**SOCIETY OF CRITICAL CARE MEDICINE**

CLINICAL PRACTICE GUIDELINES FOR RAPID SEQUENCE INTUBATION IN THE CRITICALLY ILL ADULT PATIENT

Methodology and Evidence to Decision Summary

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# **Description and Selection of Chairs and Panelists**

A multidisciplinary group of Society of Critical Care Medicine (SCCM) practitioners that included pharmacists, physicians, a nurse practitioner, and a respiratory therapist with experience in emergency medicine, critical care, anesthesiology, and prehospital medicine from the United States and Australia convened as the RSI guideline panel. Panel members had various backgrounds related to RSI themed research, clinical practice, society leadership, and previous guideline development. There was consultative support from a clinician with Grading of Recommendation, Assessment, Development and Evaluations (GRADE) methodologic experience and a librarian.

Selection of the leadership for this guideline and all others was the responsibility of the American College of Critical Care Medicine (ACCM)‘s Board of Regents (BOR), who are responsible for practice management guidelines. The BOR followed the rules provided in the SCCM guidelines Standard Operating Procedures Manual (SOP) which state that the BOR identifies two chairs and two co-vice chairs that are subject matter experts for each SCCM approved guideline. There is due consideration for diversity, equity and inclusion in the process and particular attention is paid to assuring that expertise is evaluated via submission of a curriculum vitae for each candidate. The BOR reviewed declared conflicts of interest (COI) for adjudication prior to appointment using the SCCM COI system. The panel was then identified by the appointed guidelines leadership, again following the SOP requirements followed by BOR review. Each panelist completed required COI forms before they were officially appointed to the panel, periodically throughout the guideline development process, and at the time of manuscript submission. Panelists served at the discretion of the BOR with ongoing monitoring of COI and performance.

**Selection of PICO Questions**

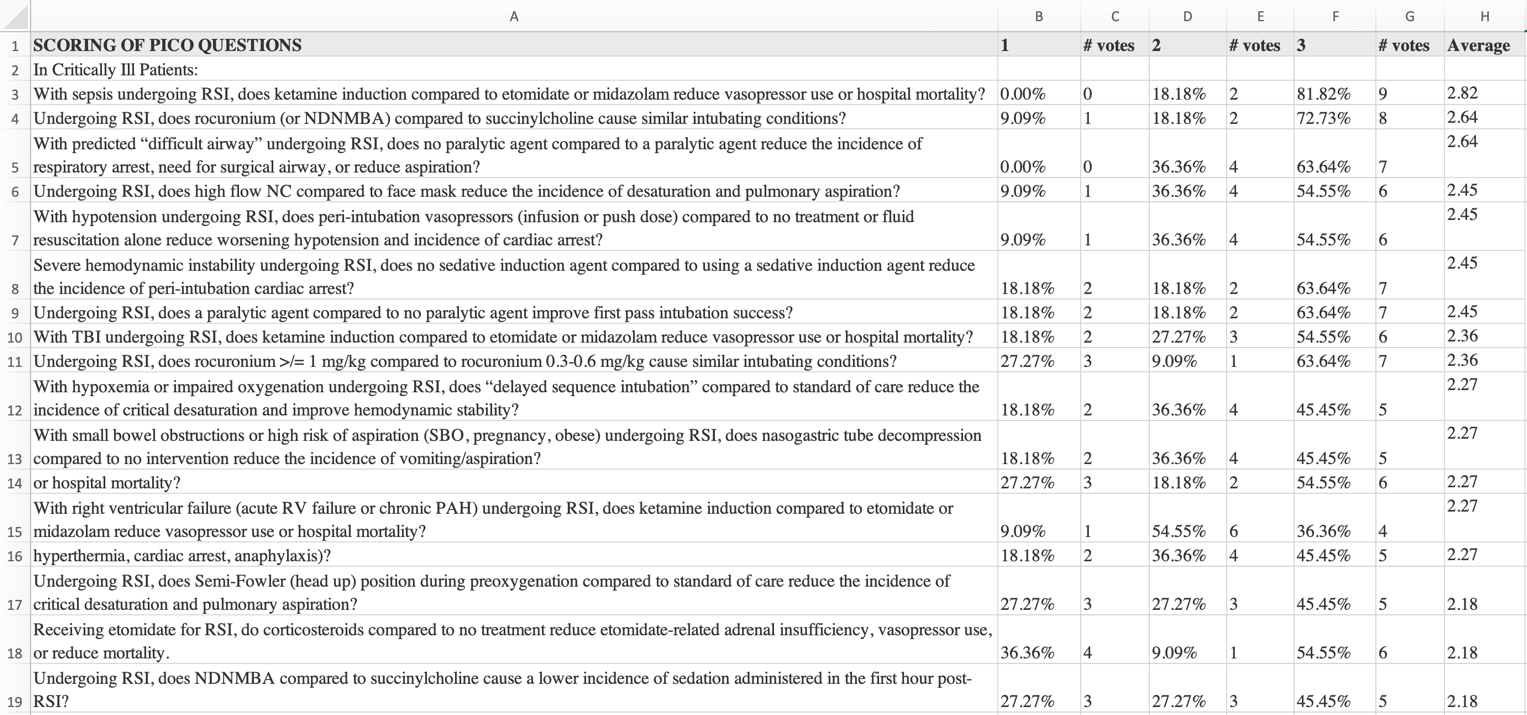
## POTENTIAL PICO QUESTIONS

Panelists identified topic areas of interest or controversy relevant to RSI in critically ill adults and submitted 35 potential PICO questions for consideration. Questions related to difficult airway management were discouraged since there are already published practice guidelines from the American Society of Anesthesiologists (Apfelbaum JL, Hagberg CA, Connis RT, et al. 2022 American Society of Anesthesiologists Practice guidelines for management of the difficult airway. *Anesthesiology* 2022; 136:31-81 [updated from 2015])

