Maine EMS Statement on “Rescue” or “Alternate” Airway Devices

Maine EMS recognizes 2 major classes of Blind Insertion Airway Devices (BIADs). The first class is periglottic devices, such as the LMA® and the second class is transglottic or potentially transglottic devices, such as the King LT®. Any FDA-approved devices from these classes are approved for use.

A c-spine collar should be considered to help protect placement of all endotracheal intubations, periglottic and transglottic airway devices.

There are periglottic devices on the market that can be used to facilitate endotracheal intubation. If these devices are placed without an attempt at endotracheal intubation, they may be treated as any other periglottic device. If they are used to assist in placing an endotracheal tube, that tube must be treated and confirmed as any other endotracheal intubation.

It is recommended to have *NO MORE THAN* one device per class (periglottic or transglottic).

Pre-Intubation Checklist

1. **Airway adjuncts ready**
   __ Suction
   __ Oropharyngeal airway/ 2 nasopharyngeal airways
   __ Nasal cannula for apneic oxygenation

2. **Intubation equipment ready**
   __ Laryngoscope assembled and functional
   __ ET tube ready with lubricant, bougie and syringe (Bougies should be used on all intubation attempts using size 6.0 ETT and above)
   __ Tube-securing device ready
   __ Continuous end-tidal CO_2 monitor ready
   __ OG Tube

3. **Back-up equipment ready**
   __ Blind Insertion Airway Device (i.e. LMA ®, iLMA®, or King®) available
   __ Consider surgical airway device

