

Surgical Intensive Care Unit

Practice Management Guidelines: Rapid Sequence Intubation

I. Purpose:

Rapid sequence intubation (RSI) involves sequential administration of induction agent followed by neuromuscular blockade to facilitate endotracheal intubation and is necessary in critically ill patients with increased aspiration risk (e.g., bowel obstruction, recent oral intake, GERD). Pre-oxygenation and hemodynamic optimization should precede drug administration to reduce intubation morbidity and mortality.

Intubation should be considered for patients with the following conditions:

- Unable to maintain a patent airway
- Decreased level of consciousness (GCS <8, non-purposeful)
- Hypoxia/hypoxemia (PaO₂/FiO₂ ratio <250)
- Respiratory rate <10 or >30
- Respiratory acidosis

II. Equipment:

1. Continuous monitoring: ECG, blood pressure, pulse oximetry
2. IV access (ideally 2 functioning peripheral IV's or a central line)
3. Pre-oxygenation device (bag-valve-mask, non-rebreather mask, BiPap, high-flow nasal cannula)
4. Bag-valve-mask connected to oxygen delivery system
5. Suction with attached Yankauer tip
6. SICU Airway Bag
 - Laryngoscope (Macintosh and Miller blades)
 - Endotracheal tube with stylet (ETT size ranges from 6.0*** to 8.5***)
 - Bougie
 - 10cc syringe
 - CO₂ detector
 - Airway adjuncts (oral airway, nasopharyngeal airway)
 - LMA (laryngeal mask airway)
 - Scalpel + 6.0 ETT for emergent cricothyrotomy
7. McGrath or other video laryngoscope
8. Medications for intubation
9. Code Cart (contains ACLS medications)

III. Medications

- Sedative (always administer before paralytic):
 - Etomidate 0.2mg/kg, usually 20mg (less if hypovolemic). Onset 60 seconds; duration 3-5 minutes
 - Propofol 1-2mg/kg (less if hypovolemic). Onset ~30 seconds; duration 3-10 minutes
 - Ketamine 1-2mg/kg, usually 100mg. Onset 20 seconds; duration 5-10 minutes
- Adjunctive Agents
 - Midazolam 0.01-0.03mg/kg, usually 1-3mg. Onset 1-5 minutes; duration is dose-dependent. Usually has minimal hemodynamic effects and is excellent for preventing recall
 - Fentanyl 1-2mcg/kg, usually 50-200mcg. Onset almost immediate; duration ~1 hour. May cause hypotension and bradycardia
- Paralytics
 - Succinylcholine 1.5mg/kg, usually 100mg. Onset 20-50 seconds; duration 4-6 minutes.
 - Absolute contraindications: hyperkalemia, myopathy, burn, spinal cord injury, pseudocholinesterase deficiency, open globe injury, and malignant hyperthermia
 - Relative contraindications: prolonged bedrest, renal failure, increased intracranial pressure
 - Rocuronium 1mg/kg. Onset 1-2 minutes; duration 30 minutes
 - For unanticipated difficult airway and subsequent “cannot intubate/cannot ventilate” scenario, consider rapid reversal with sugammadex 16mg/kg (available with anesthesia airway team supplies or through pharmacy)
 - Other non-depolarizing neuromuscular blocking agents: vecuronium (0.1mg/kg) and cisatracurium (0.2mg/kg); however these medications have longer onset of action and should be considered second-line
- Push-Dose Vasopressors
 - Phenylephrine given in 100mcg doses (1mL). May cause reflex bradycardia
 - Ephedrine given in 5-10mg doses. May be beneficial in patients with concomitant hypotension and bradycardia
 - Epinephrine given in 10-20mcg doses (1-2mL’s of 1:100,000 “baby epi”).

