These guidelines are based upon medical literature review and expert opinion and are intended to provide recommendations for AIRWAY MANAGEMENT in the care of critically ill patients.

**Best Practice Guidelines**

**Checklist for Intubation – “Time Out”**

_____  Position the patient: place pillow under shoulders and raise bed to 30 degrees, begin preoxygenation/denitrogenation with 100% NRB or bag assistance while preparing drugs and equipment.

_____  Check the chart for previous intubation records: Procedure Notes, Anesthetic Care Records

_____  Perform a focused physical exam: Airway, Cardiac, Dentures/Dentition

_____  Identify medication administrator and practitioner to monitor vital signs

_____  Identify the laryngoscopist and back-up personnel

_____  Verify IV is free-flowing with fluids running, not below the BP cuff, and not proximal to infusions

_____  Verify pulse oximeter is not below BP cuff, the QRS volume is 2, cardiac monitor (EKG) utilized

_____  Verify the BP frequency is q3 minutes or more frequent in the absence of an arterial line

_____  Verify laboratory values: serum potassium and creatinine

_____  Verify medications with physician provider (drugs and doses will vary, likely one from each category):

- Sedative-Hypnotic
- Neuromuscular Blockade
- Vasoactive and/or ACLS medications
- Post-intubation sedation – e.g. Propofol infusion, Dexmedetomidine infusion

_____  Bag-valve-mask connected to Oxygen at 10L/min with PEEP valve

_____  Carbon Dioxide (EZ-Cap) detector present

_____  Laryngoscope present x2, verify light works, and McGrath available
AIRWAY MANAGEMENT

- Appropriately sized oral and nasal airway present
- Prepare suction with Yankauer\textsuperscript{©} tip
- 10cc syringe for endotracheal tube balloon
- 7.0-7.5 (female), 7.5-8.0 (male), or smaller (striction/stenosis) endotracheal tube with stylet inserted, Bougie, and LMA
- Cricothyroidotomy kit (with scalpel in kit) and 6.0 ETT
- Attending (Critical care or anesthesia if CC unavailable), notify attending if emergency and proceeding with airway management

Drug Options: Drug choices and doses may vary with patient pathophysiology, not all (if any) of these drugs will be used. Drugs and dose will be determined by the physician

- Sedative-Hypnotic: Etomidate 0.2mg/kg, Propofol 1mg/kg, Ketamine 3mg/kg, Midazolam 5mg
  (frequently during these intubations, we use only induction agent and paralytic; however including lidocaine and fentanyl may allow use of less propofol/etomidate and help from hemodynamic standpoint)

- Neuromuscular Blockade: Succinylcholine 1mg/kg, Rocuronium 1mg/kg

- Vasoactive Medications: Phenylephrine pre-filled syringe, Ephedrine pre-filled syringe

Rationale

Airway management in the intensive care unit provides additional challenges that are not as frequently encountered in other settings such as the operating room. These may include non-fasted patients, increased secretions, decreased physiologic reserve, shorter time from apnea to desaturation, and limited access to advanced airway adjuncts. Additionally, airway complications in this setting may lead to worse outcomes than those in other situations.\textsuperscript{1} Because of these issues, the above checklist begins with the paradigm that pre-procedural assessment and planning are critical to minimizing risk. Seemingly simple steps such as optimal positioning or even a brief airway exam are often forgotten in the midst of a stressful, high intensity situation.\textsuperscript{2} With basic preparation it is recognized that the majority of ICU patients will be successfully intubated using a standard approach and direct laryngoscopy. However, it is mandatory that a contingency plan be in place each time a patient is intubated. This is reflected in the need to have at a minimum an appropriately sized laryngeal mask airway, and preferably to have a video laryngoscope or other indirect method of laryngoscopy immediately available.\textsuperscript{3}
Much emphasis is placed on the technical aspects of tracheal intubation, however, there is often less focus placed on the anesthetic chosen for these patients. It is the expectation that an anesthesiologist or intensivist will be present for every intubation except in the most exceptional circumstances. Because of this, the checklist above gives considerable latitude in choice of analgesic and anesthetic agents. It also provides a framework for other ancillary staff (especially nursing colleagues) to better understand the proper roles for these drugs in the induction sequence. Of note, it ensures the immediate availability of vasoactive agents in the event of critical post-intubation hypotension or instability where time is clearly of the essence.