4. **Team ready**
   __ Airway manager
   __ BVM operator
   __ Assistant

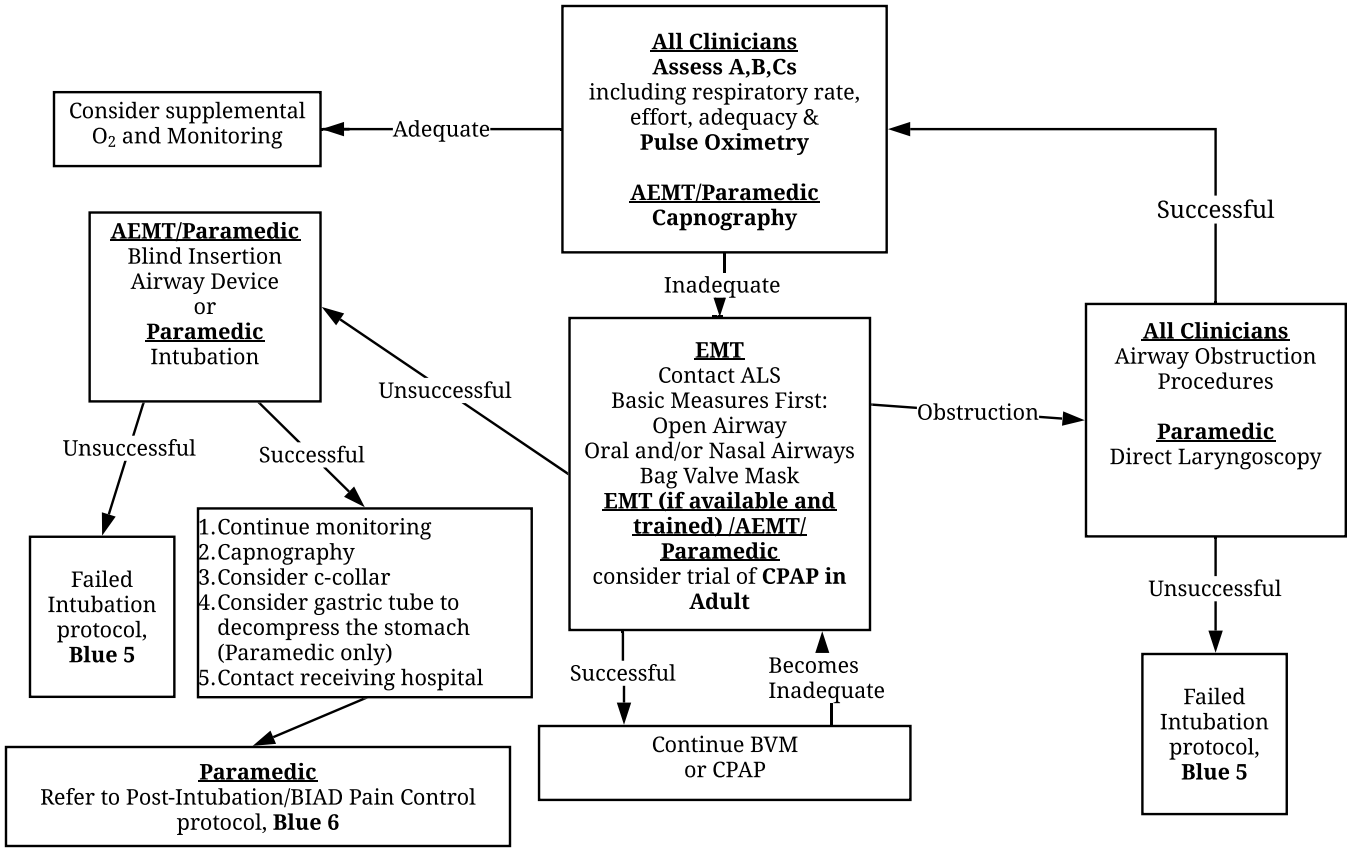
5. **Plan discussed**

6. **Patient ready**
   __ Pre-oxygenation/de-nitrogenation
   __ Vascular access
   __ Patient positioning (unless contraindicated)
      __ Ear-to-sternal-notch
      __ 30 degree head-of-bed elevation
   __ Monitoring in place
   __ Evaluate airway difficulty
   __ Prep for surgical airway as needed

7. **Post-intubation medications ready**
   __ Pain control:
      __ fentanyl
   __ Sedation (*requires OLMC*):
      __ midazolam **OR** __ ketamine

8. **Automatic ventilator settings (if available)**
   __ Volume: 6-8 mL/kg
   __ Rate: 16 (10 in asthma/COPD)

Airway Algorithm



- An intubation attempt is defined as passing a bougie or the endotracheal tube past the teeth or the endotracheal tube inserted into the nasal passage.
- Continuous capnography is **mandatory** for all patients with a BIAD or Endotracheal Tube; if prolonged use of BVM, consider use of capnography.
- The goal of airway management is adequate oxygenation, ventilation, and airway protection. If an effective airway is being maintained by BVM with an OPA and/or NPA(s), it is acceptable to continue with basic airway measures rather than BIAD or intubation.
- Consider addition of high-flow nasal cannula in addition to BVM/face-mask prior to intubation attempt if not meeting oxygenation goals. Keep in place during intubation attempt.
- The gastric tube may be connected to low suction (less than 80 mmHg).

Patients are more effectively ventilated with face-mask ventilation when:
1) A two-person ventilation technique is used
2) $ETCO_2$ is used to guide ventilation
3) Avoiding hypo- and hyperoxia
4) Avoiding hypo- and hyperventilation
5) Minimizing peak airway pressure
6) When tolerated, both oral and nasal airways are placed

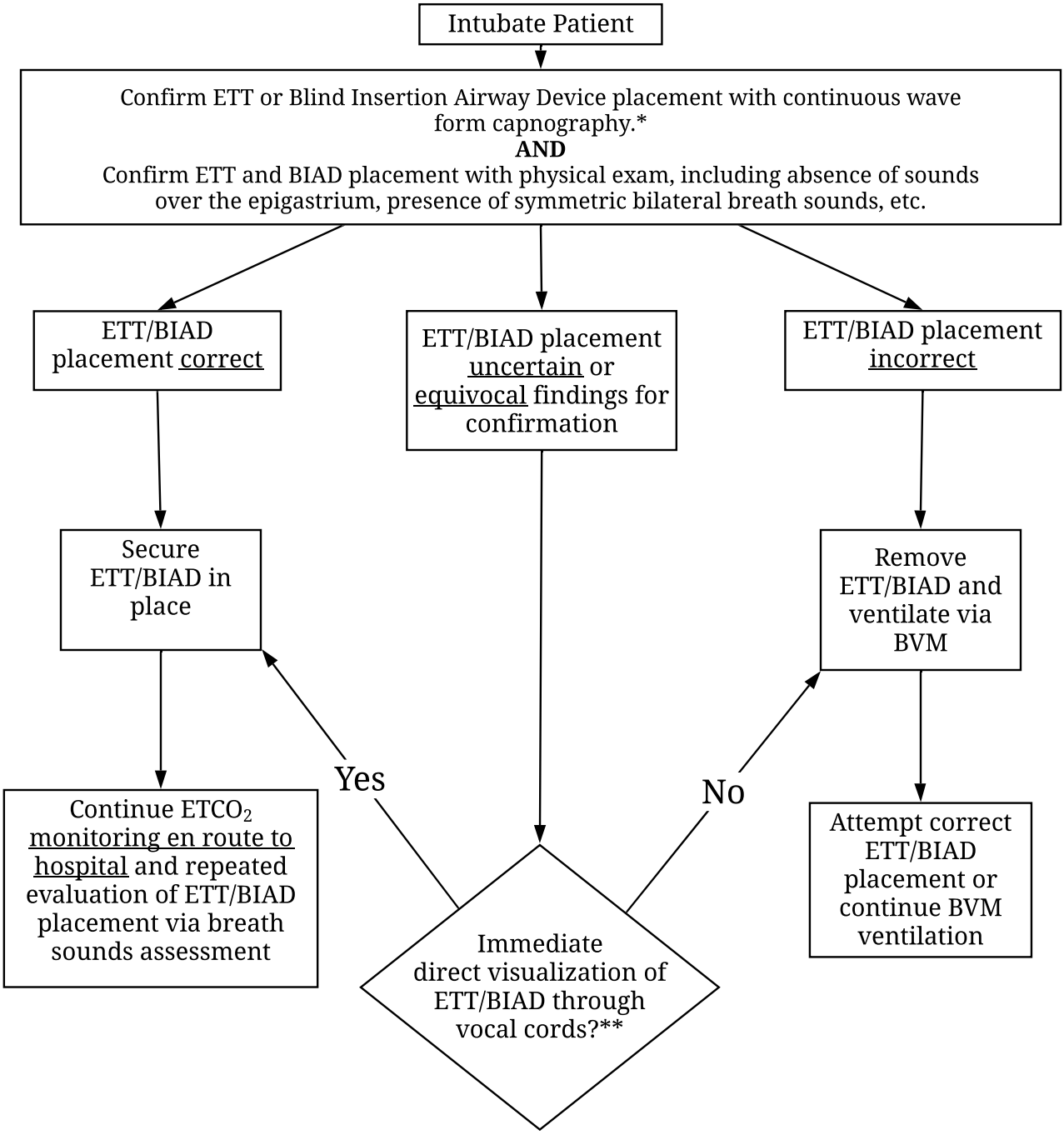
Face mask ventilation can be achieved with a transport vent if so trained (Adult only)

