospital personnel.]

   b. STAT/ /Medical or Trauma/Code Blue. If short ETA and receiving hospital does not answer the radio, EMS personnel using ***good judgement*** may need to contact a Base Hospital or have dispatch contact the receiving hospital with an ETA of arriving EMS unit. [Can be received by any hospital personnel.]

2. Standard/ Diversion: Steps 1-13 Below (Base Only)
   For use with STAT patients needing consultation, further orders, refusal of medical care and/or transportation, or for patients requesting transport to a hospital on diversion. [Must be made by the Paramedic (or EMT on BLS units only) and must be received by a MICN or Base Hospital Physician.]

F. At the initiation of call-ins, medics should identify the call as STAT/NON-STAT, Medical/Trauma, and ETA/Standard or Diversion (i.e., NON-STAT Medical ETA or STAT Medical Diversion). This will expedite communications and Base decisions.

			Steps 1-5:	
S	**T**	**E**	1.	Unit ID, Name
T	**R**	**T**	2.	ETA
A	**A**	**A**	3.	Age, Sex, Weight
N	**U**		4.	Chief Complaint, STAT/Non-STAT/Medical or Trauma/Code Blue
D	**M**		5.	Reason for Notification – "BIG FOUR" (backboard, restraints, active labor, or
A	**A**	___		patients requiring oxygen)
R	**/**			
D	**C**		Steps 6-8:	
/	**V**		6.	GCS and Mechanism of Injury
D	**A**		7.	Vital Signs
I	___		8.	G-FAST Score and Last Known Normal Time (Suspected CVA only)
V			Steps 9-14:	
E			9.	Physical Exam
R			10.	Standing Orders Completed or in Progress
S			11.	PMH
I			12.	Medications
O			13.	Allergies
N			14.	Requesting Orders/ Refusal of Medical Care and/or Transportation

G. Multi-Casualty/Format (Base Hospital Only)
Refer to EMS Policy #620 "Multi-Casualty" for multiple patient incidents.

H. Base Receiving Hospital Response Format

The MICN or Base Hospital Physician shall use a format for communicating with field personnel, which briefly highlights the Base Hospital response and key points of the prehospital patient report. This includes the patient profile, the radio operator's impression of the patient's primary problem and a description of the patient's vital signs. An example would be, "A 34-year-old male with crushing chest pain who is hypotensive."

If the call is ETA only to a receiving hospital, the receiving facility will simply identify the facility and personnel answering the radio and acknowledge the radio transmission.

I. Diversion Call-In Format

If a patient requests a hospital that is on diversion, a standard call-in is required. If the requested hospital is a Base Hospital, the call-in should go to that Base Hospital. If the patient requests transport to a receiving hospital (not a Base Hospital), the call-in should go to the appropriate Base (see note below). The Base Hospital will then notify the receiving hospital. (Refer to EMS Policy #547.1)

NOTE:

1. When the requested hospital is part of the Community Medical Centers (RMC, CCMC), the call-in should be made to RMC if possible; otherwise, geographic proximity (i.e., SAMC for Kaiser) should determine which Base is called.

2. To expedite patient destination decisions, these call-ins should be made as early as possible.

3. EMS Units should continue to prepare patients for transport and begin transport while waiting for Base Hospital response (i.e. diversions). Under **No** circumstances should EMS units wait on scene with stat patients for a Base Hospital decision for patient destination.

J. Hospital Contact and Call-in Listing

The following is a chart listing the hospitals and the types of calls they want from field. Also below the chart you will find detailed information for the described call-ins within the chart.

Call-In Format for Receiving Facilities

	ETA Call-in			Standard/Trauma Call-In		
HOSPITAL	**ALL**	**BIG FOUR**	**STAT PATIENT**	**LABOR & DELIVERY (Complaints of Pregnancy)**	**ACUTE MI or CVA**	**TRAUMA**
Adventist Health-Reedley		X				
Adventist Health-Selma		X				
Coalinga Regional Medical Center		X				
Community Medical Center-Clovis		X				
Kaiser Permanente		X				
Veterans Administration	X					
Adventist Health-Hanford (B)		X		X		
Adventist Health-Tulare (B)		X	X	X		
Community Regional Medical Center (B)		X		X	X	X
Kaweah Health Medical Center (B)		X		X	X	X
Sierra View Medical Center (B)		X		X		
Saint Agnes Medical Center (B)			X	X	X	
Valley Children's Hospital (B)	X					X

1. A standard call-in is required for patients that list the following on a cardiac monitor:

   - *** ACUTE MI *** (Zoll Monitor E Series)
   - ***STEMI*** (Zoll Monitor X Series))
   - ***ACUTE MI SUSPECTED*** (Physio-Control Monitor LifePak 12)
   - ***MEETS ST ELEVATION MI CRITERIA*** (Physio-Control Monitor LifePak 15)

   Several hospitals are using prehospital field information from the call-in to determine the activation of stroke teams or cardiac catheterization lab teams**.**

   NOTE: If a patient refuses one of the above destinations, an early ETA call-in should occur to the receiving facility requested by the patient.