The goal of this checklist is not to be a rigid prescriptive document but rather to facilitate the cognitive offloading of participants. It is expected that there will be scenarios in which more advanced skills will be required. The above list should serve as a minimum level of preparation upon which other techniques can be added as necessary.

**Background Information and Literature Review**

Airway management is one of the cornerstones of the anesthesia practice. Two of the most fundamental and life saving techniques are facemask ventilation and endotracheal intubation.

Facemask ventilation, when performed correctly and efficiently, is one of the most important and life-saving skills to master for a patient who cannot support their own airway. Poor facemask ventilation can cause hypoxemia, hypercapnia, and decreases in oxygen saturation, which can lead to changes in hypertension, hypotension, and arrhythmias. Before beginning facemask ventilation, make sure the patient is properly positioned and place the mask over the bridge of the nose and chin, pulling the mandible into the mask, creating a tight seal.

Risk factors that can compromise facemask ventilation are: history of previous complications, macroglossia, lack of teeth, receding mandible beard, and obesity.

If available, check the patient’s medical record to identify any previous anesthesia complications. Lack of teeth, receding mandible and presence of beard can be associated with difficult facemask ventilation, decreasing the possibility of an airtight seal of the facemask. Macroglossia can reduce the posterior airway space behind the base of the tongue as well as obstructing the upper airway after general anesthesia causing displacement of soft palate, base of the tongue and epiglottis. These complications are seen in patients with an increased BMI (>26 kg/m2) and/or sleep apnea. Morbidly obese patients, BMI >40 kg/m2, may also present a challenge in facemask ventilation and can experience oxygen desaturation after anesthesia.

Endotracheal intubation is another critical component of airway management. Intubation is considered to be difficult if the vocal cords are not visible using a laryngoscope, after 3 failed attempts at intubation, and requires more than 10 minutes of attempted intubation. Often patients with difficult facemask ventilation will also be difficult to intubate due to overlapping risk factors. As always if available, check the patient’s medical history to identify any previous anesthesia or intubation complications.
There are several ways to assess for a difficult endotracheal intubation. The first way is to evaluate the patient’s airway using the Mallampati score. Class III and IV is not conducive for an easy intubation.\textsuperscript{9}

![Mallampati score diagram]

The thyromental distance is another evaluation of intubation difficulty. This measures the distance from the tip of the thyroid cartilage to the inside of the mentum, with the neck fully extended and the mouth closed. Distances less than 6.5cm can be difficult, less than 6.0 cm may be impossible.\textsuperscript{9} Neck thickness is also predictive of a difficult airway.

With dental injuries being one of the most common injuries with intubation, it is important to assess for any loose teeth or protruding maxillary incisors that can make intubation difficult.\textsuperscript{10} Pre-existing dental pathology should be thoroughly examined before the induction of anesthesia, and the patient must be advised of the risk of dental damage.\textsuperscript{10} If a tooth is avulsed, it should be retrieved and kept in moist gauze or saline.

Next it is important evaluate the patient’s neck mobility. It is important to ensure the patient can hold the head erect, facing front at the maximal extension. Limited neck mobility can reduce optimal head and neck positioning during intubation or gross narrowing or distortion at the laryngeal level, sub-glottis or trachea.\textsuperscript{8}

One of the most common assessments of difficult intubation is the view at direct laryngoscopy using the Cormack-Lehane score. Grades 3 and 4 are indicators of difficult endotracheal intubation.\textsuperscript{11}
Anesthesiologists should always perform an airway evaluation for facemask ventilation and endotracheal intubation. Assessing physical abnormalities and identifying a difficult airway will allow for an appropriate airway strategy to be determined.

References


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Approval

________________________________________ Date: ____________________