PEARLS for Endotracheal Intubation
* Position the airway for best view of the cords – raise head to the sniffing position (i.e. earlobe in-line with sternal notch)
* Preparation: (four cornerstones)
1) ET tube
2) Laryngoscope with backup blade
3) Suction
4) Bougie on every attempt for ETT size 6 or greater

*** Always have a back-up plan should the primary strategy fail***

When advanced airways are placed, secure the tube with either a commercial tube holder or tape, rather than held manually

Confirmation and Monitoring of Advanced Airways



* For cardiac arrest patients, consider placement of the ETT/BIAD as well as lack of pulmonary circulation in the interpretation of $ETCO_2$ findings.

** Nasotracheally-intubated patients should be assumed to have incorrect ETT/BIAD placement if findings of breath sounds or $ETCO_2$ results are uncertain or equivocal

Failed Intubation Algorithm

A "failed" intubation or the "can't intubate patient" is defined as two (2) unsuccessful intubation attempts by the most proficient technician on scene OR anatomy inconsistent with intubation attempts.

NO MORE THAN THREE (3) TOTAL ATTEMPTS PER PATIENT WITHOUT OLMC CONSULTATION.

Adequate oxygenation and ventilation with BVM?

Yes → Continue BVM → If SPO_2 drops less than 90% or it becomes difficult to ventilate with BVM

No → Facial trauma or unrelieved obstruction?

Yes → **Paramedic** Surgical airway → Ventilate, monitor for signs of adequacy including **$ETCO_2$** and **pulse oximetry** → Notify receiving hospital

No → Blind Insertion Airway Device → Notify OLMC or receiving hospital AS EARLY AS POSSIBLE regarding the patient's difficult airway

Continuous pulse oximetry and $ETCO_2$ monitoring should be utilized in all patients with difficult airways or respiratory distress.

FOR PEDIATRIC PATIENTS REQUIRING SURGICAL AIRWAY – Consider needle cricothyrotomy in patients less than 8 years old OR if physiologically young enough that surgical landmarks are NOT identifiable.

Post-Intubation/BIAD Pain Control

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All patients with an ETT or BIAD inserted who are **not** currently in cardiac arrest are at risk for pain, anxiety and self-extubation. Therefore, appropriate pain control and anxiolysis are required for all intubated patients. Signs of inadequate pain control/sedation include eye opening, coughing or gagging, sweating, tearing, new or worsening hypertension and/or tachycardia, tachypnea, or attempts to self-extubate.

EMT

1. Minimize stimulation

ADVANCED EMT

2. Place IV for anticipated medication administration

PARAMEDIC

3. Pain control
   a. **Adult & Pediatric:** Fentanyl 0.5 - 1 mcg/kg **IV/IO** every 15 minutes to a MAX cumulative dose of 5 mcg/kg

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4. Anxiolysis - Contact **OLMC** for **ONE** of the following options:

   a. <u>Midazolam</u>
      i. **Adult:** 0.5 - 2.5 mg **IV/IO** every 5 minutes, may repeat x 3 to a MAX cumulative dose of 5 mg OR 1-5 mg **IM** every 5 minutes, may repeat x 3 to a MAX cumulative dose of 10 mg
      ii. **Pediatric:**
         1. **6 months - 12 years:** 0.05 mg/kg **IV/IO** every 5 minutes to a MAX cumulative dose of 5 mg
         2. **6 months - 12 years:** 0.1 mg/kg **IM** (MAX single dose 5 mg) every 5 minutes to a maximum cumulative dose of 10 mg

-OR-

   b. <u>Ketamine</u> (**Adult ONLY**)
      i. 0.2 mg/kg **IV/IO**, max single dose of 25 mg. Mix in 100 mL bag of saline and infuse over 10 minutes via a pump. May repeat x 1 in 5 minutes
      ii. 0.4 mg/kg **IM**, max single dose 50 mg. May repeat x 1 in 10 minutes

It is important to **avoid** hypotension in the critically ill patient, especially post cardiac arrest and head injury. Since anxiolytics (midazolam and ketamine) can cause significant hypotension, it is recommended to treat pain first and anxiolysis (if needed) second. Anxiolysis should be treated with **either** midazolam **OR** ketamine, not a combination of the two as this could cause profound hypotension.

