

CLINICAL PRACTICE BRIEF

RAPID SEQUENCE INTUBATION IN CRITICALLY ILL ADULTS

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Introduction

Airway management is a complex clinical skill that requires clinicians to be familiar with laryngoscopy devices, medications used during intubation, and the management of patients and ventilators post-intubation. Rapid sequence intubation (RSI) is a common strategy for airway management involving the rapid administration of a sedative-hypnotic agent and a neuromuscular-blocking agent (NMBA), followed by the immediate placement of the endotracheal tube (ETT). RSI reduces the risk of aspiration in at-risk patients and optimizes intubation conditions to decrease the occurrence of airway-related complications. Several considerations and techniques regarding RSI have led to significant variations in practice. Consequently, the Society for Critical Care Medicine published guidelines offering evidence-based recommendations for RSI practices to optimize patient outcomes. This practice brief is limited to considerations of RSI—awake intubations, difficult airway management, post-intubation medication concerns, and ventilator management strategies are not addressed here.

Non-pharmacologic considerations for RSI include:

- Positioning and Gastric decompressions
 - Use the semi-Fowler position (head and torso inclined) over the supine position during RSI.
 - This positioning enhances first-pass success, reduces the risk of aspiration, and provides a better view of the larynx. However, it should be avoided in patients who need spinal immobilization.
 - When there is a high likelihood of aspiration, nasogastric tube (NGT) decompression is considered when the benefits outweigh the risk of NGT placement (e.g., nasal bleeding, gagging, vomiting, etc.).
 - NGT decompression is unlikely to remove all of the gastric contents; proceduralist should still proceed as if the stomach is not completely empty and be cautious about aspiration even when NGT decompression is utilized.
- Preoxygenation
 - For situations where difficult laryngoscopy is expected, preoxygenate using high-flow nasal oxygen (HFNO).
 - HFNO enables continuous delivery during the intubation procedure.
 - For patients experiencing severe hypoxia ($\text{PaO}_2/\text{FiO}_2 < 150$), non-invasive positive pressure ventilation (NIPPV) is the preferred method for preoxygenation.
 - NIPPV enhances oxygenation in various hypoxemic patients.
 - For patients who cannot tolerate preoxygenation due to agitation, delirium, or other conditions, consider medication-assisted preoxygenation (MAPO_2) to enhance RSI preoxygenation.
 - MAPO_2 differs from delayed-sequence intubation in that the medications for MAPO_2 are used solely for preoxygenation; the sedation and NMBA for intubation are still administered rapidly when given.

Pharmacologic considerations for RSI include:

All medications discussed are administered via the intravenous (IV) route. Standard medication doses for RSI are presented in Table 1.

- Peri-intubation hemodynamic support.
 - Peri-intubation hypotension is associated with significant mortality, and efforts should be made to ensure hemodynamic stability. There is insufficient evidence to recommend peri-intubation vasopressors over intravenous fluid administration.
- Induction agent use:
 - When an NMBA is used for intubation, a sedative-hypnotic agent is administered first.
 - No difference exists between etomidate and other induction agents for RSI.
 - Etomidate is recommended in hemodynamically unstable patients due to its favorable cardiovascular profile.
 - Avoid routine administration of corticosteroids to counteract etomidate-induced adrenal suppression.
- NMBA use
 - When using a sedative-hypnotic agent for RSI, the use of an NMBA is recommended over not using an NMBA.
 - Not using an NMBA may lead to unfavorable intubating conditions, lower first-pass success rates, and increase complications.
 - Either rocuronium or succinylcholine may be used as an NMBA when there are no contraindications to succinylcholine.

Standard medication dosing considerations are presented in Table 1.

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Despite the high risks associated with the procedure, RSI remains an essential skill in critical care. These current recommendations aim to enhance intubation success and reduce adverse events, ensuring safe airway management in critical care settings. Clinicians are encouraged to consult the complete guideline for detailed information on the recommendations, including specific interventions and medication choices.

Other Considerations:

- CPT Code:
 - Use **31500** for emergency endotracheal intubation.
- ICD-10 Codes:
 - Choose from specific ICD-10 codes based on the patient's condition, such as:
 - ARF: **J96** codes as appropriate for acute respiratory failure with specification of hypoxia, hypercapnia, or both.
 - Sepsis: **A41.9** is most appropriate. Specify the causative organism, if known. **R65.2** is considered nonspecific and not used for reimbursement purposes.
 - ARDS: **J80** with further clarification based on mild, moderate, or severe ARDS.
- Documentation Requirements
 - Ensure detailed documentation, including:
 - Indication for and type of intubation (e.g., endotracheal, nasotracheal).
 - Size and depth of the ETT.
 - Confirmation of tube placement (e.g., end-tidal CO2 detector, chest X-ray).
 - Drugs administered.
 - First-pass success and/or complications.
 - Patient outcomes, including initiation of post-intubation care.

Acute Respiratory Failure (ARF) DEI considerations:

- Factors shown to influence ARF outcomes include access to healthcare, medical bias and environmental exposures.
- Providers caring for patients with ARF should be aware of the following social determinants of health (SDoH) in ARF outcomes in the U.S.:
 - Lower SDoH is associated with higher mortality.
 - Mortality related to ARF is highest among men, Black patients, patients >65yo, non-metropolitan residents and the South.
 - Black patients have higher incidence of radiographic worsening of lung disease and respiratory failure even after adjusting for individual and neighborhood-level SDoH.
 - Patients with darker skin tones are at increased risk for undetected hypoxemia and worse outcomes due to medical bias of pulse oximetry devices.
 - Hispanic and Asian populations have higher increased mortality due to failed intubations even after adjusting for age, gender and co-morbidities.

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Table 1.

MEDICATION COMMONLY USED FOR RAPID SEQUENCE INTUBATION					
Drug	Class	Dosage (IV)	Onset (sec)	Duration (mins)	Considerations
Induction Agents					
Etomidate	Sedative-Hypnotic	0.2-0.3 mg/kg	15-45	5-15	Hemodynamically stable; can cause adrenal suppression.
Propofol	Sedative-Hypnotic	1-2 mg/kg	15-45	3-10	Risk for hypotension; avoid in hemodynamically unstable patients.
Ketamine	Dissociative	1-2 mg/kg	30-60	10-20	Preserves respiratory drive; avoid in hypertensive patients and patients with concern for elevated intracranial pressure.
Midazolam	Benzodiazepine	0.1-0.3 mg/kg	60-90	15-30	Longer onset; less commonly used for RSI.
Fentanyl	Opioid Analgesic	1-3 mcg/kg	60-90	30-60	Blunts sympathetic response; can cause chest wall rigidity at high doses.
Neuromuscular Blocking Agents					
Succinylcholine	Depolarizing NMBA	1-1.5 mg/kg	30-60	5-10	Contraindicated in hyperkalemia and patients with neuromuscular disorders.
Rocuronium	Non-Depolarizing NMBA	1.2 mg/kg	45-60	30-60	Longer duration than succinylcholine.
Notes: IV - intravenous; sec - second; mins - minutes; mg - milligram; kg - kilogram; mcg - microgram; NMBA - neuromuscular blocking agent.					
Information source: Brown, C. A., Sakles, J. C., Mick, N. W., Mosier, J. M., & Braude, D. A. (2023). The Walls manual of emergency airway management (Sixth ed.). Wolters Kluwer.					

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