

**McKinley County, City of Gallup and MedStar Ambulance**

**EMERGENCY MEDICAL SERVICES  
GUIDELINES**

**PROCEDURES**

***EMS FIRST RESPONDER  
EMT - BASIC  
EMT- INTERMEDIATE  
EMT-PARAMEDIC***

**Updated May 2018**

# TABLE OF CONTENTS

AIRWAY MANAGEMENT - GENERAL GUIDELINES.....	- 1 -
AIRWAY MANAGEMENT - SUCTIONING.....	- 2 -
AIRWAY MANAGEMENT.....	- 6 -
AEROMEDICAL REQUEST.....	- 26 -
CAPNOGRAPHY.....	- 28 -
CAPNOMETRY.....	- 30 -
CARDIAC MONITORING.....	- 32 -
CARDIAC PACING-TRANSCUTANEOUS.....	- 35 -
CARDIOVERSION.....	- 37 -
CHEST INJURIES MANAGEMENT.....	- 39 -
CHEST TUBE MONITORING.....	- 42 -
COMMUNICATIONS - HOSPITAL.....	- 45 -
CPAP - CONTINUOUS POSITIVE AIRWAY PRESSURE.....	- 47 -
DEFIBRILLATION - MANUAL.....	- 49 -
DEFIBRILLATION – SEMI-AUTOMATIC.....	- 51 -
ENDOTRACHEAL MEDICATION ADMINISTRATION.....	- 53 -
GASTRIC TUBES.....	- 54 -
GLUCOMETRY.....	- 56 -
INJECTIONS .....	- 57 -
INTRANASAL DRUG ADMINISTRATION.....	- 61 -
INTRAOSSEOUS INFUSION.....	- 63 -
IV THERAPY .....	- 66 -
NEBULIZED DRUG ADMINISTRATION.....	- 70 -
OXYGEN ADMINISTRATION.....	- 71 -
PATIENT ASSESSMENT.....	- 73 -
PLEURAL DECOMPRESSION.....	- 82 -
PNEUMATIC ANTI-SHOCK GARMENT (PASG/MAST).....	- 83 -

<b>POSITIVE PRESSURE VENTILATION.....</b>	<b>- 85 -</b>
<b>SPINAL MOTION RESTRICTION.....</b>	<b>- 87 -</b>
<b>SPLINTING .....</b>	<b>-91 -</b>
<b>WOUND CARE / BLEEDING.....</b>	<b>- 95 -</b>
<b>WILDERNESS PROTOCOLS.....</b>	<b>- 97 -</b>

## AIRWAY MANAGEMENT - GENERAL GUIDELINES

### PARAMETERS

An adequate patent airway is the **HIGHEST PRIORITY WITH MOST PATIENTS**. All FR and EMTs must be skilled and practiced in all approved airway management techniques at their level, and use careful judgment in the selection of a technique.

### FR, BASIC AND INTERMEDIATE PROCEDURES

1. Approved airway management
  - a. Jaw thrust and chin lift
  - b. Visual inspection, auscultation, and feeling for air exchange
  - c. Oropharyngeal suction
  - d. Nasopharyngeal airway
  - e. Oropharyngeal airway
  - f. Multi-lumen airway (Combitube, PTL) (**EMT-Basic and Intermediate only**)
  - g. Laryngeal & supraglottic airway devices (LMA, King Airway)
  - h. Foreign Body Airway Obstruction (FBAO) – follow current AHA Guidelines
2. Continually assess the patency and adequacy of a patient's airway.
3. Document the method used to maintain the airway on the EMS report.
4. Traumatic airway management
  - a. Manually stabilize the cervical spine prior to airway maneuvers.
  - b. Protection of the cervical spine and recognition of possible mid-face trauma are of major concern but do not preclude the use of any airway adjunct when indicated in critical patients.

### PARAMEDIC PROCEDURES

5. Additional approved airway management
  - a. Endotracheal intubation
  - b. Nasotracheal intubation
  - c. Surgical cricothyrotomy

## **AIRWAY MANAGEMENT - SUCTIONING**

### ***OROPHARYNGEAL***

#### **LEVEL OF AUTHORIZATION**

FR, Basic, Intermediate & Paramedic

#### **RATIONALE**

The use of suction with appropriate devices clears fluid and debris, thus preventing airway compromise.

#### **DESIRED EFFECT**

Properly performed, suctioning should remove all visible secretions and debris without causing trauma to the oral cavity. Suctioning should prevent aspiration of foreign materials into the lungs during inspiration or ventilatory attempts.

#### **INDICATIONS**

The patient is unable to eliminate accumulated secretions or debris without assistance.

#### **CONTRAINDICATIONS**

None

#### **PROCEDURE**

1. Consider placing patient in the recovery position (on their side) to allow for drainage if spinal precautions are not a consideration.
2. Select a suction catheter (Yankauer, Whistle-tip, rigid, etc.) that will work best in removing the substance accumulated.
3. Use universal precautions (eye protection, mask, gloves, etc.).
4. Insert the suction catheter no deeper than the rescuer can visualize.
5. Apply suction while removing catheter.
6. Continue suctioning until the substance is removed and the airway is clear.
7. Repeat as necessary.

**(Continued next page)**

**AIRWAY MANAGEMENT / SUCTIONING - OROPHARYNGEAL (cont.)**

8. Maintain ventilatory support with supplemental oxygen.

**SPECIAL CONSIDERATION**

1. Suctioning can stimulate the vagus nerve causing bradycardia and hypotension.
2. *Lengthy suctioning attempts can lead to hypoxia*, which can cause serious cardiac dysrhythmias due to decreases in myocardial oxygen supply.
3. Suction may stimulate coughing which may increase intracranial pressure.
4. Maintaining suction while removing the catheter will prevent suctioned fluids and debris from dropping back into the mouth.
5. Attempting to ventilate the patient before the airway is clear may lead to aspiration.

## **AIRWAY MANAGEMENT / SUCTIONING**

### ***ENDOTRACHEAL***

#### **LEVEL OF AUTHORIZATION**

Paramedic

#### **RATIONALE**

The use of endotracheal suction, with appropriate devices, clears pulmonary secretions and debris, preventing or alleviating airway compromise.

#### **DESIRED EFFECT**

Properly performed, endotracheal suctioning should remove pulmonary secretions, resulting in improvement of lung sounds. The clearing of secretions would decrease airway resistance and increase tidal volume delivery during positive pressure ventilation.

#### **INDICATIONS**

1. There is a need to remove accumulated pulmonary secretions as evidenced by one or more of the following:
  - a. Course lung sounds or "noisy" respirations.
  - b. Visible secretions are noted in the endotracheal tube.
  - c. Suspected aspiration of gastric or upper airway secretions.
2. The need to maintain the patency and integrity of the endotracheal tube.

#### **CONTRAINDICATIONS**

When indicated, there are no absolute contraindications to endotracheal suctioning. Failure to suction in order to avoid a possible adverse reaction may result in patient death.

#### **PROCEDURE**

1. Cleanse hands.
2. Assemble required equipment.
  - a. Commercial suction kit or:
    - i. Sterile catheter

**(Continued next page)**

**AIRWAY MANAGEMENT / SUCTIONING - ENDOTRACHEAL (cont.)**

- ii. Sterile gloves
    - iii. Sterile basin
    - iv. Eye protection
  - b. Manual resuscitator
  - c. Sterile water
  - d. Water soluble lubricant
  - e. Vacuum gauge or pump and trap
3. Position the patient
  4. Pre-oxygenate the patient, if appropriate, and the airway is clear of material.
  5. Instill normal saline if required to loosen mucus.
  6. Apply sterile gloves using sterile technique.
  7. Insert the appropriate size suction catheter with suction off until resistance is met.
  8. Suction the airway while removing the catheter.
    - a. Application of vacuum limited to no more than 15 seconds.
    - b. Sterile technique must be maintained
  9. Oxygenate the patient after suctioning.
  10. Repeat as necessary

**SPECIAL CONSIDERATION**

1. Prolonged suctioning may lead to hypoxia /hypoxemia which can cause serious cardiac dysrhythmias due to decreases in myocardial oxygen supply.
2. Failure to use sterile technique may lead to infection.
3. Suctioning may stimulate the vagus nerve causing bradycardia and hypotension
4. Suctioning may stimulate coughing which may increase intracranial pressure

## AIRWAY MANAGEMENT

### *OROPHARYNGEAL AIRWAY*

#### LEVEL OF AUTHORIZATION

FR, Basic, Intermediate & Paramedic

#### RATIONALE

The oropharyngeal airway (OPA) should be used as an adjunct to maintain an open airway for patients that are unable to protect their airway due to a decreased level of consciousness.

#### DESIRED EFFECT

When properly placed, this device should conform to the curvature of the palate and hold the base of the tongue away from the posterior oropharynx. Air should pass around and through the device, and adequate ventilations should be observed.

#### INDICATIONS

This device should be used in a patient who is semi-conscious or unconscious with no gag reflex and is unable to protect their airway, and in need of ventilatory assistance.

#### CONTRAINDICATIONS

The device should not be used on patients with an intact gag reflex, because its insertion may stimulate vomiting or laryngospasm. It should be used with caution if oral trauma is present.

#### PROCEDURE

1. The correctly sized airway should be selected by measuring from the corner of the patient's mouth to the bottom of their ear (angle of the jaw). If you do not have the correct size, **DO NOT** insert the next biggest or next smallest size.
2. Use universal precautions (eye protection, mask, gloves, etc.).
3. Taking cervical spine precautions, bring the tongue forward.
4. Insert the oral airway into the patient's mouth with the tip pointing upward (toward the palate) or to the side and rotate while inserting.
5. If a tongue depressor is used, it is not necessary to rotate the airway. (**This is the recommended procedure for pediatric patients**)

(Continued next page)

**AIRWAY MANAGEMENT / OROPHARYNGEAL AIRWAY (cont.)**

6. The device will be correctly inserted if the curvature of the airway conforms to the patient's tongue and the flange will rest just above the teeth.

**SPECIAL CONSIDERATION**

1. Oral airways do not isolate the trachea from the esophagus. Therefore, vomiting may result in aspiration of stomach contents.
2. Manual maneuvers must still be used to maintain an adequate airway.
3. OPAs may be easily dislodged, and require monitoring to assure and maintain correct placement.
4. *If improperly inserted, OPA's may actually cause obstruction of the airway.*
5. If the airway cannot be properly inserted because the teeth are clenched, a nasopharyngeal airway should be considered.

## **AIRWAY MANAGEMENT**

### ***NASOPHARYNGEAL AIRWAY***

#### **LEVEL OF AUTHORIZATION**

FR, Basic, Intermediate & Paramedic

#### **RATIONALE**

The nasopharyngeal airway (NPA) should be used as an adjunct to maintain an open airway on patients who are unable to protect their airway due to a depressed level of consciousness.

#### **DESIRED EFFECT**

When properly placed, this device should relieve soft tissue obstruction in the upper airway, providing an opening for ventilation without stimulating the patient to vomit.

#### **INDICATIONS**

This device is used to assist in the maintenance of an open airway in a conscious or unconscious patient, with or without a gag reflex, who is unable to protect their airway, and in need of ventilatory assistance.

#### **CONTRAINDICATIONS**

1. Suspected basilar skull fracture
2. Active nosebleed
3. Suspected maxillofacial fracture(s)

#### **PROCEDURE**

1. The correctly sized airway should be selected by measuring from the tip of the patient's nose to the bottom of their ear (angle of the jaw) and the diameter should be slightly smaller than the patient's nostril.
2. Use universal precautions (eye protection, mask, gloves, etc.).
3. Check for obstructions or fractures to the nose.
4. Lubricate the device with a water-soluble gel, being careful not to block the tip.

**(Continued next page)**

**AIRWAY MANAGEMENT / NASOPHARYNGEAL AIRWAY (cont.)**

5. With the bevel tip directed toward the nasal septum, insert the airway. If resistance is felt, remove the airway and attempt in the other nostril.
6. Insert until the flange is resting against the nostril opening.

**SPECIAL CONSIDERATION**

1. NPAs do not isolate the trachea from the esophagus, therefore vomiting may result in aspiration of stomach contents.
2. NPAs may cause severe nosebleeds if forcefully inserted.
3. NPAs may kink or clog, causing obstruction of the airway.
4. A tube too long may pass into the esophagus and result in hypoventilation and gastric distention.
5. NPAs should never be used in the presence of a suspected basilar skull fracture, as the tube can unintentionally enter into the brain.

## AIRWAY MANAGEMENT

### **COMBITUBE®**

#### LEVEL OF AUTHORIZATION

Basic, Intermediate and Paramedic

#### RATIONALE

The Combitube® multi-lumen airway (MLA) should be used as an adjunct to maintain an open airway, while isolating the gastrointestinal tract from the respiratory tract in patients that are unable to protect their own airway due to a depressed level of consciousness.

#### DESIRED EFFECT

When properly placed, this device should prevent aspiration of stomach contents, prevent gastric distention and provide a seal in the oropharynx to allow for adequate ventilations. The tube is intended for esophageal placement, however it will also function if inadvertently inserted into the trachea. It is *imperative* that the correct ventilation port be used and that adequate lung sounds are present and epigastric sounds are absent.

#### INDICATIONS

1. The patient is semi-conscious or unconscious with an absent gag reflex who is unable to protect their airway, and in need of ventilatory assistance.
2. Endotracheal intubation cannot be performed.
3. Endotracheal intubation has been unsuccessful or unavailable.
4. Direct visualization of the larynx is not possible due to secretions, vomit or profuse bleeding.