1. In critically ill patients undergoing RSI, does passively diffused nasal cannula oxygen at a flowrate > 40 lpm compared to face mask improve denitrogenation?
2. In critically ill hypoxic patients undergoing RSI, does pressure regulated NIPPV compared to face mask reduce the incidence of critical desaturation and pulmonary aspiration?
3. In critically ill patients undergoing RSI, does high flow nasal canula compared to face mask reduce the incidence of desaturation and pulmonary aspiration?
4. In critically ill patients undergoing RSI, does high flow nasal canula compared to NIPPV reduce the incidence of critical desaturation?
5. In critically ill patients undergoing RSI, does continuous nasal oxygen compared to standard of care reduce the incidence of critical desaturation?
6. In critically ill patients undergoing RSI, does using the PEEP valve on a bag value mask compared to standard of care reduce the incidence of critical desaturation?
7. In critically ill patients undergoing RSI, does semi-Fowler (head up) position during preoxygenation compared to standard of care reduce the incidence of critical desaturation and pulmonary aspiration?
8. In critically ill patients undergoing RSI, does semi-Fowler (head up) position during intubation compared to standard of care reduce the incidence of critical desaturation and pulmonary aspiration and improve first pass success?
9. In critically ill patients with hypoxemia or impaired oxygenation undergoing RSI, does “delayed sequence intubation” compared to standard of care reduce the incidence of critical desaturation and improve hemodynamic stability?
10. In critically ill patients with hypoxemia undergoing RSI, does mask ventilation compared to no mask ventilation reduce the incidence of critical desaturation?
11. In critically ill patients with hypoxemia undergoing RSI, does apneic oxygenation compared to mask or no mask ventilation reduce the incidence of critical desaturation?
12. In critically ill patients with hypotension undergoing RSI, does peri-intubation vasopressors (infusion or push dose) compared to no treatment or fluid resuscitation alone reduce worsening hypotension and incidence of cardiac arrest?
13. In critically ill patients with TBI or CVA undergoing RSI, does lidocaine IV compared to no pre-treatment reduce the magnitude of ICP elevation or increase CPP?
14. In critically ill patients receiving succinylcholine for RSI, do defasciculating doses of NDNMBA IV compared to no pre-treatment reduce the magnitude of ICP elevation, increase CPP, or reduce the incidence of aspiration?
15. In critically ill patients undergoing RSI, does fentanyl IV compared to no pre-treatment cause less blood pressure or heart rate changes compared to baseline or improve intubating conditions?
16. In critically ill patients receiving succinylcholine for RSI, does atropine IV compared to no pre-treatment reduce the incidence of bradycardia?
17. In critically ill patients undergoing RSI, does magnesium sulfate IV compared to no pre-treatment cause less blood pressure or heart rate changes compared to baseline or improve intubating conditions?
18. In critically ill patients receiving succinylcholine for RSI, does magnesium sulfate IV compared to no pre-treatment reduce fasciculations?
19. In critically ill patients receiving ketamine for RSI induction, does midazolam IV compared to no pre-treatment reduce the incidence of emergence reactions or improve intubating conditions?
20. In critically ill patients with small bowel obstructions or high risk of aspiration (SBO, pregnancy, obese) undergoing RSI, does nasogastric tube decompression compared to no intervention reduce the incidence of vomiting/aspiration?
21. In critically ill patients with sepsis undergoing RSI, does ketamine induction compared to etomidate or midazolam reduce vasopressor use or hospital mortality?
22. In critically ill patients with traumatic injury (non-TBI) undergoing RSI, does ketamine induction compared to etomidate or midazolam reduce vasopressor use or hospital mortality?
23. In critically ill patients with TBI undergoing RSI, does ketamine induction compared to etomidate or midazolam reduce vasopressor use or hospital mortality?
24. In critically ill patients with right ventricular failure (acute RV failure or chronic PAH) undergoing RSI, does ketamine induction compared to etomidate or midazolam reduce vasopressor use or hospital mortality?
25. In critically ill patients receiving etomidate for RSI, do corticosteroids compared to no treatment reduce etomidate-related adrenal insufficiency, vasopressor use, or reduce mortality.
26. In critically ill patients with severe hemodynamic instability undergoing RSI, does no sedative induction agent compared to using a sedative induction agent reduce the incidence of peri-intubation cardiac arrest?
27. In critically ill patients undergoing RSI, does rocuronium (or NDNMBA) compared to succinylcholine cause similar intubating conditions?
28. In critically ill patients undergoing RSI, does rocuronium >/= 1 mg/kg compared to rocuronium 0.3-0.6 mg/kg cause similar intubating conditions?
29. In critically ill patients undergoing RSI, does NDNMBA compared to succinylcholine cause less adverse effects (bradycardia, hyperkalemia, malignant hyperthermia, cardiac arrest, anaphylaxis)?
30. In critically ill patients with TBI undergoing RSI, does NDNMBA compared to succinylcholine reduce in-hospital mortality?
31. In critically ill patients that received a NDNMBA for RSI and had a failed airway attempt, does sugammadex compared to non-invasive airway support improve the time to restoration of spontaneous breathing?
32. In critically ill patients undergoing RSI, does NDNMBA compared to succinylcholine cause a lower incidence of sedation administered in the first hour post-RSI?
33. In critically ill patients undergoing CPR while undergoing RSI, does a paralytic agent compared to no paralytic agent improve first pass intubation success?
34. In critically ill patients undergoing RSI, does a paralytic agent compared to no paralytic agent improve first pass intubation success?
35. In critically ill patients with predicted “difficult airway” undergoing RSI, does no paralytic agent compared to a paralytic agent reduce the incidence of respiratory arrest, need for surgical airway, or reduce aspiration?

## PICO SCORING

Panelists voted by an electronic survey on the PICO questions with the highest clinical interest and relevance using a 3-point scale (3-high, 2-moderate, 1-low priority).

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## EXPLANATION OF HOW PICO QUESTIONS WERE NARROWED

Following voting by panelists, scores were averaged and ordered from highest to lowest for review. The panelists met virtually to discuss scores with consideration to the overall goals of the guideline to include both pharmacologic and nonpharmacologic PICO questions and to the limits provided by the SCCM BOR to include 10 PICO question only. The top-ranking PICO questions were ultimately included. Some questions were combined following methodologist consultation. For example, when the intervention and comparison were similar, but the population or outcome was different, these were combined into a single PICO question and subpopulations were discussed within the context of the included literature.

## PICO QUESTIONS INCLUDED

Each PICO question was assigned a two-member team that refined the PICO wording and developed outcomes of interest focusing on those deemed most critical or important.

|  |  |
| --- | --- |
| **Number** | **PICO Question (Refined wording)** |
| 1 | In critically ill adults undergoing rapid sequence intubation (RSI), is there a difference between the semi-Fowler (head and trunk inclined) position during intubation versus the supine position with respect to first-pass intubation success (FPS) or the incidence of oxygen desaturation or pulmonary aspiration? |
| 2 | In critically ill adults undergoing planned RSI, is there a difference preoxygenating with high-flow nasal oxygen (HFNO) (with or without apneic oxygenation) versus using face-mask preoxygenation, bag-mask ventilation, or non-invasive positive pressure ventilation (NIPPV) with respect to occurrence of desaturation, gastric insufflation, or pulmonary aspiration risk? |
| 3 | In critically ill adults in whom RSI is planned but are agitated, delirious, or uncooperative, is there a difference between medication-assisted preoxygenation versus usual care with face-mask preoxygenation, assisted mask ventilation, NIPPV, or HFNO with respect to the incidence of desaturation or hemodynamic instability? |
| 4 | In critically ill adults who are undergoing RSI and are at high risk of aspirating, is there a difference between nasogastric tube (NGT) gastric decompression before intubation versus standard of care (without NGT intervention) with respect to the incidence of vomiting/aspiration? |
| 5 | In critically ill hypotensive adults undergoing RSI, is there a difference when peri-intubation vasopressors are administered, by infusion or bolus dose, versus fluid resuscitation alone with respect to the incidence of hypotension and of cardiac arrest? |
| 6 | In critically ill adults with hemodynamic instability and with a depressed level of consciousness who are undergoing endotracheal intubation, is there a difference between administration of a sedative-hypnotic agent with a neuromuscular blocking agent (NMBA) versus an NMBA alone with respect to the incidence of cardiovascular collapse or awareness during paralysis in the peri-intubation period? |
| 7 | In critically ill adults undergoing RSI, is there a difference between etomidate versus other induction agents (e.g., ketamine, midazolam, propofol) with respect to mortality or the incidence of hypotension or vasopressor use in the peri-intubation period and through hospital discharge? |
| 8 | In critically ill adults who receive etomidate for induction during RSI, is there a benefit to the co-administration of corticosteroids with respect to mortality, vasopressor use, risk of infection, multiorgan dysfunction, ventilator days, or intensive care unit (ICU) length of stay? |
| 9 | In critically ill adults undergoing endotracheal intubation, is there a difference between administration of a sedative-hypnotic agent with an NMBA versus a sedative-hypnotic agent alone with respect to FPS, the incidence of respiratory arrest or cardiovascular collapse, need for a surgical airway, or incidence of vomiting/aspiration during the peri-intubation period? |
| 10 | In critically ill adults undergoing RSI, is there a difference between rocuronium versus succinylcholine when used for RSI with respect to mortality, FPS, adverse events, and risk of awareness in the peri-intubation period and through hospital discharge? |