2. A standard call-in is required for patients with complaints of pregnancy. Several hospitals are using prehospital field information from the call-in to determine patient destination within their facility (i.e., emergency department or labor and delivery department). EMS personnel are to go to the emergency department unless redirected by the MICN or Base Hospital Physician. EMS personnel should never assume that a pregnant patient goes directly to labor and delivery.

3. Stat Trauma Call-in

   - Unit ID
   - Name (Paramedic or EMT)
   - ETA
   - Age
   - Chief Complaint
   - Mechanism of Injury
   - GCS
   - Vital Signs

   NOTE: (B) signifies a Base Hospital.

IV. LARYNGOSCOPY IN COMPLETE AIRWAY OBSTRUCTION BY FOREIGN BODY

If manual airway maneuvers (BLS Treatment Protocols, EMS Policy #510.12) fail to dislodge a foreign body causing complete airway obstruction (according to protocol), the Paramedic shall visualize the airway with laryngoscope, and if the object is visible, remove obstruction with Magill forceps. Attempt to remove foreign body with laryngoscopy for up to one minute. If unsuccessful, repeat ventilation attempts, and manual airway maneuvers, and initiate transtracheal jet insufflation according to protocol.

V. TRANSTRACHEAL JET INSUFFLATION

A. Indication:

1. Complete airway obstruction not relieved by manual procedures and airway visualization with laryngoscope.

2. Inability to intubate and inability to successfully ventilate using BVM ventilation.

B. Procedure:

1. Locate cricothyroid membrane.

2. Insert 10 gauge IV catheter through the membrane at a 45^{o} angle, directed toward the feet. Aspirate for air return with a syringe to check placement. Remove needle.

3. Stabilize catheter securely to neck.

4. Attach pediatric anesthesia adapter to catheter.

5. Supply 100% oxygen to anesthesia adapter via oxygen-powered breathing device.

   NOTE**:** In children under 12 years of age, ventilate with Bag-Valve-Catheter with 100% oxygen. If unable to ventilate, use oxygen-powered breathing device.

6. Check for proper placement in the following order:
   a. Assess chest rise.

   b. Check absence of gastric sounds.

   c. Check adequacy of breath sounds.

   d. Assess for complications, including subcutaneous air.

   e. Reassess placement every time patient is moved. Sometimes proper placement is difficult to assess. Do not just rely on the indicators listed above. Continual clinical reassessment for adequate oxygenation is essential.

C. **SURGICAL CRICOTHYROTOMY IS NOT A LOCALLY APPROVED PARAMEDIC SKILL.**

VI. NEEDLE THORACOSTOMY (CHEST DECOMPRESSION)

A. Indication: Will be identified in each individual protocol.

Signs and symptoms of Tension Pneumothorax, including **all of the following**:

1. Severe Respiratory Distress (as evidenced by apnea, severe dyspnea with tachypnea, oxygen saturation less than 90% for greater than 30 sec. (if utilized), or difficulty in bagging.

2. Lateralizing Exam (decreased breath sounds on one side, or tracheal deviation away from the tension, or asymmetric chest wall rise).

3. Hemodynamic Compromise (BP less than 90).

B. Procedure:

1. Use a 10 gauge IV catheter at least 3¼ inches long for an adult patient and 14 gauge catheter at least 1¼ inches long for pediatric patient.

2. The site preference for needle thoracostomy is:

   a. Primary Site – mid-axillary at the fifth intercostal space (approximately nipple level) on the side of decreased breath sounds, or

   b. Secondary Site – above the third rib (second intercostal space), slightly lateral to the mid-clavicular line (approximately at the level of the angle of Louis) on the side of decreased breath sounds.

3. When air returns, advance the catheter and remove the needle.

4. Attach a one-way valve to the catheter hub (if spontaneous respirations are present).

5. Stabilize the catheter securely to the chest.

6. Reassess the patient, including breath sounds and vital signs every time the patient is moved.

VII. I-GEL SUPRAGLOTTIC AIRWAY

A. Indications:

The i-gel may be used as an advanced airway alternative to endotracheal intubation. It is performed only on a patient who meets all of the following:

1. Unconscious (no purposeful movement), with an absent gag reflex.
2. Apneic or agonal respirations less than 8 per minute.
3. Appears to be at least 5 feet tall.

B. Contraindications:

1. Patients under 5 feet tall.
2. Suspected caustic ingestion.
3. Suspected narcotic overdose, until after the administration of Naloxone.
4. Laryngectomy or tracheal stoma.