Respiratory Distress with Bronchospasm #1
(COPD, Emphysema, Chronic Bronchitis, Asthma)

CAUTION: RESPIRATORY DISTRESS MAY BE DUE TO MULTIPLE OTHER CAUSES FOR WHICH OTHER TREATMENTS MAY BE INDICATED, INCLUDING THE FOLLOWING:

Pulmonary Edema, see **Blue 11**
Anaphylaxis, see **Gold 1**
Chest Trauma, see **Green 10**

EMT/ADVANCED EMT

1. O_2 as appropriate
2. If needed, assist ventilations with positive pressure ventilation using 100% O_2
3. Request ALS (see **Purple 1**)
4. Ipratropium bromide 0.5 mg / albuterol sulfate 2.5 mg nebulizer if greater than one (1) year of age with continued respiratory distress. Every 5 minutes, may repeat x 2 as needed for ongoing symptoms.
5. Consider CPAP* in patients > 18 y/o if no improvement after three nebulizers.
   *CPAP at the EMT level only if available, and so trained

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Recall that CPAP should *never* take the place of bronchodilators and should be used only **after,** or in concert with, inhaled bronchodilators in patients with acute bronchospasm. If CPAP is going to be used in the asthmatic, nebulizers *must* be administered *simultaneously**.

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6. If CPAP is initiated, do the following:
   a. Ensure ALS has been requested (see **Purple 1**). ALS clinicians bring additional therapies to support the management of patients requiring CPAP.
   b. Contact OLMC for the following treatment options:
      i. Ipratropium bromide 0.5 mg / albuterol sulfate 2.5 mg nebulizer every five minutes while the patient remains on CPAP
      ii. For severe disease refractory to CPAP ONLY: Epinephrine
         1. Adult – EPINEPHrine 0.3 mg **IM** of 1mg/1mL every 20 minutes
         2. Pediatric - EPINEPHrine dose which is as follows: < 25 kg, 0.15 mg **IM** [0.15 mL of 1mg/mL], > 25 kg, 0.3 mg **IM** [0.3 mL of 1mg/mL] in anterolateral thigh every 20 minutes

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ADVANCED EMT

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7. Cardiac monitor
8. Manage airway as needed, refer to **Blue 3**

PARAMEDIC

9. **Adult/Pediatric**

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   a. Albuterol 2.5 mg by nebulization. May repeat 1 time; **or**
   b. Ipratropium bromide 0.5 mg / albuterol sulfate 2.5 mg nebulizer if greater than one (1) year of age and in continued respiratory distress. May repeat every five minutes x 2.

(continued)

10. Dexamethasone
    a. **Adult:**
        i. 10 mg **IV/IM/IO** x 1 **OR,**
        ii. If patient can tolerate oral medications, is not in overt respiratory distress, and is not requiring an airway management technique that obscures access to the mouth (i.e. O2 mask or CPAP) consider 10 mg PO x1
    b. **Pediatric:**
        i. 0.6 mg/kg (single MAX dose of 10 mg) **IV/IM/IO** x 1 **OR,**
        ii. If patient can tolerate oral medications, is not in overt respiratory distress, and is not requiring an airway management technique that obscures access to the mouth (i.e. O2 mask or CPAP) consider 0.6 mg/kg (single MAX dose of 10 mg) PO x1

11. For patients not improving with the above measures, consider the following OPTIONS:
    a. Repeated or continuous albuterol by nebulization or inhaler.
    b. For patients in status asthmaticus
        i. Epinephrine
            1. **Adult:** EPINEPHrine 0.3 mg **IM** of 1mg/1mL every 20 minutes
            2. **Pediatric:** EPINEPHrine dose which is as follows: Less than 25 kg, 0.15 mg **IM** [0.15mL of 1mg/mL], Greater than 25 kg, 0.3 mg **IM** [0.3 mL of 1mg/mL] in anterolateral thigh every 20 minutes
        ii. Magnesium Sulfate
            1. **Adult:** Magnesium Sulfate 2 grams **IV/IO** over 10 minutes, consider placing this medication on a pump.
            2. **Pediatric:** Magnesium Sulfate 50 mg/kg **IV/IO** with a MAX dose of 2 grams over 10 minutes; consider placing this medication on a pump.