# **Search Strategy and Search Terms Used**

The search criteria were developed with the aid of the librarian, who worked with the panelists to identify combinations of text words and controlled vocabulary (MeSH: Medical Subject Headings) terms for the literature review. The librarian conducted comprehensive literature searches for the 10 PICO questions in the following biomedical databases: PubMed, Web of Science, and Scopus. Publication dates were limited to 2000 through 2020. Additional literature was compiled from the panelists’ recommendations and from the references cited in the articles identified during the literature search.

**For critically ill patients under rapid sequence intubation (RSI) (all questions):**

MeSH terms: Critical Illness; Rapid Sequence Induction and Intubation; Intratracheal Intubation; Emergency Medicine Services; Intensive Care Units; Emergency Service, Hospital

Keywords: “rapid sequence intubation”, “rapid sequence induction”, “RSI”, “endotracheal intubation”, “tracheal intubation”, “critically ill”, “trauma”, “intensive care”, “medical intensive care unit”, “surgical intensive care unit”, “emergency department”, “prehospital”, “emergency airway management”

These terms were combined with question-specific terms describing the various interventions, comparisons and outcomes.

## QUESTION 1

**In critically ill adults undergoing rapid sequence intubation (RSI), is there a difference between the semi-Fowler (head and trunk inclined) position during intubation versus the supine position with respect to first-pass intubation success (FPS) or the incidence of oxygen desaturation or pulmonary aspiration?**

**Intervention:**

MeSH terms: Patient Positioning/methods; Posture

Keywords: “semi-fowler”, “head up”, “ramped position”, “sitting position”, “seated position”, “reverse Trendelenburg”, “nonsupine”

**Comparison:**

MeSH terms: Supine Position

Keywords: “neutral position”, “laying position”, “supine”

**Outcomes:**

MeSH terms: Oxygen; Oximetry; Hypoxia; Respiratory Aspiration; Aspiration Pneumonia

Keywords: “oxygen desaturation”, “pulmonary aspiration”, “oxygen desaturation”

## QUESTION 2

## 

**In critically ill adults undergoing planned RSI, is there a difference preoxygenating with high-flow nasal oxygen (HFNO) (with or without apneic oxygenation) versus using face-mask preoxygenation, bag-mask ventilation, or non-invasive positive pressure ventilation (NIPPV) with respect to occurrence of desaturation, gastric insufflation, or pulmonary aspiration risk?**

**Intervention:**

MeSH terms: Oxygen Inhalation Therapy; Oxygen/therapeutic use

Keywords: “preoxygenation”, “high flow nasal oxygen”, “heated high flow”, “heated humidified high flow”, “nasal high flow”, “THRIVE”

**Comparison:**

MeSH terms: Laryngeal Masks; Intermittent Positive Pressure Ventilation

Keywords: “face mask oxygen”, “face mask”, “bag valve mask”, “non-invasive positive pressure ventilation”, “mask ventilation”

**Outcomes:**

MeSH terms: Oximetry; Hypoxia; Oxygen; Respiratory Aspiration; Aspiration Pneumonia

Keywords: “gastric insufflation”, “pulmonary aspiration”, “oxygen desaturation”

## QUESTION 3

## 

**In critically ill adults in whom RSI is planned but are agitated, delirious, or uncooperative, is there a difference between medication-assisted preoxygenation versus usual care with face-mask preoxygenation, assisted mask ventilation, NIPPV, or HFNO with respect to the incidence of desaturation or hemodynamic instability?**

**Patient:**

Keywords: “agitated”, “uncooperative”, “delirious”

**Intervention:**

MeSH terms: Hypnotics and Sedatives/adverse effects; Conscious Sedation

Keywords: “delayed sequence intubation”

**Comparison:**

MeSH terms: Laryngeal Masks; Intermittent Positive Pressure Ventilation; Oxygen Inhalation Therapy; Oxygen/therapeutic use

Keywords: “face mask oxygen”, “preoxygenation”, “noninvasive positive-pressure ventilation”, “high flow nasal oxygen”, “awake intubation”, “heated high flow”, “heated humidified high flow”, “nasal high flow”, “THRIVE”

**Outcomes:**

MeSH terms: Shock; Hypoxia; Oximetry; Oxygen

Keywords: “hemodynamic instability”, “oxygen desaturation”

## QUESTION 4

## 

**In critically ill adults who are undergoing RSI and are at high risk of aspirating, is there a difference between nasogastric tube (NGT) gastric decompression before intubation versus standard of care (without NGT intervention) with respect to the incidence of vomiting/aspiration?**

**Patient:**

MeSH terms: Aspiration Pneumonia; Respiratory Aspiration

**Intervention:**

MeSH terms: Gastrointestinal Intubation

Keywords: “nasogastric tube decompression”, “nasogastric decompression”, “gastric decompression”

**Comparison:**

MeSH terms: Standard of Care

Keywords: “standard care”, “usual care”

**Outcomes:**

MeSH terms: Vomiting; Aspiration Pneumonia; Respiratory Aspiration

Keywords: “vomiting”, “aspiration”

## QUESTION 5

**In critically ill hypotensive adults undergoing RSI, is there a difference when peri-intubation vasopressors are administered, by infusion or bolus dose, versus fluid resuscitation alone with respect to the incidence of hypotension and of cardiac arrest?**

**Intervention:**

MeSH terms: Vasoconstrictor Agents/administration and dosage

Keywords: “push dose”, “bolus dose”, “phenylephrine”, “epinephrine”, “ephedrine”, “norepinephrine”

**Comparison:**

MeSH terms: Fluid Therapy; Standard of Care

Keywords: “fluid resuscitation”, “fluid bolus”, “usual care”

**Outcomes:**

MeSH terms: Hypotension; Heart Arrest

Keywords: “hypotension”, “cardiac arrest”, “cardiovascular collapse”

## QUESTION 6

## 

**In critically ill adults with hemodynamic instability and with a depressed level of consciousness who are undergoing endotracheal intubation, is there a difference between administration of a sedative-hypnotic agent with a neuromuscular blocking agent (NMBA) versus an NMBA alone with respect to the incidence of cardiovascular collapse or awareness during paralysis in the peri-intubation period?**