C. Procedure:

1. Use in-line immobilization if a C-spine injury is suspected.
2. Have suction equipment immediately available.
3. Prior to placing the i-gel, hyperventilate the patient with 100% oxygen for a minimum of one minute, if possible.
4. Do not interrupt ventilation for more than 20 seconds while inserting the airway. If unable to insert and ventilate in 20 seconds or less, stop, hyperventilate and reattempt. Lubricate the gel filled cuff on all sides with H_2O soluble lubricant.
5. Insert tube and advance until a definitive resistance is felt. Do not use excessive force. Sniffing position is the optimum position.
6. If unsuccessful, ventilate for one minute before trying again.
7. Do not make more than two (2) attempts total per patient to establish an i-gel. If BVM ventilations cannot be adequately performed, a third attempt of the i-gel would be appropriate prior to the use of the TTJI.
8. The i-gel has a horizontal line to indicate optimal position of the tube in relation to the teeth.
9. Check for proper placement:
    a. Check adequacy of breath sounds.
    b. Check absence of epigastric air entry.
    c. End Tidal CO_2 Detector (for patients that are mechanically ventilated, ***with or without*** a pulse, ETT/i-gel /trach, and BVM).

NOTE: THIS DEVICE IS TO BE USED AS AN ADJUNCT TO ASSESS I-GEL PLACEMENT. ITS PURPOSE IS NOT TO ELIMINATE CLINICAL JUDGMENT.

d. Assess chest rise.

e. Reassess the placement of i-gel every time the patient is moved.

10. Secure i-gel as soon as possible.

11. After placement, ventilate with bag-valve and 15 liters/minute of oxygen with reservoir.

VIII. ENDOTRACHEAL INTUBATION

A. Indications:

Intubation may be completed prior to Base Hospital Contact if patient meets any of the following:

1. Patients >14 years of age in cardiac or respiratory arrest; or,

NOTE: In-line cervical immobilization must be used for patients with a possible neck injury.

2. Spontaneously breathing patients with GCS of 8 or less, who are unable to maintain their own airway or without gag reflex; or,

3. Spontaneously breathing patients with a GCS of 8 or less who have a respiratory rate less than 8 per minute.

B. Contraindications:

1. The patient in respiratory arrest from a suspected narcotic overdose should not be intubated until AFTER administration of Naloxone.

2. PEDIATRIC ENDOTRACHEAL INTUBATION IS **NOT** AN APPROVED SKILL FOR PARAMEDICS.

3. NASAL ENDOTRACHEAL INTUBATION IS **NOT** A LOCALLY APPROVED SKILL FOR PARAMEDICS.

4. THE PATIENT HAS A DO-NOT-RESUSCITATE ORDER (DNR) – EMS POLICY #564.

C. Procedure:

1. Provide in-line cervical immobilization for patients with a possible neck injury.

2. Have suction equipment immediately available.

3. Prior to performing endotracheal intubation, hyperventilate the patient with 100% oxygen for a minimum of one minute, if possible.

4. Do not interrupt ventilations for more than 20 seconds while performing endotracheal intubation. If unable to insert and ventilate within 20 seconds, stop, hyperventilate and reattempt.

5. If unsuccessful, ventilate for one minute before trying again.

6. Do not make more than two (2) attempts total per patient to perform endotracheal intubation. An attempt shall be defined as any cessation of ventilations in order to perform laryngoscopy. If either unsuccessful after 2 attempts, or intubation not felt possible, insert an i-gel.

7. Check for proper placement in the following order:

   a. Check adequacy of breath sounds in each hemithorax.

   b. Check absence of gastric sounds.

   c. End Tidal CO_2 Detector (for patients that are mechanically ventilated, ***with or without*** a pulse, ETT/i-gel/trach, and BVM).

      NOTE: THIS DEVICE IS TO BE USED AS AN ADJUNCT TO ASSESS TRACHEAL INTUBATION. ITS PURPOSE IS NOT TO ELIMINATE CLINICAL JUDGMENT.

      NOTE: Agencies with Capnography may utilize in place of End Tidal CO_2 Detector Device.

   d. Esophageal Detector Device (only patients ***without*** a pulse).

      NOTE: Do not use in children less than 5 years of age or less than 20 kg.

      NOTE: THIS DEVICE IS TO BE USED AS AN ADJUNCT TO ASSESS TRACHEAL INTUBATION. ITS PURPOSE IS NOT TO ELIMINATE CLINICAL JUDGMENT.

      NOTE: Agencies with Capnography may utilize after use of the EDD for continuous monitoring of ET placement.

   e. Assess chest rise and ease of ventilation.

   f. Positive fogging.

   g. Assess for complications.

   h. Reassess placement of ET tube every time the patient is moved or ET tube manipulated.

   i. In most adult patients, a properly placed ET tube will have the 22 cm mark at the level of the teeth.