#### CONTRAINDICATIONS

1. Patients with an intact gag reflex.
2. Patients under 5 feet tall (adult size).
3. Patients under 4 feet tall (small adult size).
4. Known or suspected esophageal disease. (Relative contraindication)
5. Patients suspected of ingesting a corrosive substance. (Relative contraindication)

**(Continued next page)**

**AIRWAY MANAGEMENT / COMBITUBE® (cont.)****PROCEDURE**

1. Pre-oxygenate the patient, if possible, with a ventilatory device using 100% oxygen.
2. Check the patient's mouth for sharp objects, braces, or foreign bodies.
3. Select the correct size device (adult, small adult)
4. Both cuffs of the Combitube® should be checked for leakage. Syringes should be removed after checking.
5. Use universal precautions (eye protection, mask, gloves, etc.).
6. Lubricate the tube, if necessary, with a water-soluble gel, being careful not to block the tip.
7. Assess patient for gag reflex (eyelash test is not always reliable)
8. If C-spine injuries are **NOT** suspected:
  - a. The patient's head should be placed in a neutral or sniffing position with the tongue pulled forward.
  - b. Blindly insert Combitube® until the teeth lie between the two black lines.
9. If C-spine injuries **ARE** suspected:
  - a. Manually stabilize the patient's head in a neutral position to minimize C-spine movement.
  - b. Blindly insert Combitube® until the teeth lie between the two black lines.
10. Inflate proximal cuff and distal cuffs per manufacturer's recommendations. (Additional air may be added to proximal cuff and distal cuffs if the seals are inadequate).
11. Ventilate the patient with a BVM through the blue (#1) colored tube.
12. Listen for lung and epigastric sounds and watch for chest rise to verify tube placement. Pulse oximetry, capnography, and/or any end tidal CO<sub>2</sub> detector is highly recommended to confirm adequate tube placement and oxygenation.
13. After assessing tube placement, do one of the following:
  - a. If you are 100% confident you're ventilating the lungs, continue ventilations.

**(Continued next page)**

**AIRWAY MANAGEMENT / COMBITUBE® (cont.)**

- b. If you are in doubt and suspect you are not ventilating lungs, then move ventilatory device to the clear (#2) tube and ventilate. Repeat step 12 and if 100% confident you're ventilating lungs, then continue ventilating.
14. Occasionally check pilot balloons to assure cuff remains inflated.
15. Rapidly transport the patient to the nearest medical facility and continuously monitor the patient's vital signs enroute.
16. If removal is necessary due to the patient's inability to tolerate the device or to facilitate endotracheal intubation:
  - a. Decompress the stomach (esophageal placement only) with the catheter included with the Combitube® through the white tube.
  - b. Deflate the proximal cuff (colored tube) completely.
  - c. Turn the patient on their side.
  - d. Deflate the distal cuff (white tube) completely.
  - e. Suction while removing to prevent aspiration.

**SPECIAL CONSIDERATION**

1. Sharp dental work or debris may puncture the proximal cuff.
2. The MLA should not be removed prior to endotracheal intubation unless visualization of the cords is not possible.
3. ***Failure to recognize proper tube placement may result in patient death.***
4. If patient is adequately ventilated with a MLA, ET intubation may not be necessary.
5. If epigastric sounds are noted after confirming proper tube placement, add air to the distal cuff.
6. Patient movement may dislodge the tube. Every time the patient is moved, re-verification of tube placement is necessary.
7. If resistance is met, remove tube, reposition patient and reattempt insertion. Never force tube into position.

## AIRWAY MANAGEMENT

### *LARYNGEAL and SUPRAGLOTTIC AIRWAY DEVICES*

#### KING AIRWAY

#### LEVEL OF AUTHORIZATION

FR, Basic, Intermediate & Paramedic

#### RATIONALE

Laryngeal and Supraglottic Airway Devices are used as adjuncts to maintain an open airway in patients who are unable to protect their airway due to a decreased level of consciousness, edema or restrictive airway conditions.

#### DESIRED EFFECT

When properly placed, this device seals the larynx, leaving the distal opening of the tube just above the glottis, providing a clear, secure airway. **The King Airway does not ensure absolute protection against aspiration.** Studies have shown that regurgitation is less likely and that aspiration is uncommon.

#### INDICATIONS

1. The patient must be a minimum of 4 ft. tall.
2. The patient is experiencing, or is likely to experience, upper airway compromise.
3. The patient is in respiratory or cardiac arrest.
4. The patient has edema, which may result in complete obstruction.
5. The patient has inadequate rate or depth of respiration.
6. The patient is unconscious and unable to self protect their own airway.
7. Endotracheal intubation has been unsuccessful or blind insertion is necessary.

#### CONTRAINDICATIONS (relative)

1. Patients greater than 14 weeks pregnant
2. Patients with multiple or massive injury
3. Massive thoracic injury
4. Massive maxillofacial trauma
5. Patients at risk of aspiration

#### PROCEDURE

1. Pre-oxygenate the patient, if possible, with 100% oxygen while assembling equipment.

(Continued next page)

***LARYNGEAL and SUPRAGLOTTIC AIRWAY DEVICES*****King Airway (cont.)**

2. Use universal precautions (eye protection, mask, gloves, etc.).
3. Using the information provided, in the package insert choose the correct KING LTS-D size, based on patient height.
4. Test cuff inflation system by injecting the maximum volume of air into the cuffs. Remove all air from both cuffs prior to insertion.
5. Apply a water-based lubricant to the beveled distal tip and posterior aspect of the tube, taking care to avoid introduction of lubricant in or near the ventilatory openings.
6. Re-oxygenate patient with 100% oxygen for at least 1 minute.
7. Position the head. The ideal head position for insertion of the KING LTS-D is the "sniffing position". However, the angle and shortness of the tube also allows it to be inserted with the head in a neutral position.
8. Hold the KING LTS-D at the connector with dominant hand. With non-dominant hand, hold mouth open and apply chin lift.
9. With the KING LTS-D rotated laterally 45-90° such that the blue orientation line is touching the corner of the mouth, introduce tip into mouth and advance behind base of tongue. Never force the tube into position.
10. As tube tip passes under tongue, rotate tube back to midline (blue orientation line faces chin).
11. Without exerting excessive force, advance KING LTS-D until proximal opening of gastric access lumen is aligned with teeth or gums.
12. With a syringe inflate the KING LTS-D, inflate cuffs with the minimum volume necessary to seal the airway at the peak ventilatory pressure employed (just seal volume).
13. Attach the BVM to the 15 mm connector of the KING LTS-D. While gently bagging the patient to assess ventilation, simultaneously withdraw the airway until ventilation is easy and free flowing (large tidal volume with minimal airway pressure).
14. Depth markings are provided at the proximal end of the KING LTS-D which refer to the distance from the distal ventilatory openings. When properly placed with the distal tip and cuff in the upper esophagus and the ventilator openings aligned with the opening to the larynx, the depth markings give an indication of the distance, in cm, from the vocal cords to the upper teeth.

**(Continued next page)**

***LARYNGEAL and SUPRAGLOTTIC AIRWAY DEVICES*****King Airway (cont.)**

15. Attach ETCO<sub>2</sub> monitoring device to **adaptor** and follow guidelines for its use.
16. Confirm proper position by auscultation, chest movement and verification of CO<sub>2</sub> by capnography and document.
17. Secure KING LTS-D to patient using tape (insert bite-block to prevent occlusion of the tube if the patient bites down) OR an approved commercial device. **DO NOT COVER THE PROXIMAL OPENING OF THE GASTRIC ACCESS LUMEN.** The gastric access lumen allows the insertion of up to an 18 Fr diameter gastric tube into the esophagus and stomach.
18. Immediately following successful placement of the King Airway apply an appropriately sized cervical collar. In the event a C-collar will not fit, manual inline stabilization should be utilized and if transported; blankets, towels and tape should be used appropriately to restrict cervical spinal motion. **No exceptions.**
19. If the patient is to be transported, they must be secured to a backboard.

## AIRWAY MANAGEMENT

### *LARYNGEAL and SUPRAGLOTTIC AIRWAY DEVICES*

#### LMA

#### LEVEL OF AUTHORIZATION

FR, Basic, Intermediate & Paramedic

#### RATIONALE

Laryngeal Mask Airways (LMA) is used as an adjunct to maintain an open airway in patients who are unable to protect their airway due to a decreased level of consciousness, edema or restrictive airway conditions.

#### DESIRED EFFECT

When properly placed, this device seals the larynx, leaving the distal opening of the tube just above the glottis, providing a clear, secure airway. **The LMA does not ensure absolute protection against aspiration.** Studies have shown that regurgitation is less likely and that aspiration is uncommon.

#### INDICATIONS

1. The patient is experiencing, or is likely to experience, upper airway compromise.
2. The patient is in respiratory or cardiac arrest.
3. The patient has edema, which may result in complete obstruction.
4. The patient has inadequate rate or depth of respiration.
5. The patient is unconscious and unable to self protect their own airway.
6. Endotracheal intubation has been unsuccessful or blind insertion is necessary.

#### CONTRAINDICATIONS (relative)

1. Patients greater than 14 weeks pregnant
2. Patients with multiple or massive injury
3. Massive thoracic injury
4. Massive maxillofacial trauma
5. Patients at risk of aspiration

#### PROCEDURE

1. Pre-oxygenate the patient, if possible, with 100% oxygen while assembling equipment.
2. Use universal precautions (eye protection, mask, gloves, etc.).

**(Continued next page)**

**AIRWAY MANAGEMENT / LARYNGEAL MASK AIRWAY -LMA (cont.)**

3. Select the appropriate size airway:

AIRWAY SIZE	PATIENT	MAXIMUM INFLATION VOLUME
1	Neonates/Infants up to 5 kg	4 ml
1.5	Infants 5 - 10 kg	7 ml
2	Infants/Children 10 - 20 kg	10 ml
2.5	Children 20 - 30 kg	14 ml
3	Children 30 - 50 kg	20 ml
4	Adults 50 - 70 kg	30 ml
5	Adults 70 - 100 kg	40 ml
6	Adults > 100 kg	50 ml

4. Assemble and inspect all equipment.
  - a. Visually inspect the LMA cuff for tears or other abnormalities.
  - b. Inspect the tube to ensure that it is free of blockage or loose particles.
  - c. Deflate the cuff to ensure that it will maintain a vacuum.
  - d. Inflate the cuff to ensure that it does not leak.
  - e. Completely deflate cuff prior to insertion
  
5. Lubricate the LMA just prior to insertion.
  - a. Use a water-soluble lubricant.
  - b. Lubricate the back of the mask thoroughly, avoiding excessive amounts.

**Note: Inhalation of the lubricant following placement may result in coughing or obstruction.**
  
6. If C-spine injuries are **NOT** suspected:
  - a. Extend the patient’s head and flex the neck.
  - b. Avoid LMA fold over by:
    - i. Use an assistant to pull the lower jaw downwards.
    - ii. Visualize the posterior oral airway
    - iii. Ensure that the LMA is not folding over in the oral cavity as it is inserted.
  - d. Suction as needed.
  
7. Grasp the LMA by the tube, holding it like a pen as near as possible to the mask end.
  
8. Place the tip of the LMA against the hard palate to flatten it out.
  
9. Using the index finger, keep pressing upwards as you advance the mask into the pharynx to ensure the tip remains flattened and avoids the tongue.
  
10. Press the mask into the posterior pharyngeal wall using the index finger.
  
11. Guide the mask downward into position.

**(Continued next page)**

**AIRWAY MANAGEMENT / LARYNGEAL MASK AIRWAY (LMA) (cont.)**

12. Grasp the tube firmly with the other hand and withdraw your index finger from the pharynx.
13. Gently press downward with your other hand to ensure the mask is fully inserted.
14. Inflate the mask with the recommended volume of air avoiding over-inflation.
15. Avoid touching the LMA tube while it is being inflated unless the position is obviously unstable.
16. Connect the LMA to a ventilatory device and ventilate the patient. Listen for lung and epigastric sounds and observe for bilateral chest rise. Pulse oximetry, capnography, and/or any end tidal CO<sub>2</sub> detector is highly recommended to confirm adequate tube placement and oxygenation.
17. Insert a bite-block to prevent occlusion of the tube if the patient bites down.
18. Secure the tube.
19. Check periodically to ensure proper tube placement and cuff inflation.

**SPECIAL CONSIDERATION**

1. Time is lost when equipment malfunctions. All equipment should be inspected at the beginning of every work shift.
2. Inadvertent delays in oxygenation can result from lengthy intubation efforts or failure to provide ventilatory support between attempts.
4. Patient movement may dislodge the tube. Every time the patient is moved, re-verification of tube placement is necessary.

## AIRWAY MANAGEMENT

### *INTUBATION - ENDOTRACHEAL*

#### LEVEL OF AUTHORIZATION

Paramedic

#### RATIONALE

Endotracheal intubation should be used as an adjunct to maintain an open airway, while isolating the gastrointestinal tract from the respiratory tract in patients that are unable to protect their own airway due to a decreased level of consciousness, edema or restrictive airway conditions.

#### DESIRED EFFECT

When properly placed, this device should prevent aspiration of stomach contents, prevent gastric distention and provide a definitive airway for adequate ventilations.

#### INDICATIONS

1. The patient is experiencing, or is likely to experience, upper airway compromise.
2. The patient is in respiratory or cardiac arrest.
3. The patient has edema, which may result in complete obstruction.
4. The patient has inadequate rate or depth of respiration.
5. The patient is unconscious and unable to self protect their own airway.

#### CONTRAINDICATIONS

When indicated, there are no absolute contraindications to endotracheal intubation.

#### PROCEDURE

1. Pre-oxygenate the patient, if possible, with 100% oxygen while assembling equipment.
2. Use universal precautions (eye protection, mask, gloves, etc.).
3. If C-spine injuries are **NOT** suspected:
  - a. Position the patient's head and neck by placing the head into a "sniffing position". Flexing the neck forward and the head backward can accomplish this.

**(Continued next page)**

**AIRWAY MANAGEMENT / INTUBATION - ENDOTRACHEAL (cont.)**

- b. Insert the laryngoscope blade into the right side of the patient's mouth and with a sweeping action displace the tongue to the left. Manipulate the blade to expose the vocal cords.
- c. Insert the endotracheal tube once vocal cords have been visualized to a depth that allows for good ventilation of both lungs.
- d. Suction as needed.
- e. Apply Sellick maneuver as needed.

**Note: If C-spine injuries are suspected, manually stabilize the patient's head to minimize C-spine movement.**

4. Inflate the cuff and ventilate the patient with a BVM. Listen for lung and epigastric sounds and observe for bilateral chest rise. The tube must be inserted into the trachea, therefore it is *imperative* that correct placement is verified by visualization of the tube passing through the vocal cords, assessment of adequate lung sounds and absence of epigastric sounds. Pulse oximetry, capnography, and/or any end tidal CO<sub>2</sub> detector is highly recommended to confirm adequate tube placement and oxygenation.
5. After assessing tube placement, do one of the following:
  - a. If you are confident the tube is in the trachea, inflate cuff with 5-10 cc's of air. Ventilate again repeating step 4. If still confident, continue ventilating with 100% oxygen. Secure the tube.
  - b. If you are in doubt and suspect esophageal placement, remove tube, oxygenate the patient and consider another attempt at intubation, or insert another airway device.
6. Check periodically to ensure proper tube placement and cuff inflation.