**Patient:**

MeSH terms: Shock

Keywords: “hemodynamic instability”, “minimally conscious”, “depressed level of consciousness”, “impaired level of consciousness”, “comatose”

**Intervention (Sedative Agent with NMDA):**

MeSH terms: Hypnotics and Sedatives; Anesthetics, Dissociative; Succinylcholine; Rocuronium; Vecuronium Bromide; Neuromuscular Agents, Neuromuscular Blocking Agents, Neuromuscular Blockade, Neuromuscular Nondepolarizing Agents, Neuromuscular Depolarizing Agents

Keywords: “dissociative drugs”, “midazolam”, “fentanyl”, “ketamine”, “etomidate”, “propofol”, “NMBA”, “neuromuscular blockade agents”, “succinylcholine”, “rocuronium”, “vecuronium”

**Comparison (NMDA Alone – NO Sedative Agent):**

MeSH terms: Succinylcholine; Rocuronium; Vecuronium Bromide; Neuromuscular Agents; Neuromuscular Blocking Agents; Neuromuscular Blockade; Neuromuscular Nondepolarizing Agents; Neuromuscular Depolarizing Agents

Keywords: “NMBA”, “neuromuscular blockade agents”, “succinylcholine”, “rocuronium”, “vecuronium”

**Outcomes:**

MeSH terms: Heart Arrest; Awareness; Intraoperative Awareness

Keywords: “heart rate”, “cardiac arrest”, “cardiovascular collapse”, “awareness”, “awake”, “unintentional awareness”

## QUESTION 7

## 

**In critically ill adults undergoing RSI, is there a difference between etomidate versus other induction agents (e.g., ketamine, midazolam, propofol) with respect to mortality or the incidence of hypotension or vasopressor use in the peri-intubation period and through hospital discharge?**

**Intervention:**

MeSH terms: Etomidate/therapeutic use

Keywords: “etomidate”

**Comparison:**

MeSH terms: Hypnotics and Sedatives/therapeutic use; Ketamine/therapeutic use; Anesthetics, Dissociative; Midazolam; Propofol

Keywords: “ketamine”, “midazolam”, “fentanyl”, “propofol”

**Outcomes:**

MeSH terms: Vasoconstrictor Agents; Hypotension; Hospital Mortality

Keywords: “mortality”, “vasopressors”

## QUESTION 8

## 

**In critically ill adults who receive etomidate for induction during RSI, is there a benefit to the co-administration of corticosteroids with respect to mortality, vasopressor use, risk of infection, multiorgan dysfunction, ventilator days, or intensive care unit (ICU) length of stay?**

**Patient:**

MeSH terms: Etomidate/therapeutic use; Adrenal Insufficiency/chemically induced; Adrenal Insufficiency/prevention and control

Keywords: “etomidate induction”, “etomidate”

**Intervention:**

MeSH terms: Hydrocortisone/administration and dosage; Hydrocortisone/therapeutic use; Adrenal Cortex Hormones

Keywords: “corticosteroids”, “hydrocortisone”, dexamethasone”, “methylprednisolone”

**Outcomes:**

MeSH terms: Hospital Mortality; Vasoconstrictor Agents; Hypotension; Infections; Multiple Organ Failure; Ventilators, Mechanical; Intensive Care Units; Length of Stay

Keywords: “mortality”, “vasopressors”, “shock”, “adrenal insufficiency”, “infections”, “multiorgan dysfunction”, “ventilator”, “ICU length of stay”

## QUESTION 9

## 

**In critically ill adults undergoing endotracheal intubation, is there a difference between administration of a sedative-hypnotic agent with an NMBA versus a sedative-hypnotic agent alone with respect to FPS, the incidence of respiratory arrest or cardiovascular collapse, need for a surgical airway, or incidence of vomiting/aspiration during the peri-intubation period?**

**Intervention (NMDA with Sedative Agent):**

MeSH terms: Hypnotics and Sedatives; Anesthetic, Dissociative; Succinylcholine; Rocuronium; Vecuronium Bromide; Neuromuscular Agents; Neuromuscular Blocking Agents; Neuromuscular Blockade; Neuromuscular Nondepolarizing Agents; Neuromuscular Depolarizing Agents

Keywords: “dissociative drugs”, “midazolam”, “fentanyl”, “ketamine”, “etomidate”, “propofol”, “NMBA”, “neuromuscular blockade agents”, “succinylcholine”, “rocuronium”, “vecuronium”

**Comparison (Sedative Agent alone – NO NMDA):**

MeSH terms: Hypnotics and Sedatives

Keywords: “dissociative drugs”, “midazolam”, “fentanyl”, “ketamine”, “etomidate”, “propofol”

**Outcomes:**

MeSH terms: Hospital Mortality, Apnea, Heart Arrest, Vomiting, Respiratory Aspiration, Aspiration Pneumonia

Keywords: “first-attempt intubation success”, “first pass success”, “intubation success”, “respiratory arrest”, “cardiac arrest”, “cardiovascular collapse”, “surgical airway”

## QUESTION 10

## 

**In critically ill adults undergoing RSI, is there a difference between rocuronium versus succinylcholine when used for RSI with respect to mortality, FPS, adverse events, and risk of awareness in the peri-intubation period and through hospital discharge?**

**Intervention:**

MeSH terms: Neuromuscular Blocking Agents; Neuromuscular Blockade; Neuromuscular Nondepolarizing Agents; Vecuronium Bromide; Rocuronium; Atracurium; Pancuronium

Keywords: “non-depolarizing neuromuscular blockade agents”, “NDNMBA”, “NMBA”, “rocuronium”

**Comparison:**

MeSH terms: Neuromuscular Blocking Agents; Neuromuscular Blockade; Neuromuscular Depolarizing Agents; Succinylcholine

Keywords: “depolarizing neuromuscular blockade agents”, “succinylcholine”,“suxamethonium”, “succinyldicholine”

**Outcomes:**

MeSH terms: Hospital Mortality; Drug Related Side Effects and Adverse Reactions, Awareness, Intraoperative Awareness, Hypnotics and Sedatives

Keywords: “mortality”, “first-attempt intubation success”, “first pass success”, “intubation success”, “adverse effects”, “awareness”, “awake”, “unintentional awareness”, “sedation”, “PTSD”, “time to sedation”

# **Study Inclusion and Exclusion Criteria**

Publication dates were limited to 2000 through 2020. Only if the literature search yielded less than 10 results was the search expanded to include 1990 through 2020. Searches were limited to adults (≥ 18 years of age) and English language only. Editorials, letters to the editor, and animal studies were excluded. Literature search results were exported to reference management software (EndNote, Clarivate, Philadelphia, PA) and shared with panelist teams for review. Studies with a sample size less than 10 were excluded during panelist review. Study inclusion focused on the highest quality of evidence available per outcome and per question keeping with GRADE guidance. The leadership team helped panelist teams with decisions on which studies to include when necessary.