8. Secure the ET tube as soon as possible.

9. After endotracheal intubation, ventilate with bag-valve and 15 liters/minute of oxygen with reservoir.

D. Medication Administration via the Endotracheal Route:

1. Indication:

   Medications via the endotracheal tube route should be given only when an IV/IO cannot be established. The ability to administer medications by the ET tube route should not preclude attempts to start IV/IO.

2. Procedure:

   Hyperventilate the patient with 100% oxygen. Hold chest compressions briefly while drugs are being administered down the endotracheal tube. If volume of medication is less than 1.5 ml, then flush with

2 ml sterile normal saline. Ventilate four times in rapid succession after the administration of any medication and its accompanying saline.

3. Give only the following drugs via the endotracheal route:

- Epinephrine
- Atropine
- Naloxone
- Midazolam

IX. OXYGEN THERAPY

A. Indications:

Oxygen therapy is required only for patients with the following conditions as defined in protocol:

1. Acutely altered mental status or any acute neurological symptoms (i.e., seizure, syncope, stroke, etc.).

2. Respiratory distress, cyanosis, altered respiratory rate, inhalation injuries, or exposures.

3. Any chest pain of possible cardiac or pulmonary etiology.

4. Shock.

5. Abnormal heart rate.

6. Significant multiple system trauma or patient meeting regional trauma center triage criteria.

   NOTE: This should not be based on mechanism of injury alone, but by the patient's condition and vital signs.

7. Any other condition specifically covered in the BLS or Paramedic protocols.

8. Patients shall be provided oxygen in accordance with protocols, patient signs and symptoms, or when a patient's pulse oximetry reading is 93% or less.

B. Oxygen Delivery and Dose:

1. Administer oxygen to spontaneously breathing patients according to specific protocols using either:

   a. Low flow – Nasal cannula (6 liters/min).

   b. High flow – Non-rebreathing oxygen mask (15 L/min). (Be sure to keep reservoir bag inflated.)

2. If patient has a history of COPD, start oxygen at 2 L/min by nasal cannula. If cyanotic, gradually increase oxygen flow until cyanosis clears. If still cyanotic on 6 L/min by nasal cannula change to 15 L/min by non-rebreathing mask.

   If the patient is on home oxygen and is chronically cyanotic, administer the patient's normal oxygen dosage and contact the Base Hospital regarding increasing the oxygen flow. Prepare to assist ventilations with bag-valve-mask, since oxygen may cause sleepiness and hypoventilation.

3. Use bag-valve-mask with supplemental oxygen (15 L/min) and reservoir or oxygen-powered breathing device when:

   a. Patient is not breathing.

b. Patient's breathing is too shallow to ventilate adequately.

c. Patients with a GCS of 8 or less should have their ventilations assisted.

NOTE: If a patient has a GCS of 8 or less, especially if they meet criteria for intubation and are not intubated, that patient should have their ventilations assisted by BVM or oxygen-powered breathing devices.

NOTE: Should not utilize an oxygen-powered breathing device on children less than 5 years of age except as allowed with transtracheal jet insufflation.

X. VASCULAR ACCESS

A. Establishing IV Access

Consider establishing IV access in any patient when there is a reasonable chance that the patient's condition may deteriorate enroute.

B. Saline Lock IV Access

Initiate a saline lock IV access in all patients who require vascular access based upon the specific treatment protocol, but who need no immediate medication administration or fluid administration (e.g., IV TKO and transport). Pre-existing saline lock IVs on the extremities may be used for fluid or medication administration.

If medication administration is needed due to a change in patient status, inject medication into the lock, and flush with saline. If multiple doses of medication are anticipated, consider attaching an IV bag with tubing to the saline lock with a transfer needle using sterile technique.

C. IV Access – Start one or two IVs of Lactated Ringer's solution in patients who require vascular access according to specific protocol.

D. External Jugular Venipuncture – Paramedics may use the external jugular route for IV insertion, if unable to establish an IV via other peripheral routes, and the IV is essential for patient care.

E. Pre-existing Vascular Access – If unable to establish a peripheral IV, and the patient needs fluids and/or medications, the Paramedic may use pre-existing vascular access. Refer to EMS Policy #565 (Maintenance of Patient Controlled Drugs) for patient controlled therapy. This can be used as the primary source in a code situation.

F. Intraosseous Access – The intraosseous (IO) access route is for fluid and medication administration if unable to establish an IV, and access is essential for patient care.

1. Indications:

a. In critically ill pediatric patients, where IV access is essential, and when one initial IV attempt is unsuccessful, or when no vein is immediately apparent, start intraosseous access without further IV attempts. If patient is awake and alert, contact Base Hospital prior to inserting IO line. (Volutrol will not work on IO lines; therefore, use 60cc syringe to give weight appropriate boluses and flush all medications with 10cc of LR or NS.)

b. In adult or pediatric cardiac arrest patients, IV or IO access is acceptable. If ET tube is available, administer medications via the endotracheal route if IV/IO access cannot be obtained.

c. Other patients may have intraosseous access started only by Base Hospital order.

