
S.O.P. #: 600-24

SUBJECT: Advanced Airway Management

DIVISION: EMERGENCY MEDICAL SERVICES

Objective: This SOP does not replace the Maryland State Protocols but, rather, provides more explicit guidance to ALS providers regarding the Baltimore County Fire Department's approach to the provision of high-quality advanced airway management.

This policy will provide guidance regarding jurisdictional-specific utilization of the following:

1. Continuous Positive Airway Pressure (CPAP)
2. Supraglottic Airway Insertion (SGA; i.e. King LTS-D or other SGA approved by the Medical Director)
3. Endotracheal intubation via video laryngoscopy (VL)
4. Endotracheal intubation via direct laryngoscopy (DL)
5. Nasotracheal intubation (nasal intubation)
6. Continuous waveform in-line capnography (after insertion of an ETT or SGA)
7. Continuous waveform end-tidal nasal capnography
8. Needle Decompression Thoracostomy (NDT)
9. Documentation
10. Training

Applicability: This policy applies to all ALS providers authorized to function by the Baltimore County Fire Department

General:

- A. ALS providers will manage the airway and select airway management adjuncts in accordance with the current Maryland State Protocols and to the level of their training.
- B. ALS providers will document all advanced airway management procedures on the eMEDS Patient Care Report. With regard to airway device insertions, both failed and successful attempts, including number of attempts, must be documented.
- C. All airway adjuncts, supraglottic devices, video laryngoscopes, and related airway equipment must be approved for use by the Medical Director and training must be completed prior to being cleared to utilize the equipment.

Principles:

- A. Basic techniques for airway management are often superior to advanced airway management techniques in the prehospital environment.
- B. Proper BSI to include a face mask and eye protection are mandatory for all providers caring for a patient requiring advanced airway management.
- C. Manual ventilation using a BVM can be an effective method for managing patients with respiratory distress or failure when performed correctly (insertion of an NPA/OPA, 2-person technique, good seal, 8-10 breaths per minute).
- D. Patients with respiratory failure may respond favorably to BVM ventilation and not require intubation.

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- E. The senior most EMS provider on-scene (typically an EMS Supervisor) has ultimate responsibility for ensuring proper airway management.
- F. Hyperoxia is not necessarily beneficial and potentially contraindicated in uncomplicated acute MI, post cardiac arrest, acute exacerbation of COPD, stroke, and newborn resuscitation. In patients with these conditions, administer O₂ when there is active suspicion of hypoxia or respiratory distress. Titrate O₂ delivery to treat hypoxemia. Goal SpO₂ is 94% in most patients or 92% in patients with chronic lung disease or COPD.
- G. For trauma patients, in patients with possible anemia, or in other cases where pulse oximetry may not be indicative of actual oxygenation, it remains safer to err on the side of hyperoxia rather than risk occult hypoxemia. Note*** A single episode of hypoxemia in a patient with traumatic brain injury increases risk of mortality by 150%. Special attention to avoidance of any hypoxemic episodes in this subset of patients is critical.
- H. The clinical approach to a patient with suspected opioid intoxication who is either apneic or hypoventilating should *first* focus on high-quality basic airway management with ventilation support. Naloxone administration should follow per protocol.
- I. A medical box response profile should be requested for all instances in which ALS airway management is anticipated or required. Two ALS providers are preferred for ALS airway management, but appropriate ALS airway management should not be delayed in the absence of a second ALS provider.

Section 1: Continuous Positive Airway Pressure (CPAP)

- A. *Early* application of CPAP should be the norm for patients able to protect their airway who are suffering from moderate respiratory distress that is not responsive to medications or from severe respiratory distress due to suspected exacerbation of asthma, COPD, or CHF/pulmonary edema.
- B. Patients who cannot protect their own airways (i.e. decreased LOC), are hypotensive, or are in respiratory failure should receive BVM ventilations.
- C. CPAP application should start *where the patient is found* and not wait until the patient is transferred to the ambulance.
- D. CPAP must be applied per the manufacturer's instructions.
- E. In line medications may be given with CPAP if using the Flow Safe II system.
- F. All patients requiring CPAP are considered Priority 1 patients and a consult must be performed with the appropriate hospital.