**SPECIAL CONSIDERATION**

1. Time is lost when equipment malfunctions. All equipment should be inspected at the beginning of every work shift.
2. Endotracheal intubation requires direct visualization of the vocal cords, which requires practice to eliminate improper placement and oral trauma.
3. Significant decrease in oxygenation can result from lengthy intubation efforts or failure to provide ventilatory support between attempts.
4. Patient movement may dislodge the tube. Every time the patient is moved, re-verification of tube placement is necessary.
5. ***Failure to recognize proper tube placement may result in patient death.***

**AIRWAY MANAGEMENT*****INTUBATION - NASOTRACHEAL*****LEVEL OF AUTHORIZATION**

Paramedic

**RATIONALE**

Nasotracheal intubation should be used as an adjunct to maintain an open airway, while isolating the gastrointestinal tract from the respiratory tract in patients that are unable to protect their own airway due to a decreased level of consciousness, edema or constrictive airway conditions.

**DESIRED EFFECT**

When properly placed, this device should prevent aspiration of stomach contents, prevent gastric distention and provide a definitive airway for adequate ventilations.

**INDICATIONS**

1. The patient is not apneic or in cardiac arrest, but is experiencing, or is likely to experience, upper airway compromise.
2. The patient has edema, which may result in complete obstruction.
3. The patient's mouth cannot be opened.
4. The patient has oral or maxillofacial fractures.
5. The patient is conscious or unconscious, but unable to protect their airway.

**CONTRAINDICATIONS**

1. Apnea
2. Nasal fractures
3. Basilar skull fractures
4. Nasal obstruction
5. Deviated nasal septum

**(Continued next page)**

**AIRWAY MANAGEMENT / INTUBATION - NASOTRACHEAL (cont.)****PROCEDURE**

1. Pre-oxygenate the patient, if possible, with 100% oxygen while assembling equipment.
2. Use universal precautions (eye protection, mask, gloves, etc.).
3. Administer **PHENYLEPHRINE (IN)** [1-2 "squirts"] in the nostril used for insertion.
4. Lubricate the ET tube with a water-soluble solution. (Pre-insertion of a nasopharyngeal airway into the selected nostril may be considered and removed prior to insertion of the ET tube).
5. Place the patient's head and neck into a relaxed position. If spinal injury is possible, use "C" spine precautions.
6. Insert the ET tube into the selected nostril along the floor of the nostril or facing the nasal septum to avoid damage to the turbinates. Have suction ready. Vomiting and bleeding in the posterior pharynx may occur, secondary to trauma from insertion of the tube.
7. As the tube passes into the posterior pharynx, auscultate for respiratory sounds with a stethoscope or other device. With the next inhaled breath, advance the tube into the glottic opening until the distal cuff is just past the vocal cords. At this point, the patient may cough, or strain. Esophageal placement may cause gagging.
8. Ventilate the patient prior to inflating the cuff, listen for lung and epigastric sounds, and observe for bilateral chest rise. The tube must be inserted into the trachea, therefore it is *imperative* that correct placement is verified assessment of adequate lung sounds and absence of epigastric sounds. Pulse oximetry, capnography, and/or any end tidal CO<sub>2</sub> detector is highly recommended to confirm adequate tube placement and oxygenation.
9. After assessing tube placement, do one of the following:
  - a. If you are confident the tube is in the trachea, inflate cuff with 5- 10 cc's of air. Ventilate again repeating step 8. If still confident, continue ventilating with 100% oxygen. Secure the tube.
  - b. If you are in doubt and suspect esophageal placement, remove tube, oxygenate the patient and consider another attempt at intubation, or insert another airway device.
10. Check periodically to ensure proper tube placement.

(Continued next page)

**AIRWAY MANAGEMENT / INTUBATION - NASOTRACHEAL (cont.)****SPECIAL CONSIDERATION**

1. Nasotracheal intubation is more time consuming than orotracheal intubation. The patient should be breathing adequately enough to hear air exchange during insertion.
2. It is potentially more traumatic for patients.
3. "Blind" nasotracheal intubation requires that the patient be breathing.
4. Significant decrease in oxygenation can result from lengthy intubation efforts or failure to provide ventilatory support between attempts.
5. Patient movement may dislodge the tube. Every time the patient is moved, re-verification of tube placement is necessary.
6. *Failure to recognize proper tube placement may result in patient death.*

## AIRWAY MANAGEMENT

### *CRICOTHYROTOMY*

#### LEVEL OF AUTHORIZATION

Paramedic

#### RATIONALE

Cricothyroidotomy is a surgical procedure that allows a rapid entrance to the trachea for ventilatory purposes for patients who cannot be intubated, orally or nasally, but are in need of airway management. See Indications.

#### DESIRED EFFECT

When properly performed, this procedure should prevent aspiration of stomach contents, prevent gastric distention and provide a definitive airway for adequate ventilations.

#### INDICATIONS

1. Severe facial or nasal injuries that make oral or nasal intubation impossible.
2. The patient's airway cannot be adequately managed by any conventional means.
3. Foreign body obstruction of the upper airway that cannot be removed by conventional means.
4. Laryngeal edema resulting in occlusion of the upper airway.
5. Crushing injuries to the neck resulting in obstruction.

#### CONTRAINDICATIONS

1. Inability to identify anatomical landmarks due to disease or trauma.
2. Children under 12 years of age.

#### PROCEDURE

1. Assemble equipment:
  - a. Scalpel and blade
  - b. Large curved hemostats or extra scalpel handle
  - c. Small ET tube (up to 6.0 in adults) or tracheotomy tube, if available
  - d. Antiseptic solution, 4X4 dressings
  - e. Ventilatory device with oxygen source

**(Continued next page)**

**AIRWAY MANAGEMENT / CRICOTHYROTOMY (cont.)**

2. Expose the neck and identify the trachea. Palpate the prominent thyroid notch superior and the cricoid cartilage inferior. In the space between the two lies the cricothyroid membrane.
3. Make a vertical incision and expose the anatomy. When cricothyroid membrane has been exposed, make horizontal incision (approximately ½ inch) through the cricothyroid membrane. Incise as close to the cricoid cartilage as possible until opening is sufficient enough to allow passage of ET tube.
4. Maintain the opening with the scalpel handle, hemostats or gloved finger.
5. Insert the ET tube about 1-1/2 inches into the trachea.
6. Check breath sounds, inflate cuff if present, and ventilate patient with high flow oxygen and ventilatory device. The tube must be inserted into the trachea, therefore it is *imperative* that correct placement is verified by assessment of adequate lung sounds and absence of epigastric sounds. If lung sounds present, secure tube. Pulse oximetry, capnography, and/or any end tidal CO<sub>2</sub> detector is highly recommended to confirm adequate tube placement and oxygenation.
7. Control bleeding and dress wound.

## AEROMEDICAL REQUEST

### LEVEL OF AUTHORIZATION

FR, Basic, Intermediate & Paramedic

### RATIONALE

Aeromedical transport is an option that should be considered when a patient's illness or injury requires immediate hospital intervention. It may also be applicable in cases where ground transport may not be feasible or available. Aeromedical response to many areas of the state would exceed the time necessary to transport by ground ambulance to a medical facility. However, under some circumstances this service should be considered such as in multiple casualty incidents, prolonged extrication, poor road conditions, and heavy traffic conditions. **In some situations, it may be preferable to begin transport and have the aeromedical service meet the ambulance at a pre-determined location.**

### DESIRED EFFECT

Aeromedical transport services should be notified early to standby for anticipated use during an EMS response to a potentially life-threatening incident. This early notification combined with a rapid request for actual aeromedical response when it is determined that the situation dictates its use, should decrease the time from the onset of injury or illness until definitive patient care can be provided in an appropriate medical facility.

### INDICATIONS

1. Multiple casualty incidents involving critical patients.
2. Prolonged extrication of critical patients.
3. Poor road conditions that would make it difficult to respond with an ambulance to or from the scene.
4. Heavy traffic conditions that would increase response and transport times considerably.
5. Patients whose condition warrants immediate medical attention available only at a distant medical facility.

### CONTRAINDICATIONS

1. None when necessary. However unsafe flying conditions and landing areas must be considered for the safety of the flight crew and aircraft.

**(Continued next page)**

**AEROMEDICAL REQUEST (cont.)****PROCEDURE**

1. Requests for and cancellations of aeromedical transport may be made by:
  - a. All requests shall be made through the Metro Dispatch Center
  - b. The authority for requesting and cancelling the dispatch of a helicopter for patient transport shall be the responsibility of:
    - i. The responding agency
    - ii. EMS/Fire personnel
    - iii. Law Enforcement
    - iv. Incident commander
2. Diverting of aeromedical transport aircraft:
  - a. When aeromedical response exceeds ground transport time.
  - b. When requested only by highest on scene EMS provider after patients have been transported or to be intercepted with when ground and air units are in direct radio contact.
3. Safety concerns should be discussed and addressed prior to arrival of the aircraft:
  - a. Landing zone should be blocked off for bystander safety.
  - b. Approach the aircraft only when signaled by a member of the flight crew.
  - c. Only essential personnel should approach the aircraft.
  - d. Do not approach from the rear of the aircraft.
  - e. Use extreme caution in windy conditions, may cause overhead blades to dip.
  - f. Wear ear and eye protection, and secure hats or head cover.
  - g. On sloping landing zone, approach from the downhill slope.
4. Requirements for establishing a landing zone:
  - a. 100' X 100' fairly flat area.
  - b. Area should be clear of overhead obstacles such as wires.
  - c. Protection for patient from noise and wind
  - d. Remove debris from landing area
5. Never approach the aircraft until signaled to do so by the flight crew.

## CAPNOGRAPHY

### LEVELS OF AUTHORIZATION

FR, Basic, Intermediate & Paramedic

### RATIONALE

End-tidal carbon dioxide (ETCO<sub>2</sub>) is the measurement of carbon dioxide in the airway at the end of each breath. Capnography provides a numeric reading (amount) and graphic display (waveform) of the ETCO<sub>2</sub> throughout the respiratory cycle. ETCO<sub>2</sub> is very useful in both the intubated and non-intubated patient for determining ventilation adequacy and perfusion. In order for there to be measurable CO<sub>2</sub>, there must be cardiac output (even compressions), lungs that are being ventilated and perfused, and a way for the CO<sub>2</sub> to be excreted (airway).

### INDICATIONS

1. All patients with a potential, or actual, change in metabolism, circulatory, and/or respiratory function
2. Hypoventilation states
3. Shock states
4. Bronchospastic disease
5. Chest pain with respiratory distress
6. Congestive Heart Failure
7. **All patients with advanced airways or receiving CPR**
8. Patients experiencing altered mental status
9. Any patient having received narcotic or benzodiazepine medications

### CONTRAINDICATIONS

1. None

### NOTES/PRECAUTIONS

1. A patient with normal cardiac and pulmonary function will have an ETCO<sub>2</sub> level between 35-45 mmHg. When no CO<sub>2</sub> is detected, 3 factors must be quickly evaluated for cause
  - a. Loss of airway function- Improper tube placement, apnea
  - b. Loss of circulatory function- Massive PE, cardiac arrest, exsanguination
  - c. Equipment malfunction- Tube dislodgement or obstruction
2. All intubated patients will have capnography (when available) applied and a printed copy of the post intubation capnography wave/numerical value will be obtained/documentated.

(Continued next page)

**CAPNOGRAPHY(cont.)****PROCEDURE**

1. Turn on monitor and adjust contrast as needed.
2. Verify ETCO<sub>2</sub> display is on and functioning.
3. Open tubing connector door and connect ETCO<sub>2</sub> Filterline tubing by turning clockwise.
  - a. Tubing should be connected to monitor before being connected to patient's airway.
4. Connect tubing to patient airway.
5. Record waveform and ETCO<sub>2</sub> level.

## **CAPNOMETRY**

### **LEVELS OF AUTHORIZATION**

FR, Basic, Intermediate & Paramedic

### **RATIONALE**

End-tidal carbon dioxide (ETCO<sub>2</sub>) detectors measure the concentration of exhaled carbon dioxide and are extremely useful in assessing proper placement of an endotracheal tube. An absence of measured carbon dioxide in the patient's exhaled air may indicate tube placement in the esophagus, while the presence of carbon dioxide after six full breaths usually indicates proper tracheal placement. Proper tube placement is confirmed by a color change in the colorimetric device by a reaction of CO<sub>2</sub> with the litmus paper inside the detector. As with pulse oximetry, an ETCO<sub>2</sub> detector is an addition to other methods (direct visualization, bilateral breath sounds, etc.) for confirmation of proper endotracheal tube placement.

### **INDICATIONS**

1. As an adjunct to confirm proper tube placement on all advanced airway devices.
2. On intubated patients to detect approximate ranges of end-tidal CO<sub>2</sub> when measurement may be clinically significant.

### **CONTRAINDICATIONS**

1. Not used to detect main-stem bronchial intubation.
2. Not for use during mouth-to-tube ventilation.

### **NOTES/PRECAUTIONS**

1. Due to potential increased airway resistance, do not use Pedi-Cap on patients weighing >15 kg.
2. Reflux of gastric contents, mucous, edema fluid, endotracheal medication administration, or nebulization can discolor detector. Contamination of this type may increase resistance, alter color changes, and affect ventilation. If this occurs, discard the device.

**(Continued next page)**

**CAPNOMETRY(cont.)****PROCEDURE**

1. Select appropriate detector according to patient size and weight. Remove detector from packaging.
  - a. Patients >15 kg - Easy-Cap
  - b. Patients <15 kg - Pedi –Cap
2. Match initial color of indicator to the PURPLE color labeled CHECK around the detector window.
  - a. If the purple color of the indicator is not the same color, or darker, than the area marked CHECK, do not use the detector.
  - b. If the indicator color appears pink, the separate color chart for fluorescent light must be used for accurate color matching.
3. Deliver six ventilations of moderate tidal volume.
  - a. Interpreting results before confirming 6 breath cycles can yield false results.
4. After six breaths, attach detector to endotracheal tube; then attach BVM to the detector.
5. Compare indicator color in the window on full-end expiration. If CO<sub>2</sub> is detected, the PURPLE CHECK color will change to GOLD (Range C).
6. If the results are not conclusive, and correct anatomic location cannot be confirmed with certainty by other means, the endotracheal tube should be immediately removed and reinserted.