# **Quality of Evidence Assessment Using GRADE**

The panel followed the GRADE working group’s methodology for practice management guideline development (1). The GRADE approach was used to assess the quality of evidence from high to very low and the strength of the recommendation based on evaluating six domains: risk of bias, inconsistency, indirectness, imprecision, publication bias, and other criteria (1). Each group used the GRADE evidence-to-decision framework to formulate a preliminary recommendation (2). Subsequently, recommendations were discussed via bi-weekly virtual meetings among the full panel, and consensus was achieved through discussion. Quality of the evidence and formulation of recommendations as “strong” or “conditional” based on GRADE principles were determined at these meetings (1). A strong recommendation was made when the totality of anticipated desirable effects of one intervention (or nonintervention) outweighed those of the alternatives. A strong recommendation implies that most patients would best be served by the recommended course of action. Conditional or weak recommendations were those for which the desirable effect probably outweighed the undesirable effects, but some level of uncertainty existed. A “best practice” statement, or ungraded recommendation, was developed in instances when the net benefit (or harm) was considered by panelists to be unequivocal, and the panel thought the practice statement was actionable.

1. Guyatt GH, Oxman AD, Vist GE, et al: GRADE Working Group: GRADE: An emerging consensus on rating quality of evidence and strength of recommendations. *BMJ* 2008; 336:924-926
2. Alonso-Coello P, Oxman AD, Moberg J, et al: GRADE Working Group: GRADE Evidence to Decision (EtD) frameworks: A systematic and transparent approach to making well informed healthcare choices. 2: Clinical practice guidelines. *BMJ* 2016; 353:i2089

# **How Consensus Was Achieved**

Consensus meetings were held bi-weekly over a period of 6 months. One PICO question was discussed over a 60-minute scheduled time period at each consensus meeting. Each panelist team compiled the evidence profiles and preliminary evidence to decision framework prior to consensus meeting. When more than one RCT reported the same outcome, a pooled analysis was performed; otherwise, the data was qualitatively summarized by the panelist team. These materials were provided to the entire panel within the week prior to the consensus meeting for preliminary review by panelists.

As long as a quorum of 65% of the panelist members was reached, the consensus meeting proceeded on the scheduled date (attendance ranged from 65-95% for the 10 meetings). During consensus meetings, the panelist teams reviewed the evidence profiles and worked through the evidence to decision framework together. The final recommendation was achieved through discussions during the meeting until all participating members agreed to the recommendation. Following the meeting the evidence to decision framework and final recommendation was available to all members for review. Any disagreements were discussed via email or at the following meeting until all panelists were comfortable with the recommendation.

Panelist teams wrote the recommendations, rationale, and summaries citing all included literature to develop the evidence profiles and evidence to decision framework. Once the recommendations were compiled, each panelist reviewed the guideline document and provided input until final consensus was achieved on each PICO question. The final list of all recommendations was reviewed by all panelist and required a vote of “yes” to move forward with the final recommendations provided in this guideline.

# **Evidence to Decision Summary**

## QUESTION 1: POSITIONING

In critically ill adults undergoing RSI, is there a difference between the semi-Fowler (head and trunk inclined) position during intubation versus the supine position with respect to first-pass intubation success (FPS) or the incidence of oxygen desaturation or pulmonary aspiration?

### EVIDENCE PROFILE

| **Certainty assessment** | | | | | | | **Certainty** | **Importance** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **№ of studies** | **Study design** | **Risk of bias** | **Inconsistency** | **Indirectness** | **Imprecision** | **Other considerations** |
| **First Pass Success** | | | | | | | | |
| **6** | 1 RCT  4 OBS  1 MA | serious | serious | serious | not serious | none | ⨁◯◯◯ Very low | IMPORTANT |
| **Oxygen Desaturation** | | | | | | | | |
| **3** | 1 RCT  2 OBS | serious | serious | serious | not serious | none | ⨁◯◯◯ Very low | IMPORTANT |
| **Pulmonary Aspiration** | | | | | | | | |
| **3** | 1 RCT  2 OBS | serious | serious | serious | serious | none | ⨁◯◯◯ Very low | IMPORTANT |

**RCT**: Randomized Controlled Trial

**OBS**: Observational Study

**MA**: Meta-Analysis

### SUMMARY OF JUDGEMENTS

|  | **Judgement** | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Problem** | No | Probably no | Probably yes | **Yes** |  | Varies | Don't know |
| **Desirable Effects** | Trivial | **Small** | Moderate | Large |  | Varies | Don't know |
| **Undesirable Effects** | Large | Moderate | **Small** | Trivial |  | Varies | Don't know |
| **Certainty of evidence** | **Very low** | Low | Moderate | High |  |  | No included studies |
| **Values** | Important uncertainty or variability | Possibly important uncertainty or variability | Probably no important uncertainty or variability | **No important uncertainty or variability** |  |  |  |
| **Balance of effects** | Favors the comparison | Probably favors the comparison | **Does not favor either the intervention or the comparison** | Probably favors the intervention | Favors the intervention | Varies | Don't know |
| **Resources required** | Large costs | Moderate costs | **Negligible costs and savings** | Moderate savings | Large savings | Varies | Don't know |
| **Certainty of evidence of required resources** | Very low | Low | Moderate | High |  |  | **No included studies** |
| **Cost effectiveness** | Favors the comparison | Probably favors the comparison | Does not favor either the intervention or the comparison | Probably favors the intervention | Favors the intervention | Varies | **No included studies** |
| **Equity** | Reduced | Probably reduced | **Probably no impact** | Probably increased | Increased | Varies | Don't know |
| **Acceptability** | No | Probably no | **Probably yes** | Yes |  | Varies | Don't know |
| **Feasibility** | No | Probably no | Probably yes | **Yes** |  | Varies | Don't know |

### TYPE OF RECOMMENDATION

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Strong recommendation against the intervention | Conditional recommendation against the intervention | Conditional recommendation for either the intervention or the comparison | **Conditional recommendation for the intervention** | Strong recommendation for the intervention |
| ○ | ○ | ○ | **●** | ○ |

## QUESTION 2: PREOXYGENATION

In critically ill adults undergoing planned RSI, is there a difference preoxygenating with high-flow nasal oxygen (HFNO) (with or without apneic oxygenation) versus using face-mask preoxygenation, bag-mask ventilation, or non-invasive positive pressure ventilation (NIPPV) with respect to occurrence of desaturation, gastric insufflation, or pulmonary aspiration risk?