Section 2: Supraglottic Airway Insertion (SGA)

- A. SGA insertion may be considered as an option for patients who require ventilatory support and who cannot be effectively ventilated via basic airway techniques (OPA/NPA, 2-person BVM ventilation, and good seal).
- B. An SGA should **not** be inserted in patients with an intact gag reflex, vomiting, or who can be effectively oxygenated and ventilated using BVM ventilation techniques.
- C. After SGA insertion, all of the same assessments and confirmatory measures outlined in the video laryngoscopy (VL) section apply (see Section 3 below). This includes *immediate* monitoring of continuous waveform in-line capnography to ensure the SGA is properly seated in the hypopharynx and the patient is being effectively ventilated.

Section 3: Endotracheal Intubation via Video Laryngoscopy (VL)

- A. Video laryngoscopy, when available, is the recommended first line mechanism by which patients should be intubated.
- B. Early intubation of patients in cardiac arrest has been de-emphasized. Emphasis should be placed on early, uninterrupted, high-quality compressions, and basic airway management.

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- C. A medical box response profile which includes an EMS Supervisor must be requested in all instances in which a patient requires intubation.
- D. Preparation for intubation should include but is not limited to the following:
 - a. Patients without suspected cervical or thoracolumbar spine injury or other indication to lie flat should be positioned in either a sniffing position or ear to sternal notch position with the head elevated. Unless the patient is being immobilized, cannot be moved from a flat position, or has another indication to lie flat, routinely laying patients flat for intubation is not recommended. Head elevation can be achieved using the stretcher or blanket rolls/pillows.
 - b. A BVM attached to high-flow oxygen, working suction, basic airway adjuncts, and all intubation equipment should be prepared and at the patient's side. Ensure suction is assembled and functional.
 - c. When possible, a high-flow nasal cannula should be left in place and increased to maximal flow prior to and during the intubation procedure. This achieves apneic oxygenation of the alveoli even in the absence of any spontaneous respiratory effort. This may be placed beneath a BVM or CPAP device when sufficient oxygen sources exist. The flowing nasal cannula should only be removed **after** confirmation of tube placement in the trachea.
 - d. Continuous SpO₂ and cardiac monitoring should be in place. Continuous waveform in-line capnography must be *immediately* available and attached between the endotracheal tube and BVM.
 - e. Video devices should be assembled, powered on, and endotracheal tube prepared (lubricated and loaded into the channeled King Vision blade; lubricated rigid stylet for (Glide Scope).
 - f. An intubation attempt is defined as the blade of the device passing the patient's teeth or gum line in an attempt to view the glottis.
 - g. Every intubation attempt **MUST** be documented in the eMeds report.
 - h. A second intubation attempt should *never* utilize the same approach as the first failed attempt. A second intubation attempt should be performed with some measurable and documented adjustment (i.e. adjusted patient position, 2nd attempt by more experienced provider, utilization of VL if 1st attempt was performed with DL prior to VL availability, etc).
 - i. There should always be a strategy in place to manage a failed airway attempt. (See attached algorithm for suggested Fail Option strategies)
 - j. Confirmation of proper endotracheal tube placement must include measurement and documentation of lung sounds, absent epigastric sounds, chest rise and fall, improvement in patient condition, SpO₂, and continuous waveform capnography. No less than four 'normal' end-tidal CO₂ tracings should be observed to confirm proper placement. The amplitude of the end-tidal tracing for each of these breaths should not significantly decrease.
 - k. Once the correct placement and verification of the endotracheal tube is completed, the depth of the endotracheal tube should be recorded (from the incisor or gum line) and an approved commercial endotracheal tube holder / securing device should be utilized to secure the endotracheal tube to the patient's face. It is not acceptable to tape the endotracheal tube to the patient's upper lip or face.
 - l. Confirmation of proper endotracheal tube position must be confirmed and documented at every patient transition point: with significant patient movement, from scene to transport unit, and just prior to transfer to receiving providers (MSP or ED staff).
 - m. Documentation of proper endotracheal tube placement should also include the signature of the verifying physician at the receiving hospital. This signature field can be found using the 'ALS AIRWAY' tab at

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the bottom of the 'vitals/treatments' tab in the eMeds Patient Care Report. If this is not possible, documentation of the hospital staff members name must be included in the eMeds report.

- n. Placement of a cervical collar on an intubated patient is not mandatory but may be considered to stabilize the head during transport. If the cervical collar is applied solely for the indication of head stabilization, this should be clearly documented and conveyed to receiving providers (MSP or ED staff).
- o. Should any staff member at a medical facility approach a provider with a concern regarding improper tube placement, the provider will immediately notify an EMS Supervisor. The Medical Director will be notified of any circumstances where improper tube placement was not recognized by the field providers and corrected in a timely manner.