## CARDIAC MONITORING

### LEVEL OF AUTHORIZATION

FR, Basic, Intermediate & Paramedic

### RATIONALE

Cardiac monitoring should be used at any time there is a possible cardiac problem such as chest pain, irregular pulse, decreased LOC, abnormal blood pressure, or a history of cardiac problems. It can also be considered as an adjunct for patients with severe trauma, **but should not precede emergency procedures.**

### DESIRED EFFECT

Cardiac monitoring, when performed correctly, should provide a mechanism for monitoring and documenting cardiac activity in the pre-hospital environment. This may be accomplished several ways, including printed EKG rhythm strips, internal recordings, or telemetry.

### INDICATIONS

1. Possible cardiac problems with associated chest pain, or signs and symptoms associated with a silent AMI
2. Suspected drug overdose
3. Hypertension/CVA/TIA
4. Head injury
5. Chest trauma
6. Respiratory problems
7. Metabolic problems (dehydration, DKA, acidosis, etc.)
8. Abdominal pain

### CONTRAINDICATIONS

None when indicated. Caution should be used when placing electrodes on skin damaged from trauma, burns, or chemicals. Cardiac monitoring, if indicated, should not delay emergency treatment or delay transport.

**(Continued next page)**

**CARDIAC MONITORING (cont.)****PROCEDURE**

1. Make sure the skin is free of debris that will interfere with electrode contact (sweat, body hair, dirt, etc.)
2. Attach electrodes to skin surface and attach leads to the monitor and patient.
3. Turn on monitor; adjust the gain or sensitivity to the proper level.
4. Record and report rate, regularity, origin of electrical activity and note any ectopy.
5. If possible, tracings should be printed before, during, and after delivery of procedures or medication.
6. Tracings should be printed to document a change in rhythm, rate, or any significant irregularity.
7. Label strip with time, patient name.

**12-Lead EKG**

1. With the advent of thrombolytic therapy, early diagnosis of acute myocardial infarction has become more important. American Heart Association guidelines recommend a "door-to-drug time" of 30 minutes for thrombolytic administration. A pre-hospital 12-lead could speed diagnosis and shorten time until thrombolysis.
2. A 12-lead EKG is not a treatment and should be considered only if time and personnel are available. Do not attempt to obtain a 12-lead unless all other appropriate assessment and treatment guidelines have been met. For example, a 12-lead is of no value in cardiac arrest unless there is a return of a spontaneous pulse.

**PROCEDURE**

1. Placement of limb leads:
  - a. Follow manufacturers recommendations
  - b. Left deltoid
  - c. Left side anterior below waistline
  - d. Right side anterior below waistline

**(Continued next page)**

**CARDIAC MONITORING (cont.)**

2. Placement of precordial leads:
  - a. V1 fourth intercostal space to right of sternum
  - b. V2 fourth intercostal space to left of sternum
  - c. V3 between V2 and V4
  - d. V4 fifth intercostal space midclavicular
  - e. V5 between V4 and V6
  - f. V6 fifth intercostal space midaxillary

## **CARDIAC PACING-TRANSCUTANEOUS**

### **LEVEL OF AUTHORIZATION**

Paramedic

### **RATIONALE**

Transcutaneous (external) pacing provides a safe method of increasing the heart rate on patients with symptomatic bradycardias, including high degree AV blocks.

### **DESIRED EFFECT**

During transcutaneous pacing, the heart is stimulated with externally applied cutaneous electrodes that deliver an electrical impulse at a controlled rate. When performed correctly, the external pacemaker should control the patient's heart rate, and mechanical activity until definitive treatment is available. This should cause an increase in both pulse rate and blood pressure, along with increased LOC.

### **INDICATIONS**

1. Hemodynamically significant bradycardias that have not responded to pharmacologic therapy.
2. "Overdrive" pacing (limited by the maximum pacing rate of the device) to terminate malignant supraventricular and ventricular tachycardias.
3. Metabolic disturbances causing symptomatic bradycardias.

### **CONTRAINDICATIONS**

1. Severe hypothermia
2. Cardiac arrest
3. Bradycardia in children unless hypoxia or hypoventilation has been ruled out.

**(Continued next page)**

**CARDIAC PACING-TRANSCUTANEOUS (cont.)****PROCEDURE**

1. Initiate IV, oxygen, and EKG monitoring
2. Run an initial strip as soon as monitor is attached to the patient. Use multiple leads in viewing cardiac electrical activity.
3. If the patient is conscious, explain the procedure.
4. Obtain vital signs.
5. Apply the transcutaneous pacing electrodes, insuring sufficient contact with patient's skin to allow complete electrical flow.
6. Turn pacer **ON** and set **PACING RATE** at 60 - 70 per minute.
7. Increase **CURRENT** until electrical capture is achieved.
8. Electrical capture is verified by noting whether or not a QRS complex follows every pacemaker spike. Use the minimal energy level required to get capture. Check for mechanical capture by palpating for a pulse that corresponds with the cardiac monitor.
9. Monitor the patient's condition, maintaining a close watch on pulse rate and blood pressure.
10. In the hemodynamically stable patient that is conscious and exhibits signs of discomfort, consider analgesia and/or sedation.

**SPECIAL CONSIDERATION**

1. Re-verify mechanical and electrical capture after any patient movement.

## CARDIOVERSION

### LEVEL OF AUTHORIZATION

Paramedic

### RATIONALE

Cardioversion (synchronized electrical shock) is used to terminate tachycardias, other than pulseless ventricular tachycardia and ventricular fibrillation, in patients who are hemodynamically unstable or do not respond to pharmacological intervention. Synchronization reduces the chances that a shock will induce VF.

### DESIRED EFFECT

Successful cardioversion should immediately terminate the tachycardia and decrease the potential for development of secondary complicating dysrhythmias.

### INDICATIONS

1. Supraventricular tachycardia in a patient who is hemodynamically unstable.
2. Atrial fibrillation or atrial flutter with a rapid ventricular response > 150.
3. Ventricular tachycardia with a pulse.

### CONTRAINDICATIONS

1. Ventricular tachycardia without a pulse.
2. Contraindicated (relative) when digitalis toxicity is suspected as the cause of the rhythm. When patient is decompensated and you suspect digitalis toxicity, give bolus of Lidocaine 1mg/kg before cardioverting and start at 50 joules.
3. Immediate cardioversion is usually not needed for rates <150. Consider other causes.

### PROCEDURE

1. Consider sedation with Midazolam or Diazepam (**follow Drug Guidelines**).
2. Turn on synchronizer switch. Set the energy level to 50-100 joules mono-phasic and follow manufacturers recommendations for biphasic monitors for adults; 1-2 joules/kg for children.

(Continued next page)

**CARDIOVERSION (cont.)**

3. Make sure the sync mode is capturing. The gain may have to be adjusted to increase the "size" of the QRS to allow for synchronization.
4. If using paddles, use electrode gel or other conductive material. Apply paddles to chest with firm pressure (approximately 25 pounds).
5. If using defibrillation pads, position pads appropriately.
6. Call clear, and ensure that the patient area is clear.
7. Depress the discharge button and continue to hold until the energy is discharged (there may be a short delay).
8. If rhythm is unchanged, repeat cardioversion at higher energy level.
9. If rhythm changes, follow appropriate guidelines.
10. If the device is unable to synchronize due to irregularity of the rhythm (polymorphic ventricular tachycardia) and no firing occurs, deliver an unsynchronized shock.

## **CHEST INJURIES MANAGEMENT**

### **LEVEL OF AUTHORIZATION**

FR, Basic, Intermediate, Paramedic

### **RATIONALE**

Chest trauma may result from either a blunt, penetrating, barotraumas, or CBRNE (Chemical, Biological, Radiological, Nuclear, and Explosives) environment. Treatment should be focused at ensuring both ventilatory and oxygenation status in the patient.

### **DESIRED EFFECT**

The patient will maintain an adequate ventilatory rate and volume. The patient will maintain adequate oxygenation status. Quantitative and qualitative assessment measures may be used to determine the effectiveness of treatment.

### **INDICATIONS**

The patient will present with a history, or signs and symptoms of the following conditions

1. Flail chest
2. Open chest wound
3. Barotrauma event such as an explosion or dive related issue
4. Exposure to chemical particulate or fumes

### **CONTRAINDICATIONS**

1. There are no absolute contraindications.

### **PROCEDURE**

All chest trauma patients should be expeditiously transported to the closest available trauma center for management and stabilization. Consider ALS intercept if available.

1. Flail Chest
  - a. All patients should initially be placed on 100% oxygen via a non-rebreather face mask. Maintain oxygen saturation 94% or above if quantitative measurement is available.

**(Continued next page)**

**CHEST INJURIES (cont.)**

- b. Intubation and mechanical ventilation are rarely indicated for chest wall injury alone. Where ventilation is necessary it is usually for hypoxia due to underlying pulmonary contusions. Positive pressure ventilation may be required for severe chest wall instability resulting in inadequate ventilatory volume.
    - c. Provide analgesia per local protocol
  2. Simple Pneumothorax:
    - a. All patients should initially be placed on 100% oxygen via a non-rebreather face mask. Maintain oxygen saturation 94% or above if quantitative measurement is available.
    - b. Observe for progression from simple pneumothorax to tension pneumothorax.
  3. Tension Pneumothorax:
    - a. All patients should initially be placed on 100% oxygen via a non- rebreather face mask. Maintain oxygen saturation 94% or above if quantitative measurement is available.
    - b. Treat according to pleural decompression protocol. (Paramedic only)
  4. Open Chest Wound
    - a. All patients should initially be placed on 100% oxygen via a non- rebreather face mask. Maintain oxygen saturation 94% or above if quantitative measurement is available.
    - b. Apply an occlusive dressing over the wound and tape on 3 sides. This, in theory, acts as a flap-valve to allow air to escape from the pneumothorax during expiration, but not to enter during inspiration.
    - c. Monitor closely for development of simple pneumothorax, or progression of simple pneumothorax to tension pneumothorax.
  5. Barotrauma: Barotrauma may be associated with either diving related incidents, or as a result of a CBRNE (Chemical, Biological, Radiological, Nuclear, Explosives) event. CBRNE events may also present with associated pulmonary edema due to chemical or heat effects. If a CBRNE event has occurred, provider safety is paramount, and the patient must be adequately decontaminated.

**(Continued next page)**

**CHEST INJURIES (cont.)**

- a. All patients should initially be placed on 100% oxygen via a non-rebreather face mask. Maintain oxygen saturation 94% or above if quantitative measurement is available.
- b. Monitor closely for development of simple pneumothorax, or progression of simple pneumothorax to tension pneumothorax.
- c. Positive pressure ventilation and CPAP may cause and /or exacerbate underlying pneumothorax. Use with caution.
- d. Administer bronchodilators if bronchospasm or wheezing is noted.
- e. Diuretics have limited clinical effect and may exacerbate underlying electrolyte disturbance and or volume status.

## CHEST TUBE MONITORING

### LEVEL OF AUTHORIZATION

Paramedic

### RATIONALE

Trauma, disease, or surgical interventions can interrupt the closed negative-pressure system of the lungs which may result in total collapse of the lung. A chest tube, along with a closed chest drainage system, is attached to promote drainage of air and fluid which may leak into the pleural cavity. Chest tubes must be closely monitored for patency to prevent pneumothorax or hemothorax and promote lung re-expansion.

### DESIRED EFFECT

When monitored properly, air and fluids are removed from the pleural space and normal intra-pleural and intra-pulmonic pressures are maintained.

### INDICATIONS

Inter-facility transfers requiring monitoring of a pre-established, patent chest tube.

### CONTRAINDICATIONS

None, when the chest tube is indicated and must be monitored.

### PROCEDURE

#### A. Monitoring:

1. Monitor the patient's vital signs (SpO<sub>2</sub> and ETO<sub>2</sub> if available) and breath sounds over affected lung area.
2. Assess for increasing respiratory distress and/or chest pain.
3. Observe the following:
  - a. Chest tube dressing for leakage.
  - b. If necessary, remove dressing and inspect tube at the entrance of the thorax for loose sutures and tube displacement.
  - c. Patency of the tube (kinks, dependent loops or clots).
    - i. Water level in the water seal should fluctuate with breathing, rising with inspiration and falling with expiration. If patient is on mechanical ventilation, this pattern is reversed because of the positive pressure.
    - ii. Fluctuations stop when the lung is fully re-expanded, or when tube is kinked.
  - d. **Drainage system, which should be upright and below the level of the tube insertion.**
4. Chest tubes should only be clamped (toothless clamps) under specific circumstances:

(Continued next page)

**CHEST TUBE MONITORING (cont.)**

- a. To assess for air leaks.
  - b. To rapidly empty or change collection bottle or chamber.
  - c. To change disposable systems. Have the new system ready to be connected before clamping the tube.
5. Position the patient to permit optimal drainage (do not remove LSB/Immobilization equipment on trauma patients):
    - a. Semi-Fowler's position to evacuate air (pneumothorax).
    - b. High Fowler's position to drain fluid (hemothorax).
  6. Assure tube connection between chest and drainage tubes are intact, taped well and secured in multiple locations.
    - a. Water seal vent must be without occlusion.
    - b. Suction control chamber vent must be without occlusion when suction is used.
    - c. Suction should be 15-30 cm H<sub>2</sub>O and intermittent.
  7. Coil excess tubing on mattress next to patient and secure to gurney, assure there is a dependent loop.
  8. Adjust tubing to hang in a straight line from the top of the mattress to the drainage chamber.
- B. Troubleshooting:

**Air Leak:**

1. In patients receiving mechanical ventilation with PEEP, if continuous bubbling is seen in water-seal bottle/chamber, a possible leak exists between the patient and water seal.
  - a. Locate leak.
  - b. Tighten loose connection between patient and water seal.
  - c. Leak is corrected when constant bubbling is stopped.
2. Bubbling continues, indicating that the air leak has not been corrected.
  - a. Cross-clamp chest tube at the dressing site. If bubbling stops, air leak is inside the patient's thorax (lung) or at the chest tube insertion site.
  - b. Unclamp tube and notify medical control immediately. **Leaving the chest tube clamped may cause a tension pneumothorax.**
  - c. Reinforce chest dressing.
3. The bubbling continues, indicating that the leak is not in the patient's chest or at the insertion site.
  - a. Gradually move clamps down drainage tubing away from the patient and toward the suction-controlled chamber, moving one clamp at a time.
  - b. When bubbling stops, leak is in the section of tubing or connection distal to the clamp.
  - c. Replace tubing or secure connection and release clamp.

