

TRAUMA AIRWAY MANAGEMENT GUIDELINES

Purpose: Providing a standardized and interdisciplinary approach to the airway management of trauma patients. These guidelines were created through a collaborative effort between the Departments of Anesthesia, Emergency Medicine, and Trauma Surgery.

Approach to Airway Management:

Early recognition of the difficult airway and a methodical, prepared approach will assist in establishing a safe and successful intubation. The emergency airway management algorithms endorsed by the American Society of Anesthesiologists is included in this guideline and attached as appendix.

Indications for Intubation:

Airway management is a critical component of resuscitation of the trauma patient. Clinical indications for endotracheal intubation may include:

- Airway Obstruction or high risk for airway obstruction
- Severe/uncontrollable nasal, pharyngeal, or upper airway hemorrhage
- Altered mental status c/w traumatic brain injury or aspiration risk (GCS ≤ 8)
- High spinal cord lesion with insufficient respiratory mechanics
- Cardiac Arrest
- Refractory or severe hypoventilation
- Refractory or severe hypoxia
- Hemorrhagic shock with incipient respiratory failure
- Severe smoke inhalation, major thermal or chemical burns
- Cellular hypoxia (ie. CN or CO intoxication)
- Anticipated clinical course that includes any of the above

Guidelines:

The following guidelines are acceptable best practices for airway management in trauma patients:

1. Roles, Experience & Training in emergency airway management

- Physicians performing intubation of trauma patients should have prior training in emergency airway management and the approach to the difficult airway.
- The physician should also have familiarity with the available equipment, personnel, and protocols of trauma airway management in the Emergency Department.
- Physicians should have knowledge of indications and contra-indications of the available airway devices
- The decision to intubate a patient will ultimately be made by the responsible attending staff from Trauma, Anesthesiology or Emergency Medicine.

- The primary team responsible for patient intubation will be determined by the prior written policy between the Departments of Emergency Medicine, Anesthesia, and Trauma Surgery:
 - Monday 6:00 AM until Saturday 6:00 AM: Anesthesia team
 - On Anesthesia airway days the Anesthesia Attending will make an initial assessment of the need for and likely technical difficulty of the airway. If they deem the airway within the skills of the Anesthesia Resident they will supervise the Anesthesia Resident in securing and managing the airway. If they deem the airway advanced with potential technical difficulty they will secure the airway themselves without teaching or supervision. On days where a CA3 is present with the Anesthesia Attending
 - Saturday 6:00 AM until Monday 6:00 AM: Emergency Medicine team
 - On EM airway days the Anesthesia Attending will make an initial assessment of the need for and likely technical difficulty of the airway. If they deem the airway straightforward and likely not requiring advanced airway technical skill and experience they will assume an advisory role and turn the intubation over to the EM team to be performed by the EM attending and EM resident. The Anesthesia team will remain directly involved to advise and assist with securing and managing the airway.

2. Preparation

The equipment available for airway management will be regularly checked and restocked per Emergency Department Protocol. The physician managing the airway will be responsible for checking:

- Functioning and appropriately sized laryngoscopes (blades, handles) and endotracheal tubes (Adults: size 6.0-8.0; Pediatrics: size 3.5-6.0; styletted and balloon tested)
- Oral and nasal airways
- Intravenous access
- Cardiac monitoring
- Oximetry and Capnography
- Suction (Yankauer, endotracheal suction)
- Bag-Valve-Mask (BVM)
- Supraglottic device (LMA)
- Cricothyrotomy kit
- Availability of medications for airway management

3. Assessment

- In order to identify a possible difficult airway, the airway team should perform early examination (when feasible), including Mallampati score and assessment of thyromental distance, neck circumference and injury pattern to the head and neck.

- When a difficult airway is encountered or anticipated, a call for additional equipment and resources should be made. The anesthesia team should be called if not already present.

4. Positioning

- If there is concern of cervical spine injury, cervical spine immobilization should be maintained prior to intubation and after the airway is secured.
- During the procedure, the cervical spine collar (if used) should be opened and an assistant designated by the airway physician will provide manual in-line cervical spine stabilization
- Cricoid pressure should be applied when considered appropriate. If an inadequate view is encountered, the intubating physician may manually reposition the larynx, or direct the assistant to release cricoid pressure.