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***Asthmatic patients**:
Airway management of asthmatic patients is primarily pharmacological, not mechanical. Therefore, the focus should be on taking those actions that enable the clinician to provide inhaled bronchodilators and, in patients with severe bronchospasm, obtain rapid IV or IO access, administer IV dexamethasone, IV magnesium, and consider **IM** EPINEPHrine. Due to the pathophysiology of asthma, positive pressure ventilation (facemask, BIAD, or endotracheal intubation) rarely, if ever, is an effective treatment without pharmacological intervention. Therefore, unless the patient is apneic, provide supplemental oxygen via non-rebreather and focus on providing pharmacological interventions. CPAP, with the lowest PEEP setting possible, is a last resort and a bridge to intubation. Specifically, if CPAP is going to be used in the asthmatic, continuous nebs *must* be administered *simultaneously* and the clinician must be prepared to proceed with advanced airway management.

Respiratory Distress with Bronchospasm #3
(COPD, Emphysema, Chronic Bronchitis, Asthma)

Pediatric Considerations:

Wheezing in the child less than 2 years old is very commonly due to bronchiolitis. Bronchiolitis is a self-limited viral illness of the bronchioles, marked by edema but not smooth muscle contraction. Bronchiolitis is the most common cause of wheezing in children under the age of 2. The treatment goals are to maintain oxygenation and hydration and to monitor for apnea and respiratory distress. Because the etiology is different than asthma, the treatment options are also very different. Patients suffering from bronchiolitis **do not always benefit from inhaled albuterol, though a trial is appropriate. They also do not benefit from steroids**. Instead, provide oxygen to ensure O_2 sats greater than or equal to 90% and nasal suctioning with bulb syringe. In patients who fail these measures, consider alternate diagnosis, including stridor/croup and refer to **Pink 2**. Monitor for apnea or respiratory distress and, if encountered, manage the patient's airway as indicated per **Blue 3**.

Prehospital clinicians should consider patient age, diagnosis, transport time, clinician experience, and effectiveness of ongoing bag-mask ventilation in considering whether to continue with bag-mask ventilation versus proceeding to further airway management procedures. Bag-mask ventilation has been shown to be equivalent to endotracheal ventilation in pediatric patients in most situations with short transport times. If suspected opiate overdose, refer to the Poisoning/Overdose protocol, **Yellow 1**.

Anxiolysis in CPAP

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Adult patients with respiratory failure who are unable to oxygenate and ventilate often require CPAP. These patients may be combative and unable to tolerate CPAP either due to their hypoxia or anxiety.

EMT/Advanced EMT/Paramedic

1. Attempt coaching

PARAMEDIC

2. Consider ondansetron 4 mg **IV/IO/IM** if CPAP causing nausea and bloating

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3. If unable to achieve sufficient anxiolysis to tolerate CPAP with coaching, contact **OLMC** for for **ONE** of the following anxiolytics:

   a. Midazolam
      i. 0.5 - 2.5 mg **IV/IO** every 5 minutes, may repeat x 3 to a MAX cumulative dose of 5 mg
      ii. 1-5 mg **IM** every 5 minutes, may repeat x 3 to a MAX cumulative dose of 10 mg

-OR-

   b. Ketamine
      i. 0.2 mg/kg **IV/IO**, MAX single dose of 25 mg. Mix in 100 mL bag of saline and infuse over 10 minutes via a pump. May repeat x 1 in 5 minutes
      ii. 0.4 mg/kg **IM**, MAX single dose 50 mg. May repeat x 1 in 10 minutes

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Pulmonary Edema (without shock)

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Avoid nitroglycerin in any patient who has used a phosphodiesterase inhibitor within the past 48 hours. Examples are: sildenafil (Viagra, Revatio), vardenafil (Levitra, Staxyn), tadalafil (Cialis, Adcirca) which are used for erectile dysfunction and pulmonary hypertension. Contact OLMC for options in patients who have taken such medicines.

If initial systolic BP is less than 100 mmHg, refer to "Cardiogenic Shock" protocol, **Red 22.**

EMT

1. O_2 as appropriate. Assist ventilations (PPV) if needed
2. Assess for shock
3. If BP greater than 100 mmHg, place in sitting position
4. Request ALS
5. If available, and so trained, consider trial of CPAP

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6. Cardiac monitor and 12-lead ECG
7. IV en route
8. Manage airway as needed, refer to **Blue 3**

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9. Contact OLMC for administration of nitroglycerin 0.4 mg tab or 1 spray **SL**. Repeat nitroglycerin at 2-minute intervals if systolic BP greater than 100 mmHg. After initiation of SL nitroglycerin, may place 1 inch of nitroglycerin ointment 2% to the chest wall if BP greater than 100 mmHg and remove nitroglycerin ointment 2% if BP less than 100 mmHg. If the patient has had nitroglycerin before and no IV is established, and systolic BP is greater than 100 mmHg, then it is OK to give nitroglycerin.