**(Continued next page)**

**CHEST TUBE MONITORING (cont.)**

4. Bubbling continues, indicating that the leak is not in the tubing.
  - a. Check the drainage system for leak.
  - b. Change the drainage system if indicated.

**Tension Pneumothorax Develops:**

1. If severe respiratory distress or chest pain develops:
  - a. Determine that the chest tubes are not clamped, kinked or occluded.
  - b. Correct problem if found.
  - c. Do not “milk” the chest tube if a clot is found without first clamping the tube proximal of clot.
2. Absence of breath sounds on affected side:
  - a. Notify medical control immediately
3. Hyper-resonance on affected side, mediastinal shift to unaffected side, tracheal shift to unaffected side, hypotension or tachycardia is present:
  - a. Contact Medical Control and consider **chest decompression** on the affected side.

**Water Seal (if water bottle system is used)**

1. Water-seal bottle is broken.
  - a. Insert distal end of water-seal tube into sterile solution so that tip is 2 cm below surface.
  - b. If no sterile solution is available, double clamp chest tube while preparing new bottle.
  - c. Replace bottle and release clamps.
2. Water-seal tube is no longer submerged in sterile fluid:
  - a. Add sterile solution to water-seal bottle until distal tip is 2 cm below surface.
  - b. Set water-seal bottle upright so that tip is submerged.

**Note: If unable to determine location of equipment leak or malfunction, clamp tube, disconnect device at proximal connection and replace with Heimlich Valve. Unclamp tube, reassess patient.**

**Note: Consider placement of Heimlich Valve in series between patient and Pleura-Vac/Atrium type device as a safety mechanism.**

**Chest Tube Inadvertently Pulled (Partial or Complete):**

1. Identify if leak in system exists. (If proximal tube port is not outside pleural cavity, tube is still functional).
2. If a leak exists, gently remove tube completely and rapidly close surgical site with direct pressure and occlusive dressing.
3. Notify Medical Control and consider diversion to closer facility.
4. Be prepared to emergently decompress for tensioning.

## COMMUNICATIONS - HOSPITAL

### LEVEL OF AUTHORIZATION

FR, Basic, Intermediate & Paramedic

### RATIONALE

Voice contact should be made with the receiving hospital as soon as possible to allow the hospital time to prepare for the patient's arrival (staff, appropriate treatment room, etc.) and at any time when medical information or advice is needed to supplement or clarify written protocols.

### DESIRED EFFECT

Patient care should be transferred from prehospital providers to hospital providers in an informed and efficient manner. This allows for an excellent continuum of care leading to a more positive outcome. Prehospital decision making will be more informed, thus reducing chances for incorrect treatment modalities.

### INDICATIONS

Communication with the receiving facility should be performed on every call, including calls involving refusal of service. The emergency department should be contacted as soon as possible on all incidents involving multiple patients. On-line medical control should be consulted, if possible, with questions on treatment.

### CONTRAINDICATIONS

None when used appropriately.

### PROCEDURE

1. Communication may be in the form of radio (UHF or VHF), cellular telephone, or conventional telephone.
2. The following information should be included in voice communications:
  - a. Name of receiving hospital.
  - b. Identify ambulance service and unit number.
  - c. Number of patients.
  - d. Patients age and sex.
  - e. Chief complaint or problem.
  - f. Physical findings.
  - g. Vital signs and LOC.

(Continued next page)

**COMMUNICATIONS – HOSPITAL (cont.)**

- h. Pertinent history, as needed, to clarify problem (i.e. mechanism of injury, nature of illness, OPQRSTU, SAMPLE).
  - i. Treatment given and patient's response.
  - j. Estimated time of arrival.
3. If applicable, advise the emergency department of any pertinent changes in patient's condition during transport.
4. Verbal communication of patient condition and written report should be given to ER nurse or physician.

**SPECIAL CONSIDERATIONS**

1. Situations may exist when radio communications should not preclude patient care, either by pre-hospital or emergency department personnel, due to insufficient manpower or difficult terrain.
2. Consider the use of Santa Fe control or other dispatch agency to relay information when direct communication is not possible.

## **CPAP - CONTINUOUS POSITIVE AIRWAY PRESSURE**

### **LEVEL OF AUTHORIZATION**

FR, Basic, Intermediate & Paramedic

### **RATIONALE**

Continuous Positive Airway Pressure Ventilation (CPAP) is an effective way to treat Congestive Heart Failure/Pulmonary edema by providing high flow/low pressure oxygenation. It reduces the work of breathing and increases the functional residual capacity (FRC is the amount of air remaining after exhalation) by distending airways and alveolus to increase gas exchange. It facilitates movement of water from less compliant interstitial spaces to more compliant interstitial spaces increasing oxygenation and improving lung compliance.

### **INDICATIONS**

1. Congestive Heart Failure
2. Pulmonary edema associated with volume overload
3. Submersion / Drowning
4. Chronic Obstructive Pulmonary Disease
5. Acute Respiratory Distress

### **CONTRAINDICATIONS**

1. Respiratory arrest
2. Agonal respirations
3. Hypoventilation
4. Unconsciousness
5. Shock associated with cardiac insufficiency
6. Pneumothorax
7. Facial trauma, burns

**(Continued next page)**

**CPAP - CONTINUOUS POSITIVE AIRWAY PRESSURE (cont.)****NOTES/PRECAUTIONS**

1. Possible complications include:
  - a. Gastric distention
  - b. Reduced cardiac output
  - c. Hypoventilation
  - d. Pulmonary barotrauma
  - e. Fluid retention
  
2. If systolic Blood Pressure is less <90 mm/Hg contact MCEP

**PROCEDURE**

1. Connect the generator to 50 psi oxygen outlet.
2. Attach the Mask.
3. Attach the PEEP Valve package with CPAP Circuit.
4. Attach the filter to the air entrapment port.
5. Once patient is comfortable with mask, securely attach head piece and tighten to desired fit.
6. Use CPAP device per manufacturer's recommendations.

## DEFIBRILLATION - MANUAL

### LEVEL OF AUTHORIZATION

Paramedic

### RATIONALE

The most frequent initial rhythm in sudden cardiac arrest is ventricular fibrillation (VF). The most effective treatment for VF or pulseless ventricular tachycardia (VT) is defibrillation. The effectiveness of defibrillation rapidly diminishes after the patient goes into cardiac arrest. The sooner a patient can be defibrillated after arresting, the greater the chance for conversion and subsequent survival with an intact neurological status.

### DESIRED EFFECT

Time and cause of cardiac arrest are critical factors that affect survival. If performed correctly and quickly, assuming that damage to the myocardium is not too severe, defibrillation depolarizes the cells in the electrical conduction system simultaneously to allow for return of an organized rhythm.

### INDICATIONS

1. Patients in cardiopulmonary arrest, with no advanced directives, who are in VF or VT.

### CONTRAINDICATIONS

1. Patient is in cardiopulmonary arrest, but is not in ventricular fibrillation or ventricular tachycardia.
2. Patient is in an environment that is unsafe for defibrillation (i.e., lying in water, ungrounded conductive surface, etc.).

### PROCEDURE

1. Place the patient and rescuers in a safe environment.
2. Expose the chest and make sure it is free from sweat or objects that will impede electrical current.
3. Apply conductive gel to the defibrillator paddles or appropriate pads to the chest.

(Continued next page)

**DEFIBRILLATION - MANUAL (cont.)**

4. Turn on the defibrillator and ensure you are monitoring the EKG through the appropriate leads or paddles.
5. Select the energy level as per manufacturer recommendations. Charge the device.
6. If paddles are being used, place them in the proper position and apply firm downward pressure.
7. Make sure the patient and the area is clear by shouting "**CLEAR**" and looking to the feet then head.
8. Deliver the shock by depressing discharge button.
9. After the defibrillation, immediately resume CPR for 5 cycles.
10. Re-evaluate the patient and repeat if indicated.

## **DEFIBRILLATION – SEMI-AUTOMATIC**

### **LEVEL OF AUTHORIZATION**

FR, Basic, Intermediate & Paramedic

### **RATIONALE**

The most frequent initial rhythm in sudden cardiac arrest is ventricular fibrillation (VF). The most effective treatment for VF or pulseless ventricular tachycardia (VT) is defibrillation. The effectiveness of defibrillation rapidly diminishes after the patient goes into cardiac arrest. The sooner a patient can be defibrillated after arrest, the greater the chance for conversion and subsequent survival with an intact neurological status.

### **DESIRED EFFECT**

Time and cause of arrest are critical factors that affect survival. If performed correctly and quickly, assuming that damage to the myocardium is not too severe, defibrillation depolarizes the cells in the electrical conduction system simultaneously to allow for return of an organized rhythm.

### **INDICATIONS**

1. Patients in cardiopulmonary arrest, with no advanced directives

### **CONTRAINDICATIONS**

1. Patient is in an environment that is unsafe for defibrillation (i.e., lying in water, ungrounded conductive surface, etc.).

### **PROCEDURE**

1. Place the patient and rescuers in a safe environment.
2. Expose the chest and make sure it is free from sweat or objects that will impede electrical current.
3. Turn on the defibrillator.
4. Apply appropriate pads to the chest and attach to the device.
5. Initiate analysis of the rhythm.

**(Continued next page)**

**DEFIBRILLATION – SEMI-AUTOMATIC (cont.)**

6. Make sure the patient and the area is clear by shouting "CLEAR" and looking to the feet then head.
7. Deliver the shock by depressing the discharge button.
8. After the defibrillation, immediately resume CPR for 5 cycles.
9. Re-evaluate the patient and repeat if indicated.

## ENDOTRACHEAL MEDICATION ADMINISTRATION

### LEVEL OF AUTHORIZATION

Intermediate, Paramedic

### RATIONALE

Endotracheal (ET) administration of certain medications provides a rapid alternative when an IV/IO cannot be established and medications must be administered immediately. Absorption may be almost as fast as the IV route for some medications.

### DESIRED EFFECT

When performed properly, medication is absorbed into the pulmonary capillaries of the lungs.

### INDICATIONS

1. Intubated patient in cardiac or respiratory arrest without immediate IV access.
2. Intubated patient, with a need for immediate ET applicable medications.

### CONTRAINDICATIONS

1. Drugs that are not lipid-soluble.

### PROCEDURE

1. Drugs that may be administered via the ET route are **N**alaxone, **A**tropine, **V**asopressin, **E**pinephrine, and **L**idocaine.
2. Ensure adequate ventilation of the patient's lungs through the endotracheal tube.
3. Pre-oxygenate the patient while the medication is being prepared.
4. Remove the ventilation device and administer 2-2.5 times the normal dosage of medication ordered (diluted in normal saline with 10 ml total fluid per dose) down the ET tube using a catheter.
  - a. Epinephrine should be administered using 2 -2.5 mg of 1:1000 diluted in normal saline. (Children 0.1 mg/kg, 1:1000)
5. Resume positive pressure ventilations, administering several large volume ventilations to ensure that the medication gets into the pulmonary tree.

**Note: IV/IO is always the preferred medication route.**

## GASTRIC TUBES

### LEVEL OF AUTHORIZATION

Paramedic

### RATIONALE

Gastric tubes are used when the patient's stomach is severely distended or evacuation of gastric contents is necessary. The procedure should be attempted on conscious patients with an intact gag reflex or unconscious patients whose airway is protected.

### DESIRED EFFECT

When properly placed, the tube should allow for the evacuation of stomach contents without compromising the patient's airway.

### INDICATIONS

1. Evacuation of stomach contents, including air.
2. Administration of medication (activated charcoal).
3. Diaphragmatic hernia.
4. Other per MCEP.

### CONTRAINDICATIONS

1. Patients with severe facial trauma.
2. Epiglottitis or croup.

### PROCEDURE

1. Assemble equipment:
  - a. Gastric Tube
  - b. 50 ml irrigation syringe
  - c. Water soluble jelly
  - d. Gloves
  - e. Cup of water and straw, if possible
  - f. Adhesive tape
  - g. Saline for irrigation
  - h. Emesis basin

(Continued next page)

**GASTRIC TUBES (cont.)**

1. Use Universal Precautions.
2. If possible, have the patient sit upright with support.
3. Inspect the nose for deformity or obstruction and determine the best (biggest) nostril for insertion.
4. Measure the tube, from ear lobe to the tip of the nose to the "epigastrium mark" and mark the correct length on the tube.
5. Lubricate the tube with water-soluble gel (6-8 inches).
6. Insert the tube in the selected nostril gently towards the posterior nasopharynx while directing the tube towards the patient's ear.
7. When the tube has reached the nasopharynx, gently rotate 180 degrees.
8. Insert into the oropharynx and instruct the patient to swallow. **DO NOT FORCE.**
9. Continue insertion until the tube reaches the pre-measured point and aspirate stomach contents with a syringe.
10. Inject 30 cc of air and listen over the epigastric area for sounds.
11. If placement is correct, secure the tube properly (downward) and attach to low level suction.
12. Document the procedure.

**Note: The most lethal complication (while rare) of a Gastric tube is airway obstruction.  
Another possible complication is tracheal placement.**

## GLUCOMETRY

### LEVEL OF AUTHORIZATION

FR, Basic, Intermediate & Paramedic

### RATIONALE

Automated glucometry provides an indication of the patient's blood sugar level, and is used as an adjunct in decision making.

### DESIRED EFFECT

When performed properly, the glucometer should provide the user a quantitative blood glucose level in milligrams per deciliter. Normal for adults is 60-120 mg/deciliter. In the newborn < 40 mg / deciliter and in the child < 60 mg/deciliter are considered hypoglycemic.

### INDICATIONS

1. Suspected hypo/hyperglycemia.
2. Altered mental status.
3. Unconscious from an unknown cause.

### CONTRAINDICATIONS

None when indicated.