Section 4: Endotracheal Intubation via Direct Laryngoscopy (DL)

- A. All items in Section 5 apply to intubation performed with direct laryngoscopy.
- B. Direct laryngoscopy will be considered a 'back-up' or rescue means of intubation when VL fails or is not available.
- C. Strong consideration should be given to insertion of a supraglottic airway device (i.e. King LTS-D) or basic airway management after VL failure.

Section 5: Nasotracheal Intubation (nasal intubation)

- A. May be performed by the Paramedic only as outlined in the procedure section of the Maryland State Protocols.
- B. Any administration of sedation (with opioid or benzodiazepine) must be approved by medical consultation.
- C. Always be prepared to manage epistaxis and complications from a traumatic intubation attempt.

Section 6: Continuous End Tidal Carbon Dioxide (ETCO₂) waveform in-line capnography (after insertion of an ETT or SGA)

- A. ETCO₂ is the Gold Standard to confirm, monitor, and document proper endotracheal tube placement.
- B. Continuous waveform in-line capnography monitoring **must** be initiated *immediately* after endotracheal intubation, nasotracheal intubation, or insertion of a supraglottic airway. This monitor must remain in place for the duration of care.
- C. If the patient has a pulse and no end-tidal capnography waveform is detected and doubt exists as to whether the endotracheal tube is positioned in the trachea versus the esophagus, the cuff should be deflated, tube removed, and basic airway management with an OPA/NPA and BVM ventilation resumed immediately.
- D. If a patient is pulseless, receiving chest compressions (HP-CPR), and no end-tidal capnography waveform is detected after intubation, the cuff should be deflated, tube removed, and basic airway management with an OPA/NPA and BVM ventilation resumed *immediately*. HP-CPR should produce cardiac output and some measurable end-tidal CO₂ generation. The complete absence of an end-tidal waveform even during the provision of HP-CPR makes the likelihood of esophageal intubation very high. Do not delay tube removal in the event of suspected esophageal intubation.

Section 7: Continuous waveform end-tidal nasal capnography (ETCO₂)

- A. Nasal capnography **may** be used for non-intubated patients who receive sedating medications in a sufficient amount (alone or in combination) to produce moderate or deep sedation. Moderate or deep sedation is characterized by the need for verbal or tactile stimulation to achieve purposeful responsiveness. These medications include: Morphine, Diazepam (Valium), Fentanyl, Haloperidol (Haldol), Ketamine, and Midazolam (Versed).
- B. The intended use of nasal capnography is for patients that are being actively sedated by an EMS provider using the above medications and patients being medicated using the chemical restraint and/or excited delirium syndrome (ExDS) protocol.

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- C. The routine use of nasal capnography is not indicated for every patient in respiratory distress and is not intended to replace an initial or ongoing patient assessment and clinical judgment.

Section 8: Needle Decompression Thoracostomy (NDT)

- A. NDT will be performed in accordance with Maryland State Protocols.
- B. Bilateral NDT should be considered for all patients in extremis or traumatic arrest due to multi-system blunt trauma or penetrating trauma to the neck, chest, or abdomen.
- C. While assembly and attachment of the three-way stop-cock and one-way heimlich valve are an option, this is not required after NDT of a patient in extremis or traumatic arrest.

Section 9: Documentation

- A. A 'code summary' will be uploaded to the eMeds report for all patients receiving nasal or in-line capnography monitoring, ventilatory support with BVM or CPAP, or with SGA or endotracheal tube insertion. Any patient with continuous waveform capnography must have a code summary attached to the EMEDS report. Upload of the code summary will not be limited to patients who sustain cardiac arrest.
- B. All airway related drop down menus and data fields must be completed in eMeds using the procedure tool.
- C. Intubated patients must have ETCO2 documented initially, at the time of transfer of care, and anytime a patient is moved.

Section 10: Training

- A. Approval to use any ALS airway adjunct, video laryngoscope, or similar airway device is contingent upon the provider successfully completing initial ALS training, a device in-service, and a bi-annual ALS skills check.
- B. Additional requirements for ALS airway training and special device utilization will be at the discretion of the Medical Director.

*****BSI-Face Mask and Eye Protection**