10. Consider use of CPAP

PARAMEDIC

11. Paramedic may perform all treatments above without medical control

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12. Contact OLMC if above measures are not working

Pulmonary Hypertension Complications

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There are increasing numbers of patients being treated for pulmonary hypertension throughout the State of Maine. Pulmonary hypertension is a disease in which a patient's pulmonary arterial pressures are elevated and can be due to multiple factors, including heart disease, chronic lung disease, or thromboembolic disease. Additionally, in some cases of pulmonary hypertension, the etiology is uncertain. Patients manifest with multiple clinical symptoms, including dyspnea, chest pain and syncope. Pulmonary hypertension is NOT a disease that will be diagnosed in the prehospital setting. Increasingly, patients are being treated for the disease with medications that cause pulmonary vascular vasodilation, such as treprostinil (Remodulin).

EMT
Transport Destination
Preferably, patients suffering from pulmonary hypertension who are treated by a specialist should be transported to the hospital managing their disease for ALL emergencies whenever feasible or operationally reasonable. If operational circumstances or the patient's needs dictate otherwise, please transport to the closest reasonable facility. Please consult OLMC for any questions.

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Medication Interruption
Treprostinil (Remodulin) and other medications used to treat pulmonary hypertension are provided by central access, typically through a pump. Patients are often treated with both IV and oral medications. Disruptions of the patient's IV medications can lead to increased symptoms. Most medication interruptions are NOT related to the pump, but rather the patient's central line and loss of access. In the case of interruptions of IV medication due to loss of central access:

1. Establish peripheral access

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PARAMEDIC

2. Verify the patient's medication and dose
3. Re-initiate the patient's medication through the newly-established peripheral access
4. Consider the transport destination suggestions as listed above.

PEARLS FOR PULMONARY HYPERTENSION COMPLICATIONS

Most medications used to treat pulmonary hypertension have a high pH and if left running through a peripheral line too long (greater than 4 hours) may cause peripheral vein phlebitis and sclerosis. Please document the time the medication was initiated through the peripheral line and alert treating Emergency staff.

For any questions, please contact On-Line Medical Control.

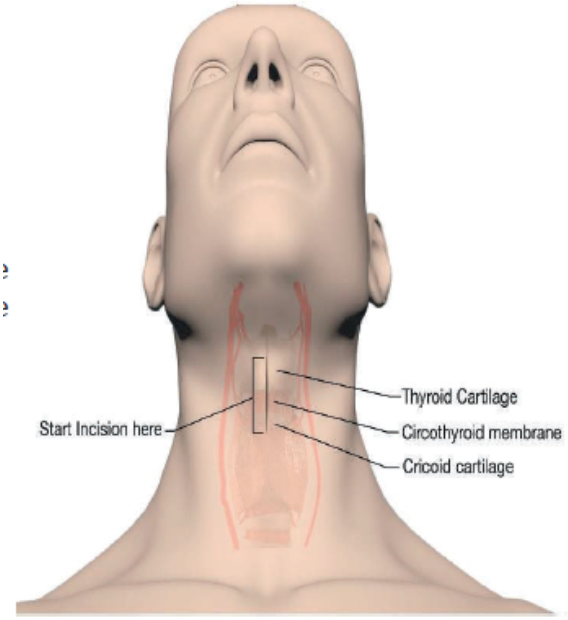
Surgical Cricothyrotomy #1

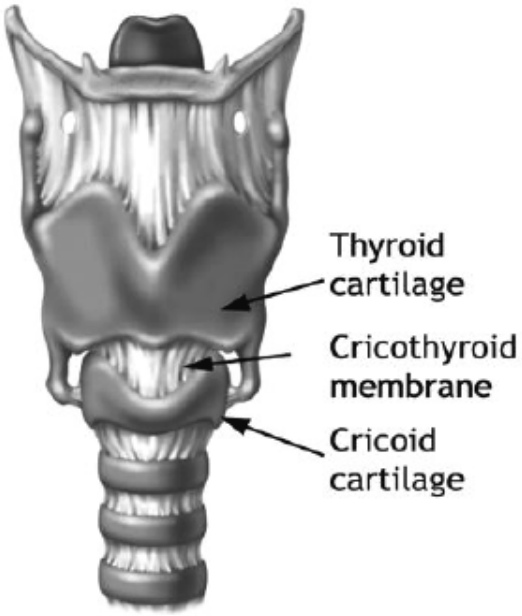
The following protocol is an effort to maintain awareness of a procedure that occurs rarely in the Maine EMS system. Ultimately, this procedure should be practiced on a regular basis to maintain proficiency. PLEASE NOTE, this protocol describes a generally acceptable open cricothyrotomy and will differ from services that employ percutaneous kits. The inclusion of this protocol DOES NOT mandate that all clinicians use this exact procedural description. Clinicians should employ the procedure they are trained, practiced and most comfortable with. This protocol is one of multiple acceptable means to perform this procedure. Regardless of the procedure type, it is essential that Maine EMS paramedics are familiar with the available supplies and materials.

