

Society of Critical Care Medicine Clinical Practice Guidelines for Rapid Sequence Intubation in the Critically Ill Adult Patient - CCM October 2023

Recommendations

Positioning

- Head and torso inclined (semi Fowler)
 - May improve first-pass intubation success (FPS)
 - Enhance preoxygenation (denitrogenation) via increased FRC
 - Improve laryngeal view
 - Reduce the risk of clinically significant aspiration

Preoxygenation

- HFNO when laryngoscopy is expected to be challenging
- NIPPV in patients with severe hypoxemia PaO₂ /FiO₂ of less than 150

Medication-Assisted Preoxygenation

- Indicated in patients undergoing RSI who are not able to tolerate a face mask, NIPPV, or HFNO because of agitation, delirium, or combative behavior
- Ketamine 1–2 mg/kg. Initial dose 1 mg/kg with 0.5 mg/kg doses until a dissociative state is achieved

Nasogastric Tube Decompression

- Consider NGT in patients at high risk of regurgitation (i.e., full stomach or intestinal obstruction) during RSI, and when risks are not prohibitive

Peri-intubation Vasopressors versus Fluid Resuscitation alone

- There is insufficient evidence to recommend vasopressors

Induction Agent Use

- Use a sedative-hypnotic induction agent when an NMBA in patients with depressed level of consciousness with hemodynamic instability

Induction Agent Selection

Etomidate 0.3 mg/ kg or 0.15 mg/kg in patients with hemodynamic compromise

Ketamine 1–2 mg/kg. Initial dose 1 mg/kg with 0.5 mg/kg doses until a dissociative state is achieved

- There is no difference between etomidate versus other induction agents (e.g., ketamine, midazolam, propofol) with respect to mortality or hypotension or vasopressor use in the peri-intubation period and through hospital discharge.
 - Etomidate has a favorable hemodynamic profile; however, there are concerns with its use due to adrenal suppression and hemodynamic instability during the stay.
 - Ketamine may be a reasonable option for RSI because of its quick onset, short duration of action, preservation of respiratory drive, and its sympathomimetic properties
 - However, in patients with depleted catecholamine stores, there is concern for hypotension and cardiac arrest
 - Midazolam may be less desirable for RSI as it has a longer onset of action compared with etomidate and ketamine and is a potent venodilator at RSI doses
 - Propofol, although having a quick onset and short duration of action, has the most profound effect on blood pressure, which may limit its use.

- Nevertheless, taken as a whole, there was no significant difference between etomidate and other induction agents in the most important outcome, mortality.
- In addition, most studies demonstrated favorable peri-intubation hemodynamics with etomidate
- Because etomidate is often readily available, clinicians have experience with its use, and it has a low cost, it is a reasonable RSI induction agent for critically ill patients.

Etomidate and Corticosteroid Use

- Against use corticosteroids for the purpose of counteracting etomidate-induced adrenal suppression
- The clinical significance of adrenal suppression is unclear and there is insufficient evidence to recommend the use of steroids

Neuromuscular-Blocking Agent (NMBA)

Use NMBA when a sedative-hypnotic induction agent is used for intubation (no surprise)

NMBA Selection

- Use either rocuronium or succinylcholine when there are no known contraindications to succinylcholine
 - There is no difference between rocuronium versus succinylcholine with respect to mortality, FPS, adverse events, and risk of awareness in the peri intubation period and through hospital discharge

Extra Pearls

- **Contraindications to succinylcholine**
 - Hyperkalemia, bradycardia, and malignant hyperthermia
 - Patients with chronic paralysis of one or more limbs or chronically bed-bound patients are at risk massive hyperkalemia and arrhythmias
 - The mechanism of the potassium release is related to upregulation of nicotinic acetylcholine receptors on muscles in patients with chronic weakness. The activation of this receptor by succinylcholine causes the release of intracellular potassium into the blood
 - Cautious use in patients with increased intracranial pressure (ICP) and risk of herniation
 - It causes a transient global muscle contraction that can transiently increase ICP
- **Rocuronium reversal**
 - Adamgammadex phase 3 multicenter clinical trial
 - Similar benefits compared to Sugammadex without anaphylactic and cardiovascular reactions
- **Ketamine compared with etomidate reduces mortality in critically ill patients undergoing intubation – More recent meta-analysis**
 - Koroki T et al. Ketamine versus etomidate as an induction agent for tracheal intubation in critically ill adults: a Bayesian meta-analysis. *Critical Care* 2024; 28:1-9.
 - Albert SG, Sitaula S: Etomidate, adrenal insufficiency and mortality associated with severity of illness: A meta-analysis. *J Intensive Care Med* 2021; 36:1124–1129

Peri-intubation hypotension is a common event in critically ill patients and is associated with organ dysfunction, prolonged duration of mechanical ventilation, prolonged ICU stay, and increased mortality.

- Etomidate has a favorable hemodynamic profile; however, there are concerns with its use in critically ill patients because it is known to inhibit adrenal enzyme function
 - Whether this effect results in hypotension, increased vasopressor use, and increased mortality in the peri-intubation and postintubation period is unknown.

- Ketamine may be a reasonable option for RSI because of its quick onset and short duration of action, its preservation of respiratory drive, and its sympathomimetic properties
 - However, in critically ill patients with depleted catecholamine stores, there is concern for hypotension