All prehospital medications administered via the intravenous route may be administered through intraosseous access according to specific protocols.

2. Contraindications:

   a. Extremity cannot be used if fracture is present.

   b. Avoid areas where a burn or cellulitis is present.

3. Procedure:

   a. The site preference for intraosseous infusion is:
      (1) Pediatrics

      First choice – the flat, medial surface of the anterior tibia, 1-2 cm below the tibial tuberosity.

      Second choice – distal anterior femur, midline 3 cm above the patella.

      (2) Adults

      2-3 cm proximal to the medial malleolus and direct it slightly upward.

      Humeral head

4. Place intraosseous needle (with stylet) either perpendicular to the bone or 45 degrees away from the nearest growth plate. Apply firm downward pressure using a rotary motion to enter the bone marrow. There will be a sudden decrease in resistance when entering the marrow.

5. When the needle is standing without support, remove the stylet and attempt to aspirate marrow.

6. Although not always present, visible aspiration of marrow content (i.e., dark blood) will confirm proper placement. Easy flow of IV solution alone does not confirm correct placement. IV fluid may not drip to gravity; pressure may be required by use of blood pressure cuff or 60cc syringe. The best indicator of proper placement is the absence of tissue swelling around the site during fluid infusion.

7. If properly placed, the needle needs no securing. It will be solidly lodged in the bone. The IV tubing should be taped.

G. IV Fluid Administration Procedure

1. For patients not requiring fluid administration (according to protocol), maintain IV at TKO.

2. For patients with traumatic cardiac arrest or who require rapid volume replacement (according to protocol), administer lactated ringers wide open until systolic BP greater than 100 or until a total of two liters infused. Contact Base Hospital for fluid orders once systolic BP greater than 100 or two liters is infused.

3. For patients who require a fluid challenge according to protocols, administer the fluid as follows:

   a. Bolus until 500 ml LR is infused or the amount ordered by the Base is infused, then return IV to TKO.

   b. Check vital signs and lung exam after each 500 ml LR bolus or the amount the Base ordered.

   c. Repeat bolus of 500 ml LR or amount ordered by the Base if patient still meets protocol criteria.

d. If signs or symptoms of shock persist after a total of two 500 ml LR boluses, contact the Base Hospital for fluid orders. Consider another bolus.

4. If signs of pulmonary edema or a new onset of dyspnea develop during IV fluid administration: Slow IVs to TKO. Contact the Base Hospital for fluid orders.

XI. SPINAL IMMOBILIZATION

A. Goals:

1. Decrease/minimize use of backboards.
2. Reserve full spinal precautions use to high-risk patients.
3. Reduce complications associated with full spinal immobilization.
4. Facilitate extrications.
5. Use resources efficiently.
6. Increase patient comfort and satisfaction.

B. Terms:

1. Neurological Signs or Symptoms: paraesthesia, numbness, weakness, paralysis, asymmetric movements or gait, pain inhibiting neck movement. New or worsened signs or symptoms in a patient with a pre-existing deficit(s).
2. Ambulatory Patient: a patient who ambulates with a steady, strong, symmetric gait and does not require assistance to move (if previous gait disturbance, no change in patient's normal gait).
3. Neck/Back Support: support provided manually, or by towels, blankets, or soft collar to minimize movement, compression, or distraction of the spine.
4. Full Spinal Precautions: KED, backboard with blocks, straps and tape, break-away flat with blocks and tape, vacuum splint, etc.
5. Altered Mental Status: inability to follow simple commands or inconsistency in following simple commands.

C. Policy

1. Ambulatory Patients:

   a. Ambulatory patients without neurological signs or symptoms, without complaints of neck/back pain, and without neck/back tenderness to palpation should be transported in position of comfort.

   b. Ambulatory patients with complaints of neck /back pain, or neck/back tenderness, without neurological signs or symptoms, should be transported on a gurney in position of comfort. Their neck/back can be supported as needed.

   c. Ambulatory patients with neurological signs or symptoms after trauma, or suspected trauma, need full spinal precautions.

2. Non-Ambulatory Patients:

a. Non-ambulatory patients without neurological signs or symptoms, without complaints of neck/back pain, and without neck/back tenderness to palpation should be transported in position of comfort.

b. Non-ambulatory patients with complaints of neck /back pain, or neck/back tenderness, without neurological signs or symptoms, should be transported on a gurney in a supine position. Their neck/back must be supported until placed on the gurney (manual, KED). Once on the gurney, their neck/back can be supported as needed.

c. Non-ambulatory patients with neurological signs or symptoms after trauma, or suspected trauma, need full spinal precautions.

d. Non-ambulatory patients with an altered mental status should be transported in full spinal/back precautions.