The primary indication for surgical cricothyrotomy is failure to maintain the airway (including oxygenation, ventilation, and protection) through other, less invasive means in a patient 8 years or older with palpable landmarks. In the Maine EMS experience, this has occurred predominantly in trauma cases with disruption of the face and normal airway anatomy and in choking patients. Even in some dramatic facial injuries, the airway may be adequately managed by sitting the patient up and leaning forward, as long as the other injury patterns allow.

Materials/Equipment for Surgical Cricothyrotomy

1. Cuffed tracheostomy tube or 6.0 - 7.0 ETT
2. Tracheal hook or bougie
3. Trousseau dilator (if available)
4. Syringe to inflate cuff
5. Scalpel (No. 11 blade)
6. Umbilical tape or other means to secure tracheostomy tube or ETT
7. 4x4 gauze

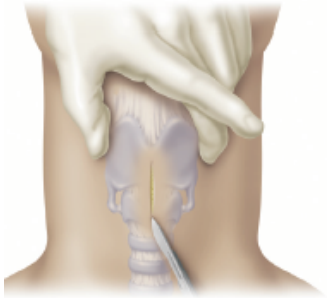


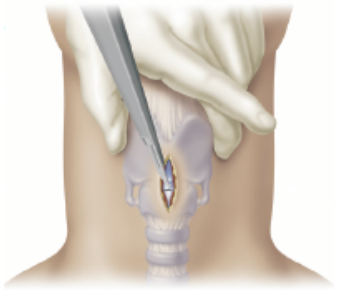


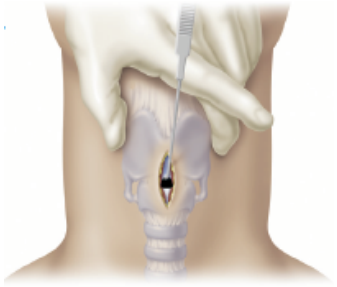
Surgical Cricothyrotomy #2

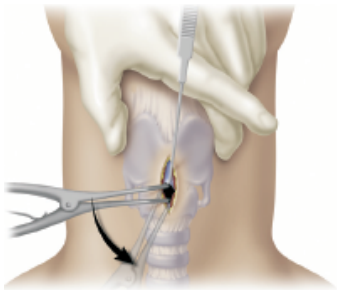
Procedure:

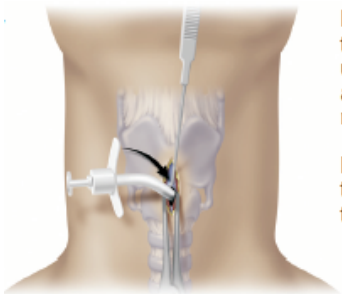
1. Extend the neck when possible to ensure best access to the trachea. Swab/cleanse the area.
2. Immobilize the trachea with your non-dominant thumb and middle finger while palpating the cricothyroid membrane with your non-dominant index finger. NOTE: The cricothyroid membrane is immediately BELOW the thyroid cartilage.
3. Make a 3 - 5 cm **vertical** incision over the cricothyroid membrane through the skin and subcutaneous tissues. NOTE: Severe bleeding is possible with this procedure and may occur at this or the following steps. Be prepared to suction and provide direct pressure to control bleeding
4. Palpate the membrane through the incision to confirm anatomy.
5. Make a small (1 cm or less) incision **horizontally** through the cricothyroid membrane.
6. Insert the tracheal hook or bougie in the opening of the membrane and rotate toward the head while maintaining hold of the thyroid cartilage with your non-dominant hand.
7. If Trousseau dilator available, insert into the incision site and spread vertical then rotate 90 degrees until the dilator is parallel with the neck.
8. Insert the cuffed tracheostomy tube or ETT tube into the incision site. Advance until the flanges rest on the skin of the neck (when using tracheostomy tube).
9. Carefully remove the dilator (if used), tracheal hook and obturator of the tracheostomy tube.
10. Inflate the balloon of the tracheostomy tube/ETT.
11. Ventilate and confirm position by physical exam and ETCO2.
12. Secure the tube in place.
13. Dress incision site.











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Tracheostomy Care #1

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Indication:
An adult or pediatric patient with an established tracheostomy with signs of respiratory distress or failure.