### 

### EVIDENCE PROFILE

| **Certainty assessment** | | | | | | | **Certainty** | **Importance** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **№ of studies** | **Study design** | **Risk of bias** | **Inconsistency** | **Indirectness** | **Imprecision** | **Other considerations** |
| **Oxygen Desaturation <80%** | | | | | | | | | |
| 8 | 5 RCT  3 OBS | serious | serious | serious | serious | none | ⨁◯◯◯ Very low | IMPORTANT |
| **Oxygen Desaturation <90%** | | | | | | | | | |
| 9 | 4 RCT  5 OBS | serious | serious | serious | serious | none | ⨁◯◯◯ Very low | IMPORTANT |
| **Gastric Insufflation or Pulmonary Aspiration** | | | | | | | | | |
| 7 | 4 RCT  3 OBS | serious | serious | serious | serious | none | ⨁◯◯◯ Very low | IMPORTANT |

**RCT**: Randomized Controlled Trial

**OBS**: Observational Study

### SUMMARY OF JUDGEMENTS

|  | **Judgement** | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Problem** | No | Probably no | Probably yes | **Yes** |  | Varies | Don't know |
| **Desirable Effects** | Trivial | Small | Moderate | **Large** |  | Varies | Don't know |
| **Undesirable Effects** | Large | Moderate | **Small** | Trivial |  | Varies | Don't know |
| **Certainty of evidence** | Very low | **Low** | Moderate | High |  |  | No included studies |
| **Values** | Important uncertainty or variability | Possibly important uncertainty or variability | Probably no important uncertainty or variability | **No important uncertainty or variability** |  |  |  |
| **Balance of effects** | Favors the comparison | Probably favors the comparison | Does not favor either the intervention or the comparison | **Probably favors the intervention** | Favors the intervention | Varies | Don't know |
| **Resources required** | Large costs | Moderate costs | **Negligible costs and savings** | Moderate savings | Large savings | Varies | Don't know |
| **Certainty of evidence of required resources** | Very low | Low | Moderate | High |  |  | **No included studies** |
| **Cost effectiveness** | Favors the comparison | Probably favors the comparison | Does not favor either the intervention or the comparison | Probably favors the intervention | Favors the intervention | Varies | **No included studies** |
| **Equity** | Reduced | Probably reduced | Probably no impact | **Probably increased** | Increased | Varies | Don't know |
| **Acceptability** | No | Probably no | Probably yes | **Yes** |  | Varies | Don't know |
| **Feasibility** | No | Probably no | Probably yes | **Yes** |  | Varies | Don't know |

### TYPE OF RECOMMENDATION

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Strong recommendation against the intervention | Conditional recommendation against the intervention | Conditional recommendation for either the intervention or the comparison | **Conditional recommendation for the intervention** | Strong recommendation for the intervention |
| ○ | ○ | ○ | **●** | ○ |

## QUESTION 3: DRUG-ASSISTED PREOXYGENATION

In critically ill adults in whom RSI is planned but are agitated, delirious, or uncooperative, is there a difference between medication-assisted preoxygenation versus usual care with face-mask preoxygenation, assisted mask ventilation, NIPPV, or HFNO with respect to the incidence of desaturation or hemodynamic instability?

### EVIDENCE PROFILE

| **Certainty assessment** | | | | | | | **Certainty** | **Importance** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **№ of studies** | **Study design** | **Risk of bias** | **Inconsistency** | **Indirectness** | **Imprecision** | **Other considerations** |
| **Oxygen Desaturation** | | | | | | | | | |
| 2 | 2 OBS | serious | serious | serious | serious | none | ⨁◯◯◯ Very low | IMPORTANT |
| **Hemodynamic Instability** | | | | | | | | | |
| 1 | 1 OBS | serious | not serious | serious | serious | none | ⨁◯◯◯ Very low | IMPORTANT |

**OBS**: Observational Study

### SUMMARY OF JUDGEMENTS

|  | **Judgement** | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Problem** | No | Probably no | Probably yes | **Yes** |  | Varies | Don't know |
| **Desirable Effects** | Trivial | Small | Moderate | **Large** |  | Varies | Don't know |
| **Undesirable Effects** | Large | Moderate | Small | Trivial |  | Varies | **Don't know** |
| **Certainty of evidence** | **Very low** | Low | Moderate | High |  |  | No included studies |
| **Values** | Important uncertainty or variability | Possibly important uncertainty or variability | **Probably no important uncertainty or variability** | No important uncertainty or variability |  |  |  |
| **Balance of effects** | Favors the comparison | Probably favors the comparison | Does not favor either the intervention or the comparison | **Probably favors the intervention** | Favors the intervention | Varies | Don't know |
| **Resources required** | Large costs | Moderate costs | **Negligible costs and savings** | Moderate savings | Large savings | Varies | Don't know |
| **Certainty of evidence of required resources** | Very low | Low | Moderate | High |  |  | **No included studies** |
| **Cost effectiveness** | Favors the comparison | Probably favors the comparison | Does not favor either the intervention or the comparison | Probably favors the intervention | Favors the intervention | Varies | **No included studies** |
| **Equity** | Reduced | Probably reduced | **Probably no impact** | Probably increased | Increased | Varies | Don't know |
| **Acceptability** | No | Probably no | **Probably yes** | Yes |  | Varies | Don't know |
| **Feasibility** | No | Probably no | Probably yes | **Yes** |  | Varies | Don't know |

### TYPE OF RECOMMENDATION

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Strong recommendation against the intervention | Conditional recommendation against the intervention | Conditional recommendation for either the intervention or the comparison | **Conditional recommendation for the intervention** | Strong recommendation for the intervention |
| ○ | ○ | ○ | **●** | ○ |

## QUESTION 4: NASOGASTRIC TUBE DECOMPRESSION

In critically ill adults who are undergoing RSI and are at high risk of aspirating, is there a difference between nasogastric tube (NGT) gastric decompression before intubation versus standard of care (without NGT intervention) with respect to the incidence of vomiting/aspiration?

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### BEST PRACTICE STATEMENT ONLY

No studies were identified

## QUESTION 5: PERI-INTUBATION VASOPRESSORS

In critically ill hypotensive adults undergoing RSI, is there a difference when peri-intubation vasopressors are administered, by infusion or bolus dose, versus fluid resuscitation alone with respect to the incidence of hypotension and of cardiac arrest?

### EVIDENCE PROFILE

| **Certainty assessment** | | | | | | | **Certainty** | **Importance** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **№ of studies** | **Study design** | **Risk of bias** | **Inconsistency** | **Indirectness** | **Imprecision** | **Other considerations** |
| **Hypotension or Cardiac Arrest** | | | | | | | | | |
| 6 | 3 RCT  3 OBS | serious | serious | serious | serious | none | ⨁◯◯◯ Very low | CRITICAL |

**RCT**: Randomized Controlled Trial

**OBS**: Observational Study

### SUMMARY OF JUDGEMENTS

|  | **Judgement** | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Problem** | No | Probably no | Probably yes | **Yes** |  | Varies | Don't know |
| **Desirable Effects** | Trivial | Small | Moderate | **Large** |  | Varies | Don't know |
| **Undesirable Effects** | Large | Moderate | Small | Trivial |  | Varies | **Don't know** |
| **Certainty of evidence** | **Very low** | Low | Moderate | High |  |  | No included studies |
| **Values** | Important uncertainty or variability | **Possibly important uncertainty or variability** | Probably no important uncertainty or variability | No important uncertainty or variability |  |  |  |
| **Balance of effects** | Favors the comparison | Probably favors the comparison | **Does not favor either the intervention or the comparison** | Probably favors the intervention | Favors the intervention | Varies | Don't know |
| **Resources required** | Large costs | Moderate costs | **Negligible costs and savings** | Moderate savings | Large savings | Varies | Don't know |
| **Certainty of evidence of required resources** | Very low | Low | Moderate | High |  |  | **No included studies** |
| **Cost effectiveness** | Favors the comparison | Probably favors the comparison | Does not favor either the intervention or the comparison | Probably favors the intervention | Favors the intervention | Varies | **No included studies** |
| **Equity** | Reduced | Probably reduced | **Probably no impact** | Probably increased | Increased | Varies | Don't know |
| **Acceptability** | No | Probably no | **Probably yes** | Yes |  | Varies | Don't know |
| **Feasibility** | No | Probably no | **Probably yes** | Yes |  | Varies | Don't know |