3. Severe Blunt Multisystem Trauma:

a. Patients with severe blunt multisystem trauma should be transported using KED, break-away flat, or backboard to expedite bed transfers in severely injured patients.

4. Penetrating Trauma

a. If both blunt and penetrating trauma occur, manage as if severe blunt multi-system trauma.

5. The following is a chart summary regarding when spinal immobilization should be considered.

Spinal Immobilization Chart

	No neck pain/tenderness	Neck pain/tenderness	Neurological signs/symptoms	Altered Mental Status
Ambulatory	Position of Comfort	Gurney Position of Comfort with/without support	Full	Position of Comfort
Non-Ambulatory	Position of Comfort	Gurney supine Position of Comfort with extrication support	Full	Full
Severe Blunt Multisystem Trauma	Full	Full	Full	Full
Penetrating Trauma	Position of Comfort	Gurney supine Position of Comfort with extrication support	Full	Full

NOTE: If a patient does not meet requirements to be transported in full spinal precautions, this does **NOT** mean they are **"cleared"** from having a spinal injury. Significant injuries may be present and further evaluation is needed.

NOTE: Patients with isolated non-traumatic mid-to-low back pain do not need immobilization of the cervical spine. Immobilization of the mid and lower spine is sufficient in these cases.

NOTE: The Paramedic should consider removing C-spine immobilization on any patient who does not meet the above criteria and is placed in C-spine immobilization prior to the paramedic's arrival (i.e., first responders).

NOTE: If a child car seat is available, this device can be utilized for extrication support or spinal immobilization.

XII. TRACHEOSTOMY CARE/SUCTIONING

A. Indications:

1. Any patients with respiratory distress and a tracheostomy.

B. Contraindications:

1. None

C. Procedure:

1. Assess Problem

a. Obstruction (Partial/Complete)

- Excessive secretions
- Dried secretions
- Obstructed inner cannula
- Swelling/Infection
- Foreign Body
- Bleeding (Rare)

b. Dislodgment

- Sutures or tapes loose
- Trach tube out of tracheostomy

2. Type of Tube:

a. Single or double lumen – Both types have balloons similar to ET tubes. Double lumen tubes have an inner cannula that is removable.

3. Treatment:

a. 100% oxygen by BVM or mask to trach based on patient ability to ventilate.

b. Remove inner cannula if double lumen tube (rinse with sterile saline).

c. Suctioning (use sterile gloves as necessary).

- Preoxygenate.
- Irrigate with 3cc NS through trach (i.e., saline fish, irrigation syringe).
- Tell patient to exhale.
- Insert suction catheter gently until resistance is felt.
- Tell patient to cough/exhale.
- Suction during withdrawal of catheter.

4. Contact Base Hospital for medical direction if:

a. Patient not improving after above treatments.

b. Patient develops subcutaneous emphysema.

c. Patient is bleeding from trach.

d. Trach tube is dislodged.

e. You have any questions.

Irrigate with 3cc NS through trach (i.e., saline fish, irrigation syringe).

NOTE: Do not delay transport. STAT transport, contact base hospital enroute to closest appropriate facility.

XIII. TRANSCUTANEOUS PACING (TCP)

A. Indications:

1. Patients with serious signs and symptoms related to bradycardia (HR less than 60 beats/minutes) who have failed to respond to pharmacological therapy. "Hemodynamically significant" may be defined by severe chest pain, severe shortness of breath, pulmonary edema, acutely altered mental status, or shock (BP less than 90).

   a. In an **adult**, pacing should be attempted if the patient has a persistent, symptomatic bradycardia after a total of 1 mg of Atropine has been administered.

   b. In a **child**, oxygenation, ventilation, epinephrine, and atropine all should precede pacing.

2. The pacer may also be used on the order of a physician who is initiating an interfacility transfer or on the order of a Base Hospital Physician in a case where the paramedic has requested on-line medical control.

B. Contraindications:

1. Patients with no signs/symptoms related to bradycardiac rhythm.

C. Procedure:

1. Consider administering Fentanyl and/or Midazolam (per Policy #530.10). If unable to start IV, consider administering IM.

2. Place pads on the patient's chest and back.

3. Set initial TCP rate at 80 beats per minute (bpm).

4. Begin output at 0 milliamps (mA). Increase by 10mA until capture/pulses are noted. Once capture is confirmed, continue pacing at a slightly higher output level (10%).

5. If capture is maintained but the patient remains symptomatic of inadequate tissue perfusion (B/P less than 90 systolic, altered level of consciousness), consider increasing **the rate** by 10 bpm until 100 bpm is reached.