IV. Preparation

1. Ensure consent is obtained by physician unless intubation is deemed emergent
2. SICU attending must be notified of intubation and should be present for intubation. Patient condition may dictate intubation proceed without attending present; patient safety should be the first priority.
3. If SICU attending unavailable to supervise procedure, call the Anesthesia Airway phone or the Trauma Attending phone:
 - a. SICU Attending: 615-886-0669
 - b. Anesthesia Airway Team: 615-887-7369
 - c. Trauma Attending: 615-480-1149
4. Perform a time out using the separate intubation checklist once everyone involved in the procedure is at bedside

5. Identify medication nurse
6. Identify proceduralist
7. Verify a functioning IV
 - a. Blood pressure cuff should not be on the same extremity as the IV that is being used for medication administration
8. Verify medications between intubating provider and medication nurse; ensure availability of extra medications if needed
9. Verify functioning oxygen saturation probe and have a backup available; utilize QRS volume 2 or greater on monitor
 - a. Blood pressure cuff should not be on the same extremity as the oxygen saturation probe

V. Procedure

1. Wash hands and don personal protective equipment
2. Setup suction apparatus and connect rigid tip catheter to tubing
3. Check equipment
 - a. Use syringe to inflate cuff on ETT and assess for leaks; completely deflate the cuff afterwards
 - b. Insert the stylet into the endotracheal tube ensuring the tip of the stylet does not extend past the end of the endotracheal tube
4. Check the mouth for dentures and remove if present
5. Begin preoxygenation for 3-5 minutes via bag-valve-mask attached to 100% oxygen, 100% non-rebreather mask, BiPAP with FiO₂ 100%, and/or high-flow nasal cannula with FiO₂ 100%
 - a. Consider insertion of nasopharyngeal airway or oropharyngeal airway if patient tolerates
6. Position the patient's head by flexing the neck forward and extending the head (sniffing position)
 - a. Consider ramping
 - b. If cervical spine injury is confirmed or suspected, in-line cervical spinal immobilization must be maintained during the entire procedure and these positioning techniques are contra-indicated
7. Administer medications
 - a. Practitioner may identify someone to push medications, but best practice is to have whoever drew up or received medications to administer them
 - b. Medications should be labeled with name and concentration
8. Perform external laryngeal manipulation or apply cricoid pressure as indicated
9. After endotracheal tube is placed, inflate cuff with 5-10cc's of air
10. Confirm endotracheal tube placement while manually bagging with 100% oxygen
 - a. Attached disposable CO₂ detector and watch for color change to indicate the presence of CO₂ (yellow = "yes" for 3 consecutive breaths)
 - b. Auscultate over the epigastrium and bilateral lung fields in at least two positions
 - i. If breath sounds are absent on the left side, deflate the cuff and withdraw the tube 1-2cm. Re-evaluate for bilateral breath sounds indicating correct tube placement

- c. Observe for symmetric chest wall movement
 - d. Evaluate oxygen saturation (SpO₂) by pulse oximetry
 - e. If methods of confirmation reveal that the tube has not been correctly placed, deflate the cuff and remove the tube immediately and begin to pre-oxygenate with bag-valve-mask attached to 100% oxygen, as patient will likely still be paralyzed
 - f. If there is a second failed attempt, begin difficulty airway algorithm and call for assistance
- 11. Connect endotracheal tube to ventilator
 - 12. Secure the endotracheal tube and reconfirm position; note the position of the tube in centimeters at the teeth
 - 13. Order a chest x-ray to evaluate tube position

VI. Revised September 1, 2025:

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VIII. References

Algie CM, Mahar RK, Tan HB, Wilson G, Mahar PD, Wasiak J. Effectiveness and risks of cricoid pressure during rapid sequence induction for endotracheal intubation. *Cochrane Database Syst Rev*. 2015;(11):CD011656. Published 2015 Nov 18. doi:10.1002/14651858.CD011656.pub2

Apfelbaum JL, Hagberg CA, Caplan RA, et al. Practice guidelines for management of the difficult airway: an updated report by the American Society of Anesthesiologists Task Force on Management of the Difficult Airway. *Anesthesiology*. 2013;118(2):251-270. doi:10.1097/ALN.0b013e31827773b2