Procedure:

1. Consult the patient's caregiver for assistance.
2. Assess the tracheostomy tube looking for easily reversible causes of distress, including detached oxygen source, plugging, etc.
3. Administer high-flow O2 over the tracheostomy via non-rebreather mask or blow by.
4. If patient's respiratory distress continues, assist ventilation using a bag-valve-mask to the tracheostomy tube.
5. Suction the tracheostomy tube if unable to ventilate with BVM, course upper airway sounds or if respiratory distress continues despite BVM ventilation
   a. Use the patient's suctioning supplies or a tube that is no more than 1/2 the diameter of the tracheostomy tube.
   b. Use no more than 80 mmHg suction pressure in **pediatric** patients and 150 mmHg in **adults**
   c. If tracheostomy tube has a cannula, remove it prior to suctioning
   d. Determine the proper suction catheter depth by measuring the obturator. If no obturator is available, insert the suction catheter 2-3 inches into the tracheostomy tube. DO NOT force the suction catheter into the tracheostomy tube.
   e. Pre-oxygenate when possible for 30-60 seconds then insert the suction catheter to the desired depth. Apply suctioning while removing the catheter. Gently rotate the catheter while withdrawing. This should take 10 - 15 seconds.
6. Consider using 2 - 3 mL of saline or nebulized saline to help loosen thick secretions
7. If respiratory distress continues, consider likely cause and reference appropriate protocol

In the case of an adult or pediatric patient with established tracheostomy tube (greater than 1-2 weeks old), in respiratory distress or failure in which the above measures have not succeeded in improving respiratory status, consider replacing the tracheostomy tube. This protocol may also be appropriate for patients with dislodged tracheostomy tubes.

PEARLS FOR TRACHEOSTOMY CARE
There are many types of tracheostomy tubes on the market. One of the most common types is the Shiley. These tracheostomy tubes have an inner and outer cannula. **PLEASE NOTE:** only the inner cannula has a 15 mm adapter that will fit a BVM, the outer cannula will not. The inner cannula MUST be in place to ventilate the patient

ANY bleeding from the tracheostomy site should be evaluated emergently. Follow the Hemorrhage/Hemorrhagic Shock protocols, **Green 15 - 18,** AND, in the case of severe hemorrhage from the tracheostomy site, hyperinflate the tracheostomy cuff with 50 mL of air, in an effort to tamponade the bleeding vessel. Inflate slowly, to prevent cuff rupture. Depending on the make and model of the tube, inflating the entire 50 mL may not be possible.

Tracheostomy Care #2

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Indication for Tracheostomy Replacement:
An **adult** or **pediatric** patient with an established tracheostomy (greater than 2 weeks old) with signs of respiratory distress or failure that have not improved with measures listed on the previous page. Also, for patients dislodged tracheostomy. If tracheostomy tube is less than 2 weeks old, refer to **Blue 3** and attempt to secure airway from above.

Necessary Equipment:
- Replacement tracheostomy tube, if available (from the patient or care giver)
- If no replacement tracheostomy tube is available, an ETT of similar internal diameter (see below)
- If possible, water-based lubricant jelly

Procedure:
1. Place the patient on high-flow O2 and monitor
2. Place patient in a semi-recumbent position with the neck slightly extended
3. Remove old stoma dressing and clean the site
4. Lubricate the new tracheostomy tube or replacement ETT
5. Deflate the old tracheostomy tube's balloon and remove during exhalation
6. Using the replacement tracheostomy tube's obturator, insert the replacement tube at a 90 degree angle to the cervical axis.
7. Next, gently advance the replacement tracheostomy tube in a fluid fashion, using the natural curvature of the tube until the flange is flush against the neck.
8. Remove the obturator if using a replacement tracheostomy tube and insert the hollow internal cannula.
9. If using an ETT as replacement, remove the old tracheostomy tube as described above, insert a bougie into the stoma directed downward. Slowly advance the lubricated ETT into the stoma. RECALL, when using an ETT as replacement, it need only be advanced a few centimeters into the stoma. Consider shortening the ETT by cutting the tube AFTER the takeoff for the balloon inflation.
10. Inflate the cuff of the replacement tracheostomy tube or ETT
11. Secure the device to the patient's neck.

Portex Cuffed D.I.C. Tracheostomy Tubes		Shiley Tracheostomy Tubes	
Portex Tube Size (mm) and Color	Internal Diameter (mm) / ETT Equivalent	Shiley Tube Size	Internal Diameter (mm) / ETT Equivalent
3.0	3.0 / 3.0-3.5	3.0 (NEO or PED)	3.0 / 3.0-3.5
3.5	3.5 / 3.5-4.0	3.5 (NEO or PED)	3.5 / 3.5-4.0
4.0	4.0 / 4.0-4.5	4.0 (NEO or PED)	4.0 / 4.0-4.5
5.0	5.0 / 5.0	4.5 (NEO or PED)	4.5 / 4.5-5.0
6.0 (orange)	6.0 / 6.0	5.0 (NEO or PED)	5.0 / 5.0
7.0 (green)	7.0 / 7.0	6	6.4 / 6.0-7.0
8.0 (white)	8.0 / 8.0	8	7.6 / 7.0-8.0
9.0 (blue)	9.0 / 9.0	10	8.9 / 9.0
10.0 (yellow)	10.0 / 10.0		

PEARLS FOR TRACHEOSTOMY CARE
Please Note - the internal diameter of an ETT is designated by the tube name - i.e. 6.0 tube has a 6.0 mm internal diameter. If the tracheostomy is less than 2 weeks old, the track is immature and there is risk of creating a false lumen if attempts to replace or change the tracheostomy are made.