D. Troubleshooting:

1. Make sure the pads are properly placed and have good contact with the skin.

2. Check the batteries of the pacer.

3. Use adequate energy to capture the rhythm.

4. Use adequate analgesia and sedation to minimize patient discomfort.

XIV. 12-LEAD ECG

A. Indications:

1. Coronary ischemic chest discomfort
2. Shortness of breath with pulmonary edema (if acute onset of symptoms)
3. Unexplained hypotension (in presumed cardiogenic shock)
4. Return of spontaneous circulation (after any ACLS treatment for arrest)

NOTE: All other 12-LEAD ECG applications **require Base Hospital approval**.

B. Contraindications:

1. None

C. Procedure:

1. Apply 12-lead ECG per manufacturer's instructions.
2. Use limited to that described in Central California Policies and Procedures.

XV. CONTINUOUS POSITIVE AIRWAY PRESSURE (CPAP)

A. Indications:

1. Severe Shortness of Breath with Bronchospasm (Including COPD and Asthma)
2. Severe Shortness of Breath with Pulmonary Edema (Including Congestive Heart Failure)
3. Allergic Reactions with severe bronchospasm.
4. Conscious, breathing spontaneously, and able to follow commands

B. Contraindications:

1. Pediatric patients (14 years old or less)
2. Actively vomiting
3. Hypotensive (systolic blood pressure less 90)
4. Suspected of having a pneumothorax
5. An inability to achieve a good facial seal with the CPAP mask.

C. Procedure:

1. Do not delay medication administration to apply CPAP.
2. The patient must be continuously monitored for development of respiratory failure or vomiting. If either occurs, remove the CPAP circuit, clear the airway as necessary to prevent any aspiration, and provide respiratory assistance with either BVM or other advanced airway adjunct.
3. CPAP will be delivered at a continuous pressure of 5 up to 10 cm H_2O utilizing 100% oxygen.

a. Start CPAP at10 cm H_2O and decrease if possible.

b. Start oxygen at 100% and titrate for oxygen saturation greater than 95% if possible.

4. CPAP may introduce transient hypotension via decreased venous return secondary to elevated intrathoracic pressure.

a. If systolic blood pressure falls to less than 80 mmHG, remove CPAP.

b. If systolic blood pressure falls between 80-100 mmHG, decrease CPAP to 5 cm H_2O if possible.

XVI. VENTRICULAR ASSIST DEVICES

A. Procedure:

1. Assess the patient – There may be no palpable pulse, therefore, utilize other parameters for patient assessment (e.g., mental status, skin signs, capillary refill, and $ETCO_2$).

2. Assess the device.

a. Device information and VAD Coordinator contact number may be on the device.

b. If caregiver is present, yield to their advice.

c. For continuous flow devices (no palpable pulse), auscultate over the left upper quadrant of the abdomen or over the heart and listen for the "hum" of the device.

d. Determine if the device has power (If the device has power, it does not necessarily mean it is working properly). A malfunctioning pump should beep or may have a blinking or solid red light.

e. Check the device for secure connections.

3. If the patient's condition appears to be related to their VAD, and it is safe and reasonable, it is preferred to transport the patient to the facility, within the CCEMSA region, in which their VAD Coordinator works. If the patient condition warrants transport to a closer or more appropriate hospital (i.e. trauma or burn center) as directed in Policy 547, follow patient destination criteria as stated in policy.

B. Special Considerations

1. Prehospital providers should rely upon the patient's level of consciousness, skin signs, capillary refill, respirations, and $ETCO_2$ to make clinical decisions. Pulse-oximetry and blood pressures will not be obtainable in patients with a second-generation VAD device.

2. Patients may be cardioverted or defibrillated if symptomatic.

3. There are no absolute medication contraindications for VAD patients.

4. Chest compressions are not contraindicated and can be performed, but only if you are certain the pump is not working and/or there is not any flow through the VAD.
Mechanical CPR devices (e.g. Lucas Device) are **CONTRAINDICATED**.

5. Treatment should follow appropriate treatment protocols.

6. Contact the Base Hospital as needed.

7. If possible, the patient's family member or caregiver should accompany the patient to the hospital. All related VAD equipment including spare batteries should be transported with the patient.

8. In arrest situations, determine if a POLST/DNR or Advanced Directive is available.

XVII. CONTINUOUS WAVEFORM CAPNOGRAPHY

A. Indications:

1. Confirmation of proper endotracheal tube and i-gel placement.

2. Continuous monitoring of patients with an advanced airway.

3. Monitoring of resuscitation efforts during cardiac arrest in patients with advanced airway.

B. Contraindications:

1. None

C. Procedure:

Confirmation and monitoring of advanced airway:

1. Continuous waveform capnography must be used for all patients receiving advanced airway management (endotracheal tube and i-gel placement).

2. Attach the capnography device to the monitor prior to applying the device to the patient. This ensures that the device properly zeroes to ensure an accurate reading.