### PROCEDURE

1. Clean fingertip and allow thorough drying.
2. Apply personal protection equipment.
3. Pierce the side of the finger pad with lancet.
4. Obtain an adequate drop of blood for the "sample".
5. Apply drop to the test strip and insert into glucometer.
6. Dispose of sharps and biohazard waste in proper containers.
7. Note the reading on the glucometer.

## INJECTIONS

### *SQ & IM*

#### LEVEL OF AUTHORIZATION

FR, Basic, Intermediate, Paramedic

#### RATIONALE

When medication administration is necessary and the medication must be given via the SQ or IM route, or as an alternative route for selected medications when IV/IO access is not obtainable.

#### DESIRED EFFECT

When performed properly, subcutaneous and intramuscular medications are absorbed slowly into the bloodstream resulting in a delayed onset of action and prolonged effect.

#### INDICATIONS

1. Emergency administration of appropriate drugs when IV access is not or cannot be readily established, or in situations where SQ and IM are the required route of administration.

#### CONTRAINDICATIONS

1. No absolute contraindications.

#### PROCEDURE

1. Confirm medication order and route of administration.
2. Verify drug and concentration.
3. Using universal precautions draw up correct dose and make sure all air is expelled from the syringe.
4. Explain the procedure and desired effects to the patient. Reconfirm patient allergies.
5. The most common site for subcutaneous injection is the arm. Injection volume should not exceed 1 cc.

(Continued next page)

**INJECTIONS (SQ & IM) (cont.)**

6. The most common sites for intramuscular injection are the deltoid and thigh. Injection volume should not exceed 2 cc in the deltoid and 3 cc in the thigh.
7. The injection volume should not exceed 1 cc in pediatric patients.
8. Expose the selected area and cleanse the injection site with alcohol.
9. Reconfirm drug and drug dose.
10. Insert the needle into the skin with a smooth, steady motion as follows:
  - a. SQ: 45 degree angle
  - b. IM: 90-degree angle skin pinched up skin flattened
11. Aspirate for blood. If blood is noted, remove the needle and prepare a new syringe.
12. If no blood is noted, inject the medication.
13. Withdraw the needle quickly and dispose of all equipment properly into a sharps container. Do not recap the needle.
14. Apply pressure to the site until bleeding is stopped. Cover wound with a bandage.
15. Monitor the patient for the desired therapeutic effects as well as any possible side effects.
16. Document the medication, dose, route, time, and patient response.

## INJECTIONS

### *AUTO-INJECTORS*

#### LEVEL OF AUTHORIZATION

FR, Basic, Intermediate & Paramedic

#### RATIONALE

When medication administration is necessary and the medication must be given via the SQ or IM route, or as an alternative route for selected medications when IV access is not obtainable.

#### DESIRED EFFECT

When performed properly, subcutaneous and intramuscular medications are absorbed slowly into the bloodstream resulting in a delayed onset of action and prolonged effect.

#### INDICATIONS

1. Emergency administration of appropriate drugs when IV/IO access is not or cannot be readily established, or in situations where IM is the required route of administration.

#### CONTRAINDICATIONS

1. No absolute contraindications.

#### PROCEDURE

1. Confirm medication order and route of administration.
2. Verify drug and concentration.
3. Explain the procedure and desired effects to the patient. Reconfirm patient allergies.
4. Remove the auto-injector from its package.
5. Grasp the auto-injector with the thumb and first two fingers.
6. DO NOT cover or hold the needle end with your hand, thumb, or fingers-you might accidentally inject your self. An accidental injection into the hand WILL NOT deliver an effective dose of the medication especially if the needle goes through the hand.
7. Pull the injector out of the clip with a smooth motion. **The auto-injector is now armed.**  
**(Continued next page)**

**INJECTIONS - AUTO-INJECTORS (cont.)**

8. The injection site for administration is normally in the outer thigh muscle. It is important that the injections be given into a large muscle area. If the individual is thinly-built, then the injections should be administered into the upper outer quadrant of the buttocks.
9. Place the tip of the auto-injector firmly against the injector site. Re-check to make certain that the injector is loaded prior to placing it firmly against the injection site.
10. Push hard until you hear or feel the injector activate. Hold the injector in place until the medication is fully injected (a minimum of ten (10) seconds).
11. Once administered, record the times administered, and try to properly discard the auto-injector in an appropriate sharps container.
12. Massage the injection sites, if time permits.

## INTRANASAL DRUG ADMINISTRATION

### LEVEL OF AUTHORIZATION

Basic, Intermediate, Paramedic

### RATIONALE

Intranasal (IN) drug administration provides a safe, rapid, and effective way to administer emergency drugs in both pre-hospital and clinical settings. It offers an easy and convenient method of administration that requires minimal training. It is painless and it decreases the possibility of exposures to blood-borne diseases.

### DESIRED EFFECT

When performed properly, intranasal medications are absorbed via the rich vascular plexus of the nose and directly enter the circulation.

### INDICATIONS

1. Used as an alternative route for administration of medications when IV access is not or can not be readily established.

### CONTRAINDICATIONS

1. No absolute contraindications.
2. If there is something wrong with the nasal mucosa, it may not absorb medications effectively:
  - a. Vasoconstrictors
  - b. Bloody nose, nasal congestion, mucus discharge
  - c. Destruction of nasal mucosa from surgery, trauma or cocaine abuse.

### PROCEDURE

1. Assess ABC's.
2. For pulseless patients, initiate CPR.
3. For apneic or hypoventilating patients, assist ventilations.
4. Load syringe with appropriate dose of medication and attach the Mucosal Atomizer Device (MAD). Dose may be administered with ½ doses in each nostril, i.e. Naloxone.
5. Place atomizer within the nostril.

**(Continued next page)**

**INTRANASAL DRUG ADMINISTRATION (cont.)**

6. Briskly compress syringe to administer correct drug dose. Have a towel available to catch any secretions.
7. Remove and repeat process in the other nostril, if indicated, until the full therapeutic dose is administered.
8. Continue ventilating patient and secure airway as needed.

## INTRAOSSEROUS INFUSION

### *TIBIAL/HUMERAL*

#### LEVEL OF AUTHORIZATION

Intermediate, Paramedic

#### RATIONALE

Intraosseous (IO) infusion allows for a rapid emergency vascular access when peripheral IVs have not been successful, or when the situation deems it appropriate. IO lines may be used for fluid resuscitation and/or delivery of medications. This procedure is for treatment of potentially life threatening conditions.

#### DESIRED EFFECT

When performed properly, intravenous solutions and medications will pass from the marrow cavities into large venous channels and then into the systemic circulation causing the desired effect.

#### INDICATIONS

1. Fluid replacement in unresponsive patients when peripheral access is not obtainable.
2. Medication administration for children in cardiac arrest.
3. Unresponsive, critically ill patients, with impaired vascular access due to obesity or edema.
4. Burn or other injury preventing accesses to the venous system at other sites.

#### CONTRAINDICATIONS

1. Trauma to the extremity
2. Fracture proximal to the IO site
3. Congenital bone disease or bony lesion at the site
4. Osteomyelitis
5. Cellulitis or other indicators of infection at the injection site

(Continued next page)

**INTRAOSSEROUS INFUSION – TIBIAL/HUMERAL (cont)****PROCEDURE**

1. Identify landmarks and prepare the insertion site with antiseptic solution. Sites for insertion include:

**Peds and Adult Proximal Tibial**

- a. 2 to 3 cm (2-3 finger breadths) below the tibial tuberosity (proximal tibia) in the flat surface of anterior tibia. [Illinois Bone Marrow Needle or similar, EZ-IO System]

**Adult only Distal Tibial and Humeral head**

- b. 2 to 3 cm (2-3 finger breadths) above the medial malleolus (distal tibia) in the flat surface of the anterior tibia. [EZ-IO System]
  - c. 2 to 3 cm (2-3 finger breadths) below the acromioclavicular joint on the lateral humeral head, [EZ-IO System]
2. The IO needle is inserted, angling the shaft 15 degrees away from the growth plate, into the flat tibial surface. Placement is detected when a "pop" can be felt and the needle and the needle should be firmly anchored to the bone.
  3. Remove the stylet and flush. Saline can be flushed in easily without evidence of swelling around the site, the needle should remain in place.
  4. Saline is then infused (5 cc) by syringe to verify placement and to clear the IO needle of any foreign objects.
  5. Infuse Lidocaine 2% via **slow IVP over 5 min** for local anesthetic effect for a semi or conscious patient.

Ped: [0.25-0.50mg/kg] max of 20mg up to 8 y/o {1cc}

Adult: [0.50mg/kg] max of 40 mg {2cc}

6. Attach standard IV tubing and infuse medications or fluid quickly to prevent clotting of needle. Fluid may not flow by gravity alone.
6. The needle should be secured with tape or other device.

## **INTRAOSSEOUS INFUSION**

### ***STERNAL***

#### **LEVEL OF AUTHORIZATION**

Not authorized by Dr. Kruis

## **IV THERAPY**

### ***EXTREMITIES***

#### **LEVEL OF AUTHORIZATION**

Intermediate, Paramedic

#### **RATIONALE**

Intravenous fluid therapy provides a rapid route for replacement of fluid lost through hemorrhage, replacement of electrolytes, and for the introduction of medications directly into the vascular system.

#### **DESIRED EFFECT**

When performed correctly, IV access provides a route that allows fluids and drugs to produce a pharmacological effect that is almost immediate.

#### **INDICATIONS**

1. Fluid replacement
2. Electrolyte replacement
3. Medication administration

#### **CONTRAINDICATIONS**

None when the procedure is indicated.

#### **PROCEDURE**

1. If the patient is conscious, explain why the IV is necessary and what the procedure entails.
2. Assemble the necessary equipment, check for contamination and expiration dates.
3. Insert tubing into the IV bag using aseptic technique, squeeze the drip chamber and fill halfway and allow the fluid to run through the tubing to purge all air.
4. Apply a tourniquet above the venipuncture site.
5. Select an appropriate catheter and prepare additional equipment (i.e. sterile dressings, tape, syringes, vacutainers, etc.).

(Continued next page)

#### **IV THERAPY (cont.)**

6. Apply gloves for personal and patient protection.
7. Prepare the puncture site using an antiseptic solution to cleanse the site.
8. Stabilize the vein and with the bevel of the catheter facing up, insert the catheter into the vein.
9. Advance the needle and catheter approximately 2mm beyond the point where blood return in the hub of the needle was noted. Slide the catheter over the needle into the vein without moving the needle. Once the catheter is completely in the vein, remove the needle and dispose of it into a "sharps" container.
10. Remove the tourniquet and attach the tubing and flush the line by opening the tubing clamp wide open.
11. Secure the IV site with tape or other device and cover the injection site with a sterile dressing.
12. Set flow at desired rate.
13. Check for signs of infiltration and document the procedure.
13. Document the IV.

## IV THERAPY

### *EXTERNAL JUGULAR*

#### LEVEL OF AUTHORIZATION

Intermediate, Paramedic

#### RATIONALE

External jugular cannulation provides a route for intravenous fluid therapy when other peripheral veins have not provided suitable IV access. It provides a rapid route for replacement of fluid lost through hemorrhage, replacement of electrolytes, and for the introduction of medications directly into the vascular system

#### DESIRED EFFECT

When performed correctly, external jugular IV access provides a route that allows fluids and drugs to produce a pharmacological effect that is almost immediate.

#### INDICATIONS

- 1 External jugular vein cannulation is indicated in a critically ill patient  $\geq 8$  years of age who requires intravenous access for fluid or medication administration and in whom an extremity vein was not attainable and/or EZ-IO is not available or advisable.
2. External jugular cannulation can be attempted initially in life threatening events where no obvious peripheral site is noted or obtainable.

#### CONTRAINDICATIONS

1. Infection over the insertion site.
2. Lack of anatomic landmarks due to neck size, shape or deformities.
3. Suspected or proven fracture of the cervical spine.
4. Patient with coagulopathies. More easily compressible sites should be considered or EZ-IO System.
5. Unsuccessful contralateral attempt at insertion with resultant hematoma.

(Continued next page)

**EXTERNAL JUGULAR (cont.)****PROCEDURE**

1. If the patient is conscious, explain why the IV is necessary and what the procedure entails.
2. Assemble the necessary equipment, check for contamination and expiration dates.
3. Insert tubing into the IV bag using aseptic technique, squeeze the drip chamber and fill halfway and allow the fluid to run through the tubing to purge all air.
4. Select an appropriate catheter (16 gauge or larger 1 ½ to 2” is preferable) and prepare additional equipment (i.e. sterile dressings, tape, syringes, vacutainers, etc.).
5. Attach a 5cc syringe to catheter.
6. Apply gloves for personal and patient protection.
7. Place the patient in a supine or Trendelenburg position. This helps to distend the jugular veins and reduces the possibility of an air embolism.
8. Turn the patient’s head toward the opposite side if there is no possibility of cervical spine injury.
9. Prep the selected site as per peripheral IV site.
10. Align the catheter with the vein and aim in a caudal position (toward the clavicle).
11. Lightly place a finger just above the clavicle to produce a “tourniqueting” effect.  
Puncture the vein midway between the angle of the jaw and the clavicle and cannulate the vein in the usual manner and aspirate for blood return.
12. Attach an IV line and secure the catheter avoiding circumferential dressing or taping.
13. Assure patency of the line.
14. Document the IV.

## NEBULIZED DRUG ADMINISTRATION

### LEVEL OF AUTHORIZATION

FR, Basic, Intermediate & Paramedic

### RATIONALE

Small volume nebulizers (SVN), provides a route of administration that carries the drug, in a fine mist, directly to the site of action in the lungs.

### DESIRED EFFECT

When performed correctly SVN, using albuterol, should reverse bronchial constriction.

### INDICATIONS

1. Wheezing associated with asthma
2. COPD
3. Anaphylaxis (after administration of Epinephrine)

### CONTRAINDICATIONS

1. Hypersensitivity to medications

### PROCEDURE

1. Assemble equipment and attach the nebulizer to an oxygen source.
2. Add the appropriate amount of drug to the mist chamber.
3. Turn on the oxygen bottle and set the regulator per manufacturer's specifications or until a fine mist is produced.
4. Place the mouthpiece into the patient's mouth and have them periodically inhale and hold the drug in their lungs as long as possible. The patient should be encouraged to cough. Continue administration until the entire drug has been administered.
5. Monitor the patient for effectiveness.
6. The nebulizer can be attached to a BVM or CPAP to facilitate administration of the drug in conjunction with positive pressure ventilation.