### TYPE OF RECOMMENDATION

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Strong recommendation against the intervention | Conditional recommendation against the intervention | **Conditional recommendation for either the intervention or the comparison** | Conditional recommendation for the intervention | Strong recommendation for the intervention |
| ○ | ○ | **●** | ○ | ○ |

## QUESTION 6: INDUCTION AGENT USE

In critically ill adults with hemodynamic instability and a with depressed level of consciousness who are undergoing endotracheal intubation, is there a difference between administration of a sedative-hypnotic agent with a neuromuscular blocking agent (NMBA) versus an NMBA alone with respect to the incidence of cardiovascular collapse or awareness during paralysis in the peri-intubation period?

### BEST PRACTICE STATEMENT ONLY

No studies were identified

## QUESTION 7: INDUCTION AGENT SELECTION

In critically ill adults undergoing RSI, is there a difference between etomidate versus other induction agents (e.g., ketamine, midazolam, propofol) with respect to mortality or the incidence of hypotension or vasopressor use in the peri-intubation period and through hospital discharge?

### 

### EVIDENCE PROFILE

| **Certainty assessment** | | | | | | | **Certainty** | **Importance** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **№ of studies** | **Study design** | **Risk of bias** | **Inconsistency** | **Indirectness** | **Imprecision** | **Other considerations** |
| **Mortality** | | | | | | | | | |
| 8 | 6 RCT  2 OBS | serious | not serious | not serious | not serious | none | ⨁⨁⨁◯ Moderate | CRITICAL |
| **Hypotension** | | | | | | | | | |
| 7 | 7 OBS | serious | serious | not serious | not serious | none | ⨁⨁◯◯ Low | IMPORTANT |
| **Vasopressor Use** | | | | | | | | | |
| 2 | 2 RCT | serious | not serious | not serious | not serious | none | ⨁⨁⨁◯ Moderate | IMPORTANT |

**RCT**: Randomized Controlled Trial

**OBS**: Observational Study

### SUMMARY OF JUDGEMENTS

|  | **Judgement** | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Problem** | No | Probably no | Probably yes | **Yes** |  | Varies | Don't know |
| **Desirable Effects** | Trivial | **Small** | Moderate | Large |  | Varies | Don't know |
| **Undesirable Effects** | Large | Moderate | Small | **Trivial** |  | Varies | Don't know |
| **Certainty of evidence** | Very low | Low | **Moderate** | High |  |  | No included studies |
| **Values** | Important uncertainty or variability | Possibly important uncertainty or variability | **Probably no important uncertainty or variability** | No important uncertainty or variability |  |  |  |
| **Balance of effects** | Favors the comparison | Probably favors the comparison | **Does not favor either the intervention or the comparison** | Probably favors the intervention | Favors the intervention | Varies | Don't know |
| **Resources required** | Large costs | Moderate costs | **Negligible costs and savings** | Moderate savings | Large savings | Varies | Don't know |
| **Certainty of evidence of required resources** | Very low | Low | Moderate | High |  |  | **No included studies** |
| **Cost effectiveness** | Favors the comparison | Probably favors the comparison | Does not favor either the intervention or the comparison | Probably favors the intervention | Favors the intervention | Varies | **No included studies** |
| **Equity** | Reduced | Probably reduced | **Probably no impact** | Probably increased | Increased | Varies | Don't know |
| **Acceptability** | No | Probably no | **Probably yes** | Yes |  | Varies | Don't know |
| **Feasibility** | No | Probably no | Probably yes | **Yes** |  | Varies | Don't know |

### TYPE OF RECOMMENDATION

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Strong recommendation against the intervention | Conditional recommendation against the intervention | **Conditional recommendation for either the intervention or the comparison** | Conditional recommendation for the intervention | Strong recommendation for the intervention |
| ○ | ○ | **●** | ○ | ○ |

## QUESTION 8: ETOMIDATE AND CORTICOSTEROID USE

In critically ill adults who receive etomidate for induction during RSI, is there a benefit to the co-administration of corticosteroids with respect to mortality, vasopressor use, risk of infection, multiorgan dysfunction, ventilator days, or intensive care unit (ICU) length of stay?

### EVIDENCE PROFILE

| **Certainty assessment** | | | | | | | **Certainty** | **Importance** | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **№ of studies** | **Study design** | **Risk of bias** | **Inconsistency** | **Indirectness** | **Imprecision** | **Other considerations** |
| **Mortality** | | | | | | | | | | |
| 6 | 4 RCT  2 OBS | not serious | serious | not serious | serious | none | ⨁⨁◯◯ Low | | CRITICAL |
| **Multiorgan Dysfunction** | | | | | | | | | | |
| 3 | 3 RCT | not serious | serious | not serious | serious | none | ⨁⨁◯◯ Low | | CRITICAL |
| **Ventilator Days** | | | | | | | | | | |
| 2 | 2 RCT | not serious | serious | not serious | serious | none | ⨁⨁◯◯ Low | | IMPORTANT |
| **Vasopressor Days** | | | | | | | | | | |
| 3 | 3 RCT | not serious | serious | not serious | serious | none | ⨁⨁◯◯ Low | | IMPORTANT |
| **ICU Length of Stay** | | | | | | | | | | |
| 3 | 2 RCT  1 OBS | serious | not serious | not serious | serious | none | ⨁⨁◯◯ Low | | IMPORTANT |

**RCT**: Randomized Controlled Trial

**OBS**: Observational Study

### SUMMARY OF JUDGEMENTS

|  | **Judgement** | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Problem** | No | Probably no | Probably yes | Yes |  | Varies | **Don't know** |
| **Desirable Effects** | Trivial | **Small** | Moderate | Large |  | Varies | Don't know |
| **Undesirable Effects** | Large | Moderate | **Small** | Trivial |  | Varies | Don't know |
| **Certainty of evidence** | Very low | **Low** | Moderate | High |  |  | No included studies |
| **Values** | Important uncertainty or variability | **Possibly important uncertainty or variability** | Probably no important uncertainty or variability | No important uncertainty or variability |  |  |  |
| **Balance of effects** | Favors the comparison | Probably favors the comparison | **Does not favor either the intervention or the comparison** | Probably favors the intervention | Favors the intervention | Varies | Don't know |
| **Resources required** | Large costs | Moderate costs | **Negligible costs and savings** | Moderate savings | Large savings | Varies | Don't know |
| **Certainty of evidence of required resources** | Very low | Low | Moderate | High |  |  | **No included studies** |
| **Cost effectiveness** | Favors the comparison | Probably favors the comparison | Does not favor either the intervention or the comparison | Probably favors the intervention | Favors the intervention | Varies | **No included studies** |
| **Equity** | Reduced | Probably reduced | **Probably no impact** | Probably increased | Increased | Varies | Don't know |
| **Acceptability** | No | Probably no | **Probably yes** | Yes |  | Varies | Don't know |
| **Feasibility** | No | Probably no | Probably yes | **Yes** |  | Varies | Don't know |

### TYPE OF RECOMMENDATION

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Strong recommendation against the intervention | **Conditional recommendation against the intervention** | Conditional recommendation for either the intervention or the comparison | Conditional recommendation for the intervention | Strong recommendation for the intervention |
| ○ | **●** | ○ | ○ | ○ |

## QUESTION 9: NEUROMUSCULAR BLOCKING AGENT USE

### In critically ill adults undergoing endotracheal intubation, is there a difference between administration of a sedative-hypnotic agent with an NMBA versus a sedative-hypnotic agent alone with respect to FPS, the incidence of respiratory arrest or cardiovascular collapse, need for a surgical airway, or incidence of vomiting/aspiration during the peri-intubation period?