3. Attach the capnography device to the bag valve mask prior to intubation attempt.

4. The capnography device should be used to confirm placement immediately following insertion of the advanced airway. Additionally, intubation should be confirmed through direct visualization, confirmation of equal breath sounds, and absence of gastric sounds.

5. Proper placement is confirmed by presence of normal capnography waveform with ventilation. A normal $ETCO_2$ has a square appearance. A normal value is between 35-45 mmHg. Patients in cardiac arrest or those with poor perfusion may have low $ETCO_2$ readings (< 10 mmHg) however, there should still be a normal square shaped tracing.

6. An $ETCO_2$ value less than 10 mmHg without typical appearance of the waveform is indicative of esophageal placement or misplacement. The endotracheal tube or i-gel must be immediately removed.

7. A sudden increase in the $ETCO_2$ value during cardiac arrest is suggestive of ROSC.

8. Continuously monitor the waveform $ETCO_2$ tracing. The monitor tracing showing the initial waveform must be attached to the PCR. If the waveform cannot be attached to the PCR due to technologic failure, the numeric $ETCO_2$ value and presence of waveform must be documented in the PCR at the following time intervals:

a. Immediately after placement of an advanced airway.

b. After any patient movement.

c. Every 5 minutes during transport.

d. On turnover of care to the emergency department.

9. An appropriate $ETCO_2$ waveform confirms the proper advanced airway placement (ETT and i-gel) and may be used in lieu of physician signature for advanced airway confirmation **provided that the $ETCO_2$ waveform is attached to the PCR.**

XVIII. MECHANICAL CPR DEVICES

Manual chest compressions are the standard of care for patients in cardiopulmonary arrest.
Studies have shown no mortality benefit to support the use of mechanical CPR devices over high-quality manual chest compressions. However, there are situations where manual CPR is challenging or dangerous for the prehospital provider and mechanical chest compressions are preferred.

A. Indications:

1. Patients being transported with ongoing CPR
2. Prolonged resuscitation (> 10 minutes) to prevent rescuer fatigue or when limited rescuers are available
3. Prophylactic application prior to transport in patients with ROSC in case of rearrest. Device should only be activated in the event of rearrest
4. Cardiac arrest patients located in a confined space where manual CPR and rapid extrication are not possible

B. Contraindications:

1. Patient is too small for the device to be applied per manufacturer instructions
2. Patient is too large for the device to be applied per manufacturer instructions
3. Age and weight restrictions per manufacturer instructions
4. Device cannot be appropriately positioned on the chest
5. Cardiac arrest due to trauma
6. Patients with ventricular assist devices

C. Procedure:

1. Manual CPR should be performed immediately on patient arrival. Do not delay initiation of chest compressions to place the mechanical CPR device.
2. Ensure the chest is exposed prior to placement of the device.
3. The CPR feedback device must be removed prior to application of the mechanical CPR device, unless otherwise specified in manufacturer instructions.
4. Minimize interruptions in compressions when applying the device. The device should be applied in a choreographed stepwise fashion with manual chest compressions delivered between steps.
5. Follow device specific manufacturer instructions for application and operation.
6. Ensure appropriate defibrillator pad placement and reassess pad placement with each rhythm check.

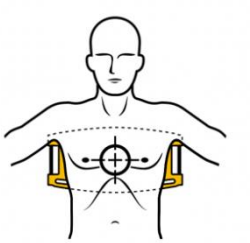
D. Special Considerations:

The following devices are approved for use in the CCEMSA region. Any additional devices shall be approved by the EMS Agency prior to implementation.

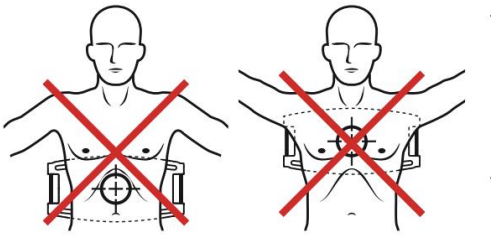
LUCAS:

1. It is critical that the suction cup is placed in the appropriate position indicated below and continually reassessed during transport.

Correct placement:



Incorrect placement:



2. The neck stabilization strap must be applied prior to patient movement. Secure the arms to the device using the device straps. Additionally, a permanent marker should be used to mark the upper and lower edges of the suction cup on the patient's chest. These markings will be referenced as landmarks to ensure the suction cup is in appropriate position throughout transport.

3. If the suction cup position migrates during transport, it must be immediately corrected. Misplacement of the device may lead to inadequate circulation and internal injury.

4. Defibrillation may safely be applied while the LUCAS device is providing compressions.

Zoll AutoPulse

1. Ensure that the device is appropriately positioned according to the manufacturer instructions.

2. The device should be continually monitored during transport to prevent migration.

3. Ensure shoulder restraint should be applied prior to transport to keep the patient properly aligned on the AutoPulse platform.