**Note: Airborne spread of disease should be a consideration.  
Caution should be used with acute cardiac presentation or CHF.**

## OXYGEN ADMINISTRATION

### LEVEL OF AUTHORIZATION

FR, Basic, Intermediate & Paramedic

### RATIONALE

Administration of supplemental oxygen, using appropriate oxygen delivery devices, provides increased concentrations of oxygen for use by the body tissues. Oxygen should be administered whenever it is clinically indicated.

### DESIRED EFFECT

When performed correctly, oxygen administration will elevate arterial oxygen tension, increase oxygen content of arterial blood. This provides the body tissues with improved oxygenation for metabolism, alleviating ischemia, reducing acidosis, and reducing intracranial pressure.

### INDICATIONS

1. Suspected hypoxemia or respiratory distress from any cause
  - a. Included but not limited to:
    - i. Acute chest pain
    - ii. Pulmonary congestion
    - iii. Respiratory / Cardiopulmonary arrest
    - iv. Shock
    - v. Seizures
    - vi. Head injuries
    - vii. CVA /TIA
    - viii. Acute and chronic disorders

### CONTRAINDICATIONS

Oxygen should never be withheld from anyone who needs it. Patients with a hypoxic drive should be monitored closely.

### PROCEDURE

1. Administration of oxygen and selection of delivery devices is situation dependent. Decisions should be based on hypoxic status, rate and depth of ventilation and seriousness of injury or illness.

**(Continued next page)**

**OXYGEN ADMINISTRATION (cont.)**

- a. Low Concentration - A nasal cannula is well tolerated by patients that are able to breathe through their noses, and will deliver a concentration of 24 - 44% when adjusted to a flow rate of 1 - 6 L/min. It should be used on patients with adequate tidal volume with minimal or no respiratory distress or oxygenation problems. Flow rates > 6 l/min may dry mucous membranes in the nasal passages and a simple facemask should be considered.
- b. Moderate Concentration - A simple facemask should be considered for patients who are in a low to moderate degree of distress with adequate tidal volume. It will deliver 40-60% oxygen at a flow rate of 8 - 10 L/min. To avoid re-breathing of carbon dioxide, the flow rate should be at least 5 L/min. The mask should be monitored for condensation, indicating hypoventilation, and debris such as vomit and sputum.
- c. High Concentration - The non-rebreather mask should be used on patients with serious respiratory problems, but adequate tidal volume, and can deliver 80-100% oxygen at a flow rate of 10 - 16 L/min. Do not let the bag completely deflate between breaths.
- d. High Concentration/Assisted - For patients with an inadequate rate or depth of ventilations, positive pressure ventilatory devices should be used. These include BVMs, demand valve resuscitators, and automatic transport ventilators. These devices are capable of delivering 80 - 100% oxygen, under pressure, to assure both adequate minute volume and concentration of oxygen.
- e. Use humidified oxygen for asthma patients, COPD patients, wheezing and/or stridor in children, inhalation burns or long transports exceeding 30 minutes. Use *warm* humidified oxygen on hypothermic patients.

## PATIENT ASSESSMENT

### *SCENE SIZE UP*

## LEVEL OF AUTHORIZATION

FR, Basic, Intermediate, Paramedic

## RATIONALE

Every patient encounter includes an evaluation of the scene and its components regarding safety, potential hazards, communication and the need for scene control. In an attempt to avoid repetition of the components of the Scene size up, please refer to the following scene size up procedure. Perform scene size up on all patient encounters.

## PROCEDURE

- A. Scene Safety, consider potential hazards
  1. Common scene hazards
    - a. Environmental
    - b. Hazardous substances
      - i. Chemical
      - ii. Biological
    - c. Violence
      - i. Patient
      - ii. Bystanders
      - iii. Crime scenes
    - d. Rescue
      - i. Motor-vehicle collisions
        - a) Extrication hazards
        - b) Roadway operation dangers
      - ii. Special situations

(Continued next page)

**PATIENT ASSESSMENT - Scene Size Up (cont.)**

## 2. Evaluation of the scene

## a. Is the scene safe?

- i. Yes - establish patient contact and proceed with patient assessment
- ii. No - is it possible to quickly make the scene safe?
  - a) Yes - assess patient
  - b) No - do not enter any unsafe scene until minimizing hazards
- iii. Request specialized resources immediately

## B. Scene management

## 1. Impact of the environment on patient care

## a. Medical

- i. Determine nature of illness
- ii. Hazards at medical emergencies

## b. Trauma

- i. Determine mechanism of injury
- ii. Hazards at the trauma scene

## c. Environmental considerations

- i. Weather or extreme temperatures
- ii. Toxins and gases
- iii. Secondary collapse and falls
- iv. Unstable conditions

## 2. Addressing hazards

## a. Protect the patient

- i. After making the scene safe for the EMS provider, the safety of the patient becomes the next priority.
- ii. If the EMS provider cannot alleviate the conditions that represent a health or safety threat to the patient, move the patient to a safer environment.

**(Continued next page)**

**PATIENT ASSESSMENT - Scene Size Up (cont.)**

- b. Protect the bystanders
    - i. Minimize conditions that represent a hazard for bystanders.
    - ii. If the EMS provider cannot minimize the hazards, remove the bystanders from the scene.
  - c. Request resources
    - i. Request additional resources needed at the scene immediately.
      - a) Multiple patients - additional ambulances
      - b) Fire hazard - fire department.
      - c) Traffic or violence issues - law enforcement
  - d. Scan the scene for information related to
    - i. Mechanism of injury
    - ii. Nature of the illness
3. Violence
- a. EMS providers should not enter a scene or approach a patient if the threat of violence exists.
  - b. Park away from the scene and wait for the appropriate law enforcement officials to minimize the danger.
4. Need for additional or specialized resources
- a. A variety of specialized protective equipment and gear is available for specialized situations.
    - i. Chemical and biological suits can provide protection against hazardous materials and biological threats of varying degrees.
    - ii. Specialized rescue equipment may be necessary for difficult or complicated extrications.
    - iii. Ascent or descent gear may be necessary for specialized rescue situations.
  - b. Only specially trained responders should wear or use the specialized equipment.

**(Continued next page)**

**PATIENT ASSESSMENT - Scene Size Up (cont.)**

## 5. Standard precautions

## a. Overview

- i. Based on the principle that all blood, body fluids, secretions, excretions (except sweat), non-intact skin, and mucous membranes may contain transmissible infectious agents.
- ii. Include a group of infection prevention practices that apply to all patients, regardless of suspected or confirmed infection status, in any healthcare delivery setting.
- iii. Universal precautions were developed for protection of healthcare personnel.
- iv. Standard precautions focus on protection of patients.

## b. Implementation

- i. The extent of standard precautions used is determined by the anticipated blood, body fluid, or pathogen exposure.
  - a) Hand-washing
  - b) Gloves
  - c) Gowns
  - d) Masks
  - e) Protective eyewear

## c. Personal Protective Equipment

- i. Personal protective equipment includes clothing or specialized equipment that provides some protection to the wearer from substances that may pose a health or safety risk.
- ii. Wear PPE appropriate for the potential hazard.
  - a) Steel-toe boots
  - b) Helmets
  - c) Heat-resistant outerwear
  - d) Self-contained breathing apparatus
  - e) Leather gloves

## 6. Multiple patient situations

## a. Number of patients and need for additional support

- i. How many patients?
- ii. Does the dispatch suggest the need for additional support?
- iii. Protection of the patient.

**(Continued next page)**

**PATIENT ASSESSMENT- Scene Size Up (cont.)**

- iv. Protection of bystanders
  - a) Remove
  - b) Isolate
  - c) Barricade
  
- b. Need for additional resources
  - i. Incident Command System (ICS or IMS)
  - ii. Consider if this level of commitment is required

**PATIENT ASSESSMENT*****PRIMARY ASSESSMENT*****LEVEL OF AUTHORIZATION**

FR, Basic, Intermediate, Paramedic

**RATIONALE**

Every treatment guideline includes an initial assessment of life threats and appropriate treatment for these conditions. In an attempt to avoid repetition of the components of the primary assessment, please refer to the following primary assessment guideline. Perform a primary assessment on all patient encounters.

A. Maintain or establish **AIRWAY PATENCY** for all patients, by:

**FIRST RESPONDER, BASIC and INTERMEDIATE MANAGEMENT**

1. Positioning maneuvers as indicated by patient condition
2. Suction (oropharynx, nasopharynx, or stoma)
3. Nasopharyngeal airway
4. Oropharyngeal airway
5. Multi-lumen airway
6. Laryngeal and Supraglottic Airway Devices

**PARAMEDIC PRE-HOSPITAL MANAGEMENT**

7. Endotracheal suctioning
8. Laryngoscopic visualization
9. Magill forceps manipulation
10. Nasotracheal intubation (blind or visualized)

**(Continued next page)**

**PATIENT ASSESSMENT- Primary Assessment (cont.)**

11. Oral endotracheal intubation
12. Stomal intubation
13. Surgical cricothyrotomy

B. Maintain or establish **ADEQUATE VENTILATION & OXYGENATION** for all patients by:

**FIRST RESPONDER, BASIC and INTERMEDIATE MANAGEMENT**

1. Assess rate and depth of ventilation.
2. Administer oxygen as indicated by patient condition
3. Consider use of pulse oximetry (including room air SpO<sub>2</sub>), end-tidal CO<sub>2</sub> detectors (ETCO<sub>2</sub>) and capnometry/capnography to assess effectiveness.
4. Bag Valve Mask (BVM) with supplemental oxygen.
5. Positive Pressure Ventilatory Devices (PPVD) to include Automatic Transportable Ventilators (ATV) and Continuous Positive Airway Pressure (CPAP).
6. Consider capnography or capnometry, if available.

**PARAMEDIC PRE-HOSPITAL MANAGEMENT**

7. Pleural decompression.

C. Maintain or establish **ADEQUATE CIRCULATION** by:

**FIRST RESPONDER and BASIC MANAGEMENT**

1. Properly position patient.
2. CPR, if indicated, including use of impedance threshold devices and automated compression devices.
3. Control major hemorrhage using:
  - a. Direct pressure

**(Continued next page)**

**PATIENT ASSESSMENT- Primary Assessment (cont.)**

- b. Elevation
  - c. Tourniquet
  - d. PASG (if active bleeding below the level of garment)
4. Cardiac monitoring for documentation only, not diagnostic interpretation.

**INTERMEDIATE PRE-HOSPITAL MANAGEMENT**

- 5. Peripheral IV/IO access and/or external jugular access
- 6. Fluid administration

**PARAMEDIC PRE-HOSPITAL MANAGEMENT**

- 7. Utilizing pre-existing vascular access as primary site
- 8. ACLS as per current AHA Guidelines

## PATIENT ASSESSMENT

### *HISTORY AND PHYSICAL EXAM (H&P)*

#### LEVEL OF AUTHORIZATION

FR, Basic, Intermediate, Paramedic

#### RATIONALE

After life-threatening conditions have been corrected, an appropriate focused history and physical exam should be performed on all patients. In an attempt to avoid repetition of the components of the focused history and physical exam, please refer to the following Focused History and Physical Exam Guideline. Perform a focused history and physical exam on all patient encounters.

#### A. Conduct H&P for all patients, including:

1. Level of consciousness
2. History of chief complaint
3. Pertinent past medical history (**SAMPLE, OPQRSTU**)
4. Physical exam
5. Skin signs
6. Lung sounds
7. Cardiac monitor, may include 12 lead EKG data collection for documentation
8. Neurological exam, including pupillary reaction, coordination and general movement
9. Vital Signs including:
  - a. Ventilatory effort, rate and volume
  - b. Pulse rate, strength and regularity
  - c. Blood Pressure
  - d. If available, oxygen saturation and Capnometry
  - e. Temperature, if indicated
  - f. Glucometry, if indicated
10. Mental Status exam

## PLEURAL DECOMPRESSION

### LEVEL OF AUTHORIZATION

Paramedic

### RATIONALE

A pneumothorax (traumatic or spontaneous) may exacerbate into tension pneumothorax leading to a decreased lung capacity, decreased cardiac output and severe hypoxia.

### DESIRED EFFECT

When performed properly, pleural decompression should relieve air pressure in the chest cavity and allow for adequate ventilations.

### INDICATIONS

1. Tension pneumothorax

### CONTRAINDICATIONS

1. None when indicated

### PROCEDURE

1. Universal precautions.
2. Prep the area with an antiseptic solution. Two preferred locations are:
  - a. The second intercostal space, midclavicular just above the 3rd rib.
  - b. The fourth intercostal space, mid-axillary just above the 5th rib.
3. Insert a 10 - 14 gauge angiocath, or commercial device, just above the rib until air rushes out.
4. Remove the needle, leaving the catheter in place.
5. Tape and secure to chest.
6. Re-assess lung sounds. A second needle may have to be inserted, or both sides of the chest may require decompression.

Note: If improperly performed, the technique may actually cause a pneumothorax or damage underlying vasculature and organs.

## **PNEUMATIC ANTI-SHOCK GARMENT (PASG/MAST)**

### **LEVEL OF AUTHORIZATION**

Basic, Intermediate, Paramedic

### **RATIONALE**

When inflated, the device applies circumferential pneumatic counter-pressure to the structures beneath the garment, causing compression of the blood vessels under the garment. This pressure may possibly help to stabilize blood pressure, which would affect blood flow to the heart, brain, and lungs. This same pressure may help to control bleeding, and stabilize fractures of the lower limbs and pelvis.

### **DESIRED EFFECT**

When applied correctly, the garment should increase peripheral vascular resistance, control hemorrhage, and provide stabilization to fractures located under areas of the body covered by the device.

### **INDICATIONS**

1. Control active bleeding (internal or external) in areas covered by the device.
2. Stabilization of fractures of the pelvis and lower limbs.

Note: Transport time is a relative factor. PASG should be considered if the transport time is expected to be > 30 minutes, however in critical patients time required to apply the device versus its benefits, must be considered.