5. Preoxygenation

- If feasible, patients will be administered 100% oxygen for at least 3 minutes, or 8 vital capacity breaths by BVM prior to intubation

6. Medications

- In case of peri-intubation hemodynamic collapse vasoactive drugs (ACLS) should be available, including atropine, phenylephrine, and epinephrine.
- Any pre-intubation medications that may effect the patient's hemodynamic or respiratory status must be discussed with the airway management team prior to administration.
- The medications given for rapid sequence induction and intubation will be under the direction of the attending physician supervising airway management
- As medications are administered, they will be announced and recorded by the nursing scribe during the resuscitation
- Upon successful intubation, post-intubation sedation medications will be ordered by the airway physician after a discussion with the resuscitation leader

7. Pre-treatment

- In selected patients with signs of increased intracranial pressure, aortic dissection, or reactive airway disease the following medications may be considered as pre-treatment:
 - Lidocaine 1.5mg/kg IV
 - Fentanyl 1-3mcg/kg IV (caution: hypovolemia with hypotension)

8. Induction

- The following medications are recommended for induction
 - Etomidate 0.2-0.3 mg/kg IV
 - Propofol 0.25-2.0mg/kg IV (caution: hypotension, especially in TBI)

9. Paralysis

- The following medications are recommended for paralysis
 - Succinylcholine 1.0 - 1.5 mg/kg IV (caution: contraindications!)
 - Alternative: Rocuronium 1.0 - 1.2 mg/kg

10. Confirmation

- After placement of an endotracheal tube, its' proper placement should always be confirmed by continuous capnography, auscultation of breath sounds, and absence of gastric ventilatory sounds
- If feasible a Chest X ray should be performed
- If there are any doubts about the proper tube placement it may be checked with a fiberoptic bronchoscope

11. Post Intubation Management

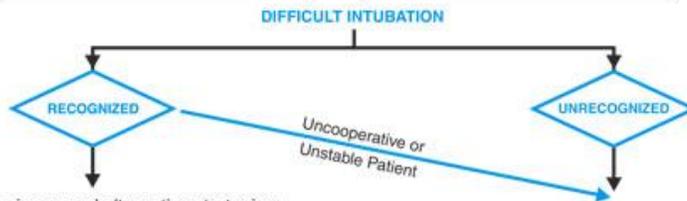
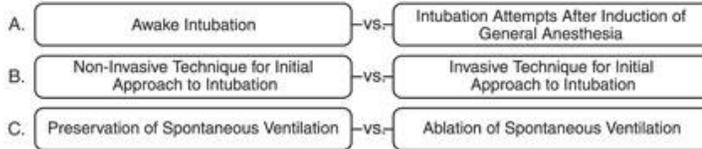
- After the placement of a cuffed endotracheal tube has been verified, the following medications are suitable for post-intubation sedation, when needed.
 - Midazolam 0.01-0.05 mg/kg IV, Or
 - Alternative: Propofol 25-100 mcg/kg/min IV drip (caution: hypotension)
- For pain control, the following medication is recommended:
 - Fentanyl 1-3 mcg/kg IV
- If paralysis is required, the following medication is recommended:
 - Rocuronium: 0.5 mg/kg IV

References:

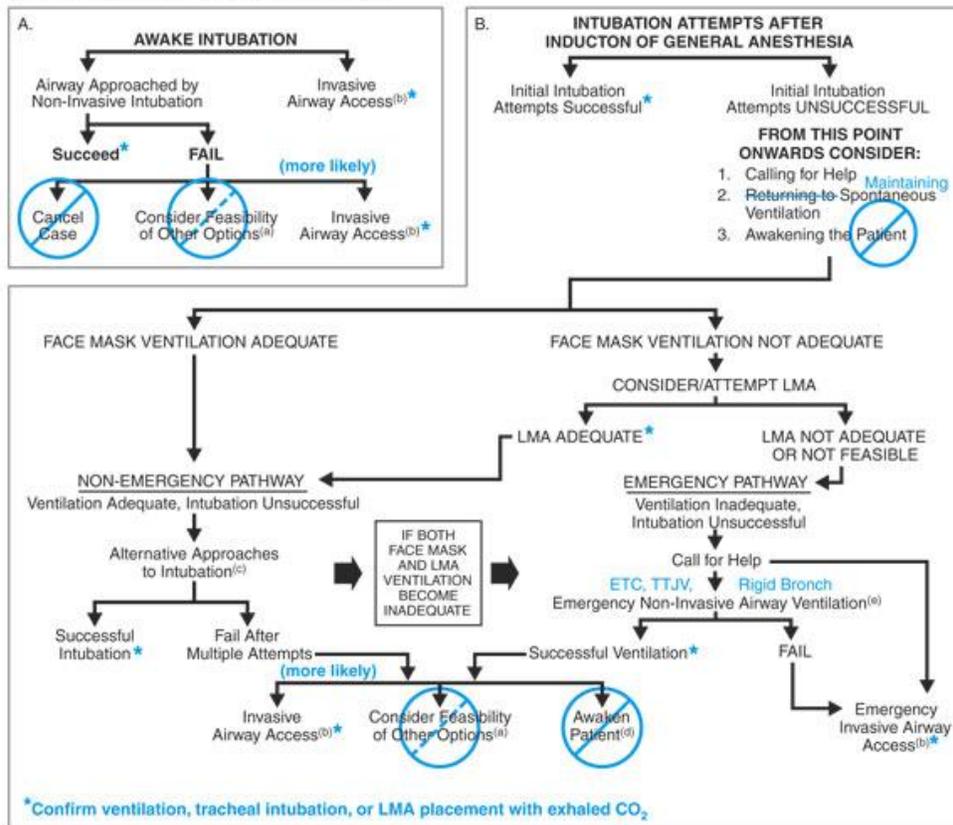
Practice guidelines for the management of the difficult airway. An updated report by the American Society of Anesthesiologists Task Force on Management of the Difficult Airway. *Anesthesiology* 2003; 98:1269-1277
(<http://www.asahq.org/Knowledge-Base/Trauma-and-Emergency-Preparedness/ASA/Trauma-Airway.aspx>)

2003 DIFFICULT AIRWAY ALGORITHM (MODIFIED FOR TRAUMA)

1. Assess the likelihood and clinical impact of basic management problems.
 - A. Difficult Ventilation
 - B. Difficult Intubation
 - C. Difficulty with Patient Cooperation or Consent
 - D. Difficult Tracheostomy
2. Actively pursue opportunities to deliver supplemental oxygen throughout the process of difficult airway management.
3. Consider the relative merits and feasibility of basic management choices:
 - A. Awake Intubation vs. Intubation Attempts After Induction of General Anesthesia
 - B. Non-Invasive Technique for Initial Approach to Intubation vs. Invasive Technique for Initial Approach to Intubation
 - C. Preservation of Spontaneous Ventilation vs. Ablation of Spontaneous Ventilation



4. Develop primary and alternative strategies:



- Other options include (but are not limited to): surgery utilizing face mask or LMA anesthesia, local anesthesia infiltration or regional nerve blockade. Pursuit of these options usually implies that mask ventilation will not be problematic. Therefore, these options may be of limited value if this step in the algorithm has been reached via the Emergency Pathway. Judgment required. Rarely appropriate for trauma patients.
- Invasive airway access includes surgical or percutaneous tracheostomy or cricothyrotomy.
- Alternative non-invasive approaches to difficult intubation include (but are not limited to): use of different laryngoscope blades, LMA as an intubation

- conduit (with or without fiberoptic guidance), fiberoptic intubation (FOB), intubation stylet or tube changer (airway exchange catheter, AEC) light wand, retrograde intubation, and blind oral or nasal intubation.
- Consider re-preparation of the patient for awake intubation or canceling surgery. Rarely applicable in the trauma patient.
- Options for emergency non-invasive airway ventilation include (but are not limited to): rigid bronchoscope (Rigid Bronch), esophageal-tracheal combitube ventilation (ETC), or transtracheal jet ventilation (TTJV).
- Extubation strategies include: evaluation of the airway with FOB and extubation over an airway exchange catheter (AEC).