April MD, Arana A, Reynolds JC, et al. Peri-intubation cardiac arrest in the Emergency Department: A National Emergency Airway Registry (NEAR) study. *Resuscitation*. 2021;162:403-411. doi:10.1016/j.resuscitation.2021.02.039

Casey JD, Janz DR, Russell DW, et al. Bag-Mask Ventilation during Tracheal Intubation of Critically Ill Adults. *N Engl J Med*. 2019;380(9):811-821. doi:10.1056/NEJMoa1812405

De Jong A, Rolle A, Molinari N, et al. Cardiac Arrest and Mortality Related to Intubation Procedure in Critically Ill Adult Patients: A Multicenter Cohort Study. *Crit Care Med*. 2018;46(4):532-539. doi:10.1097/CCM.0000000000002925

Driver BE, Prekker ME, Klein LR, et al. Effect of Use of a Bougie vs Endotracheal Tube and Stylet on First-Attempt Intubation Success Among Patients With Difficult Airways Undergoing Emergency Intubation: A Randomized Clinical Trial. *JAMA*. 2018;319(21):2179-2189. doi:10.1001/jama.2018.6496

Groombridge C, Maini A, Olausson A, et al. Impact of a targeted bundle of audit with tailored education and an intubation checklist to improve airway management in the emergency department: an integrated time series analysis. *Emerg Med J*. 2020;37(9):576-580. doi:10.1136/emermed-2019-208935

Jaber S, Rollé A, Godet T, et al. Effect of the use of an endotracheal tube and stylet versus an endotracheal tube alone on first-attempt intubation success: a multicentre, randomised clinical trial in 999 patients. *Intensive Care Med*. 2021;47(6):653-664.

Khandelwal N, Khorsand S, Mitchell SH, Joffe AM. Head-Elevated Patient Positioning Decreases Complications of Emergent Tracheal Intubation in the Ward and Intensive Care Unit. *Anesth Analg*. 2016;122(4):1101-1107. doi:10.1213/ANE.0000000000001184

Kornas RL, Owyang CG, Sakles JC, Foley LJ, Mosier JM; Society for Airway Management's Special Projects Committee. Evaluation and Management of the Physiologically Difficult Airway: Consensus Recommendations From Society for Airway Management. *Anesth Analg*. 2021;132(2):395-405. doi:10.1213/ANE.0000000000005233

Lewis SR, Butler AR, Parker J, Cook TM, Smith AF. Videolaryngoscopy versus direct laryngoscopy for adult patients requiring tracheal intubation. *Cochrane Database Syst Rev*. 2016;11(11):CD011136. Published 2016 Nov 15. doi:10.1002/14651858.CD011136.pub2

Levitan RM, Mickler T, Hollander JE. Bimanual laryngoscopy: a videographic study of external laryngeal manipulation by novice intubators. *Ann Emerg Med*. 2002;40(1):30-37. doi:10.1067/mem.2002.125716

Mosier JM, Sakles JC, Stolz U, et al. Neuromuscular blockade improves first-attempt success for intubation in the intensive care unit. A propensity matched analysis. *Ann Am Thorac Soc*. 2015;12(5):734-741. doi:10.1513/AnnalsATS.201411-517OC

Oliveira J E Silva L, Cabrera D, Barrionuevo P, et al. Effectiveness of Apneic Oxygenation During Intubation: A Systematic Review and Meta-Analysis. *Ann Emerg Med*. 2017;70(4):483-494.e11. doi:10.1016/j.annemergmed.2017.05.001

Semler MW, Janz DR, Lentz RJ, et al. Randomized Trial of Apneic Oxygenation during Endotracheal Intubation of the Critically Ill. *Am J Respir Crit Care Med*. 2016;193(3):273-280. doi:10.1164/rccm.201507-1294OC

Weingart SD, Levitan RM. Preoxygenation and prevention of desaturation during emergency airway management. *Ann Emerg Med*. 2012;59(3):165-75.e1. doi:10.1016/j.annemergmed.2011.10.002