### **CONTRAINDICATIONS**

1. There are no absolute contraindications. Relative contraindications include:
  - a. Pulmonary edema
  - b. Increased intracranial pressure
  - c. Pregnancy (beyond second trimester)
  - d. Penetrating objects
  - e. Abdominal evisceration
  - f. Active bleeds above the site of the garment

**(Continued next page)**

**PNEUMATIC ANTI-SHOCK GARMENT (PASG/MAST) (cont.)****PROCEDURE****Inflation:**

1. Prepare the PASG and if the patient is being placed on a spine-board, place the garment on the board prior to moving the patient.
2. Position the patient and remove clothing in areas that will be covered by the garment.
3. Quickly palpate abdomen, pelvis and lower extremities.
4. Apply PASG.
5. Be sure pants do not extend above rib margin.
6. Obtain baseline vital signs prior to inflation.
7. Inflate the legs and abdomen to 90 mm Hg or until the Velcro® pulls.
  - a. **NEVER** inflate abdominal section alone.
  - b. **DO NOT** inflate over burns.
  - c. The application of **PASG SHOULD NOT DELAY TRANSPORT.**
8. For injuries limited to the extremities, inflate leg section only with enough air to stop hemorrhage and/or splint suspected fractures.
9. Record time of inflation.
10. Auscultate lung sounds in all fields for adequacy of ventilation after inflation.
11. Recheck vital signs.
12. Do not deflate in the pre-hospital setting without physician orders.

**Deflation:**

1. Should occur in a medical facility, by physician order only, large bore IVs in place.
2. Obtain baseline set of vitals.
3. Deflate abdominal compartment slowly.
4. Deflate one leg at a time, and if systolic BP drops 5 mm Hg, stop deflation.
5. Re-inflate PASG if needed and if vital signs stabilize, continue deflation.

## **POSITIVE PRESSURE VENTILATION**

### **LEVEL OF AUTHORIZATION**

FR, Basic, Intermediate & Paramedic

### **RATIONALE**

A significant decrease in the patient's rate or depth of breathing will lead to hypercarbia, hypoxia, and a lowered pH. Assisted ventilation is indicated when this condition exists. The procedure must provide enough force to overcome resistance of the lungs and chest wall, as well as the respiratory passageways. Adequate ventilation pressures and volumes, combined with an adequate rate, will provide an adequate minute volume.

### **DESIRED EFFECT**

When performed correctly, an adequate tidal volume (6-7 ml/kg with supplemental oxygen or 10 ml/kg on room air) should be provided, under adequate pressure (< 20 cmH<sub>2</sub>O in non-intubated patients). Inspiratory pressures in intubated patients should be titrated to provide adequate gas exchange. Combined with a proper rate, this should produce an adequate exchange of gases (O<sub>2</sub> and CO<sub>2</sub>) at the alveolar level.

### **INDICATIONS**

1. Patients that are in respiratory or cardiac arrest.
2. Patients that are breathing, but have inadequate rate or depth of ventilation.
3. Patients that need assistance in controlling ventilatory rate.

### **CONTRAINDICATIONS**

1. None when ventilatory assistance is indicated.

### **PROCEDURE**

1. Manually insure that the patient has a patent airway using the head tilt-chin lift maneuver or in case of suspected trauma, the jaw-thrust.
2. Ventilate the patient, assessing for chest rise while ensuring the airway is open. Continue ventilations until airway adjunct has been inserted.
3. Insert appropriate airway adjunct (i.e. oropharyngeal, nasopharyngeal, Combitube®, supraglottic device, laryngeal device, endotracheal tube, etc).

**(Continued next page)**

**POSITIVE PRESSURE VENTILATION (cont.)**

4. Ensure that the ventilatory device is connected to a supplemental oxygen source, if available, using an adequate oxygen flow (8-12 lpm with an oxygen concentration  $\geq$  40%).
5. If the patient is not intubated, make sure the mask is properly sealed on the patient's mouth and nose. If the patient is intubated, connect the device to the tube, ensuring a proper fit.
6. For ventilation of patients with a perfusing rhythm, deliver approximately 10-12 breaths per minute (1 breath every 6-7 seconds). Deliver these breaths over 1 second when using a mask or advanced airway.
7. Auscultate lung sounds and watch for symmetric chest rise.
8. Avoid inspiratory pressures  $>20$  cmH<sub>2</sub>O in non-intubated patients which can lead to gastric distention or barotrauma. Cricoid pressure should be considered.
9. Continuously monitor the ventilatory device to ensure there are no malfunctions of equipment or use.
10. Airway adjuncts should be monitored for proper placement.
11. Devices capable of measuring carbon dioxide levels (capnography, end tidal CO<sub>2</sub> detectors, and colorimetric devices) should be utilized to ensure adequate respiration.

## SPINAL MOTION RESTRICTION

### LEVEL OF AUTHORIZATION

FR, Basic, Intermediate & Paramedic

### RATIONALE

Stabilization of the spinal column prior to moving the patient from the scene, and during transport, may prevent further damage, which could result in permanent neurological deficit.

### DESIRED EFFECT

When performed correctly, spinal immobilization should provide stabilization for the fracture, or displacement, above and below the site. Limiting movement may also help to reduce pain.

### INDICATIONS

Spinal immobilization should be considered for all patients that have been subjected to forces that could potentially cause injury to the spinal column. Patient complaint of spinal pain, spinal tenderness, spinal deformity, neurological deficits or abnormalities must also be considered for cause to immobilize. Absence of complaints or visual injury does not confirm there is no injury. Drug use and distracting injuries may mask spinal injuries during assessment.

**NOTE: Penetrating trauma without suspicion of spinal injury is not an indication for spinal immobilization.**

### CONTRAINDICATIONS (RELATIVE)

1. On scene, if patient is unstable and in need of rapid extrication and transport. Use manual C-spine stabilization.
2. Unsafe environment.

### PROCEDURE

**NOTE: RIGID SPINE BOARDS ARE NOT TO BE USED ROUTINELY FOR SPINE MOTION RESTRICTION.**

(Continued next page)

**SPINAL MOTION RESTRICTION (cont.)**

There are only 3 uses for rigid spine boards:

1. Extrication when a patient is unable to extricate themselves with assistance.
2. Moving a patient over irregular terrain until the ambulance stretcher is reached.
3. CPR

**A. Supine and hemodynamically stable:**

1. Manually stabilize the head without airway compromise.
2. Check for pulse, movement, and sensation in extremities.
3. Bring head to the eyes forward position if no pain or resistance is met.
4. Apply correctly sized cervical collar without compromising the airway.
5. Place patient on long spine board with minimum movement using straddle slide or 4 person log roll.
6. Secure the body, then the head to long spine board.
7. Recheck pulse, movement, and sensation in extremities.

**B. Supine and hemodynamically unstable:**

1. This procedure should be used when extrication times would negatively impact the survival of an unstable supine patient.
2. Manually stabilize the head without airway compromise.
3. Check for pulse, movement, and sensation in extremities.
4. Bring head to the eyes forward position if no pain or resistance is met.
5. Apply correctly sized cervical collar without compromising the airway.
6. Place patient on full body spinal device with minimum movement using straddle slide log roll.

**(Continued next page)**

**SPINAL MOTION RESTRICTION (cont.)**

7. If adequate personnel are available, "hand stabilize" the patient to the board while moving to the ambulance stretcher.
8. If time and manpower permits, log roll patient or use slide board to remove long spine board while en route.

**C. Seated and hemodynamically stable:**

1. Manually stabilize the head without airway compromise.
2. Check for pulse, movement, and sensation in extremities.
3. Bring head to the eyes forward position if no pain or resistance is met.
4. Apply correctly sized cervical collar without compromising the airway.
5. Allow patient to self-extricate if possible
6. If necessary, assist patient with self-extrication and assist patient to stretcher.

**D. Seated and hemodynamically unstable:**

1. This procedure should be used when extrication time would negatively impact the survival of an unstable seated patient.
2. Manually stabilize the head without airway compromise.
3. Check for pulse, movement, and sensation in extremities.
4. Bring head to the eyes forward position if no pain or resistance is met.
5. Apply correctly sized cervical collar without compromising the airway.
6. Use manual spinal immobilization to rapidly extricate the patient from the seated position onto a long spine board.
7. If adequate personnel are available, "hand stabilize" the patient to the board while moving to the ambulance stretcher.
8. If time and manpower permits, log roll patient or use slide board to remove long spine board while en route.

**(Continued next page)**

**SPINAL MOTION RESTRICTION (cont.)****E. Standing and hemodynamically stable or unstable:**

1. Manually stabilize the head without airway compromise.
2. Check for pulse, movement, and sensation in extremities.
3. Bring head to the eyes forward position if no pain or resistance is met.
4. Apply correctly sized cervical collar without compromising the airway.
6. Assist patient onto stretcher.

## **SPLINTING**

### ***EXTREMITY***

#### **LEVEL OF AUTHORIZATION**

FR, Basic, Intermediate & Paramedic

#### **RATIONALE**

Isolated extremity trauma itself is rarely life threatening, however, complications of poorly managed injuries may result in significant loss of function and disability. The development of hemorrhagic shock is also a concern and the most important and immediate danger. Careful management of the extremity may prevent exacerbation of the existing injury and help preserve future function.

#### **DESIRED EFFECT**

When performed correctly, the fracture site, along with the joint above and below, will be immobilized. This should prevent further injury, help control bleeding and reduce pain.

#### **INDICATIONS**

1. Injury to the extremity with associated pain, swelling, numbness, tingling, deformity, or loss of function.
2. Amputation, if not completely severed.
3. Stabilize IV sites.

#### **CONTRAINDICATIONS**

None when indicated. Splinting should not be done on scene if the patient is unstable.

#### **PROCEDURE**

1. Manually stabilize injured extremity.
2. Cut or remove clothing to expose injury.
3. Check distal circulation, pulse, and neurological status.
4. Select and prepare appropriate splint.

**(Continued next page)**

**SPLINTING (cont.)**

5. Apply splint without moving fracture site regularly during transport.
6. Pad where applicable.
7. Immobilize above and below injury.
8. Re-check distal circulation, pulse, and neurological status.

**Note: A traction splint can be used with no traction applied and used as a rigid splint.**

**SPLINTING (cont.)*****TRACTION SPLINT*****LEVEL OF AUTHORIZATION**

FR (with Medical Direction), Basic, Intermediate & Paramedic

**RATIONALE**

The use of traction on a mid-shaft fracture of the femur helps in relieving spasms or tension to the muscles, stabilizes the fractured bone ends, and prevents additional damage to the surrounding arteries, veins and tissues. Relief of tension and spasms also assists in alleviating pain.

**DESIRED EFFECT**

When performed correctly, the fracture site, along with the joint above and below, will be immobilized. This should prevent further injury, help control bleeding and reduce pain.

**INDICATIONS**

1. Mid-shaft fracture to the femur.

**CONTRAINDICATIONS**

1. Fractures to the head of the femur.
2. Fractures to the lower third of the femur.
3. Associated fractures to the pelvis, patella, tibia, fibula.
4. Partial amputation of the extremity.
5. Critical patients should not have the device applied on scene.

**PROCEDURE**

1. Manually stabilize injured extremity.
2. Remove clothing to expose injury.
3. Remove shoe and sock.

**(Continued next page)**

**TRACTION SPLINT (cont.)**

4. Check distal circulation and neurological status
5. Adjust splint to proper length beside uninjured leg.
6. Apply the splint according to manufacturer's instructions.
7. Pull traction on the injured extremity.
8. Secure extremity to splint.
9. Recheck distal circulatory status, pulse, movement, and sensation.

**Note: Intermediates and paramedics, prior to applying traction splint, may administer analgesics.**

**SPECIAL CONSIDERATION**

1. Application of a traction splint to an open fracture of the femur with protruding bone ends may lead to further damage and infection. Medical control should be consulted prior to applying traction in this situation.

## WOUND CARE / BLEEDING

### LEVEL OF AUTHORIZATION

FR, Basic, Intermediate & Paramedic

### RATIONALE

Proper wound care prevents further contamination and control of hemorrhage. This may prevent hypotension or subsequent infections.

### DESIRED EFFECT

When performed correctly, the wound will be covered with a sterile dressing and held securely in place by a bandage. Bleeding will be controlled and both venous and arterial circulation will be unobstructed.

### INDICATIONS

All open wounds that are exposed to contamination.

### CONTRAINDICATIONS

None when indicated.

### PROCEDURE

1. If bleeding is uncontrolled, apply:
  - a. Direct pressure.
  - b. Direct pressure combined with elevation (of the extremity).
  - c. Pressure bandage.
  - d. Temporary (< 1 hour) tourniquet\* (if pressure and elevation ineffective) used to allow delivery of patient to hospital or get assistance to continue with direct pressure.
  - e. Long term (> 1 hour) tourniquet\* as a last resort, but don't delay until the patient has exsanguinated.
  - f. Tourniquets\* may only be used on extremities.
2. Place dressing over the wound and firmly secure with a suitable bandage.
3. Assess circulation distal to the bandage and neurological status.
4. Patients that are not transported should be advised to see a physician regarding tetanus status.

(Continued next page)

## WOUND CARE / BLEEDING

### SPECIAL CONSIDERATION

1. If bleeding continues after the bandage is applied and especially if the bandage becomes soaked with blood, leave the bandage and apply direct pressure to the bleeding site(s).
- **Use a wide (minimum of three inches) band as a tourniquet such as B/P Cuff or commercial tourniquet or other suitable method.**

## **WILDERNESS PROTOCOLS**

### **LEVEL OF AUTHORIZATION**

FR, Basic, Intermediate & Paramedic

### **RATIONALE**

Wilderness EMS provides medical care to patients in the specialized pre-hospital situations of wilderness, backcountry, and other delayed and prolonged transportation contexts such as catastrophic disasters (referred to jointly as "the wilderness context"). The following skills shall only be used by providers who have a current wilderness certification from an EMS Bureau approved wilderness caregiver course and are authorized by their medical director to provide the treatment.

### **DESIRED EFFECT**

When applied appropriately, wilderness protocols will enable responders to utilize skills and decision making directives to adequately manage patients in a wilderness environment.

### **INDICATIONS**

EMS providers are functioning in a wilderness environment (an environment in which time to a hospital is expected to exceed two hours, except in the case of an anaphylactic reaction, in which no minimum transport time is required), and are authorized by their medical director to provide the treatment.

### **CONTRAINDICATIONS**

None when indicated.

### **PROCEDURES**

1. Minor wound cleaning and management;
2. Cessation of CPR;
3. Field clearance of the cervical spine;
4. Reduction of dislocations resulting from indirect force of the patella, digit, and anterior shoulder.