### EVIDENCE PROFILE

| **Certainty assessment** | | | | | | | **Certainty** | **Importance** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **№ of studies** | **Study design** | **Risk of bias** | **Inconsistency** | **Indirectness** | **Imprecision** | **Other considerations** |
| **First Pass Success** | | | | | | | | | |
| 5 | 5 OBS | serious | serious | not serious | not serious | none | ⨁⨁◯◯ Low | IMPORTANT |
| **Respiratory or Cardiovascular Collapse** | | | | | | | | | |
| 3 | 3 OBS | serious | serious | not serious | serious | none | ⨁◯◯◯ Very low | CRITICAL |
| **Need for Surgical Airway** | | | | | | | | | |
| 1 | 1 OBS | serious | not serious | not serious | very serious | none | ⨁◯◯◯ Very low | IMPORTANT |
| **Vomiting or Aspiration** | | | | | | | | | |
| 5 | 5 OBS | serious | serious | not serious | serious | none | ⨁◯◯◯ Very low | IMPORTANT |

**OBS**: Observational Study

### SUMMARY OF JUDGEMENTS

|  | **Judgement** | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Problem** | No | Probably no | Probably yes | **Yes** |  | Varies | Don't know |
| **Desirable Effects** | Trivial | Small | Moderate | **Large** |  | Varies | Don't know |
| **Undesirable Effects** | Large | Moderate | **Small** | Trivial |  | Varies | Don't know |
| **Certainty of evidence** | Very low | **Low** | Moderate | High |  |  | No included studies |
| **Values** | Important uncertainty or variability | Possibly important uncertainty or variability | **Probably no important uncertainty or variability** | No important uncertainty or variability |  |  |  |
| **Balance of effects** | Favors the comparison | **Probably favors the comparison** | Does not favor either the intervention or the comparison | Probably favors the intervention | Favors the intervention | Varies | Don't know |
| **Resources required** | Large costs | Moderate costs | **Negligible costs and savings** | Moderate savings | Large savings | Varies | Don't know |
| **Certainty of evidence of required resources** | Very low | Low | Moderate | High |  |  | **No included studies** |
| **Cost effectiveness** | Favors the comparison | Probably favors the comparison | Does not favor either the intervention or the comparison | Probably favors the intervention | Favors the intervention | Varies | **No included studies** |
| **Equity** | Reduced | Probably reduced | **Probably no impact** | Probably increased | Increased | Varies | Don't know |
| **Acceptability** | No | Probably no | **Probably yes** | Yes |  | Varies | Don't know |
| **Feasibility** | No | Probably no | **Probably yes** | Yes |  | Varies | Don't know |

### TYPE OF RECOMMENDATION

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Strong recommendation against the intervention | Conditional recommendation against the intervention | Conditional recommendation for either the intervention or the comparison | Conditional recommendation for the intervention | **Strong recommendation for the intervention** |
| ○ | ○ | ○ | ○ | **●** |

## QUESTION 10: NEUROMUSCULAR BLOCKING AGENT SELECTION

In critically ill adults undergoing RSI, is there a difference between rocuronium versus succinylcholine when used for RSI with respect to mortality, FPS, adverse events, and risk of awareness in the peri-intubation period and through hospital discharge?

### EVIDENCE PROFILE

| **Certainty assessment** | | | | | | | **Certainty** | **Importance** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **№ of studies** | **Study design** | **Risk of bias** | **Inconsistency** | **Indirectness** | **Imprecision** | **Other considerations** |
| **Mortality** | | | | | | | | | |
| 1 | 1 OBS | very serious | not serious | not serious | serious | none | ⨁◯◯◯ Very low | CRITICAL |
| **First Pass Success** | | | | | | | | | |
| 6 | 2 RCT  4 OBS | serious | not serious | not serious | not serious | none | ⨁⨁⨁◯ Moderate | IMPORTANT |
| **Adverse Effects** | | | | | | | | | |
| 18 | 11 RCT  7 OBS | serious | serious | serious | serious | none | ⨁◯◯◯ Very low | IMPORTANT |
| **Risk of Awareness** | | | | | | | | | |
| 3 | 3 RCT | serious | not serious | serious | very serious | none | ⨁◯◯◯ Very low | IMPORTANT |

**RCT**: Randomized Controlled Trial

**OBS**: Observational Study

### FOREST PLOT

Outcome of First Pass Success (2 RCT)

Table

Description automatically generated

### SUMMARY OF JUDGEMENTS

|  | **Judgement** | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Problem** | No | Probably no | Probably yes | **Yes** |  | Varies | Don't know |
| **Desirable Effects** | Trivial | **Small** | Moderate | Large |  | Varies | Don't know |
| **Undesirable Effects** | Large | Moderate | **Small** | Trivial |  | Varies | Don't know |
| **Certainty of evidence** | Very low | **Low** | Moderate | High |  |  | No included studies |
| **Values** | Important uncertainty or variability | Possibly important uncertainty or variability | Probably no important uncertainty or variability | **No important uncertainty or variability** |  |  |  |
| **Balance of effects** | Favors the comparison | Probably favors the comparison | **Does not favor either the intervention or the comparison** | Probably favors the intervention | Favors the intervention | Varies | Don't know |
| **Resources required** | Large costs | Moderate costs | **Negligible costs and savings** | Moderate savings | Large savings | Varies | Don't know |
| **Certainty of evidence of required resources** | Very low | Low | Moderate | High |  |  | **No included studies** |
| **Cost effectiveness** | Favors the comparison | Probably favors the comparison | Does not favor either the intervention or the comparison | Probably favors the intervention | Favors the intervention | Varies | **No included studies** |
| **Equity** | Reduced | Probably reduced | **Probably no impact** | Probably increased | Increased | Varies | Don't know |
| **Acceptability** | No | Probably no | Probably yes | **Yes** |  | Varies | Don't know |
| **Feasibility** | No | Probably no | Probably yes | **Yes** |  | Varies | Don't know |

### TYPE OF RECOMMENDATION

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Strong recommendation against the intervention | Conditional recommendation against the intervention | **Conditional recommendation for either the intervention or the comparison** | Conditional recommendation for the intervention | Strong recommendation for the intervention |
| ○ | ○ | **●** | ○ | ○ |