

Challenges and Advances in Intubation: Rapid Sequence Intubation

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KEYWORDS

- Intubation • Rapid sequence intubation
- Endotracheal intubation

DEFINITION/OVERVIEW

Rapid sequence intubation (RSI) is a process whereby pharmacologic agents, specifically a sedative (eg, induction agent) and a neuromuscular blocking agent are administered in rapid succession to facilitate endotracheal intubation.¹

RSI in the emergency department (ED) usually is conducted under less than optimal conditions and should be differentiated from rapid sequence induction (also often abbreviated RSI) as practiced by anesthesiologists in a more controlled environment in the operating room to induce anesthesia in patients requiring intubation.^{2–6} RSI used to secure a definitive airway in the ED frequently involves uncooperative, nonfasted, unstable, critically ill patients. In anesthesia, the goal of rapid sequence induction is to induce anesthesia while using a rapid sequence approach to decrease the possibility of aspiration. With emergency RSI, the goal is to facilitate intubation with the additional benefit of decreasing the risk of aspiration.

Although there are no randomized, controlled trials documenting the benefits of RSI,⁷ and there is controversy regarding various steps in RSI in adult and pediatric patients,^{8–13} RSI has become standard of care in emergency medicine airway management^{14–17} and has been advocated in the airway management of intensive care unit or critically ill patients.¹⁸ RSI has also been used in the prehospital care setting,^{14,19,20}

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although the results have been mixed, especially in trauma patients (most notably in traumatic brain injury patients), such that an expert panel found that “the existing literature regarding paramedic RSI was inconclusive.”²⁰ Furthermore, training and experience “affect performance” and that a successful “paramedic RSI program is dependent on particular emergency medical services (EMS) and trauma system characteristics.”²⁰

ADVANTAGES AND DISADVANTAGES OF RAPID SEQUENCE INTUBATION

The purpose of RSI is to make emergent intubation easier and safer, thereby increasing the success rate of intubation and decreasing the complications of intubation. The rationale behind RSI is to prevent aspiration and its potential problems, including aspiration pneumonia, and to counteract the increase in systemic arterial blood pressure, heart rate, plasma catecholamine release, intracranial pressure (ICP), and intraocular pressure (IOP) that occurs with endotracheal intubation. Blunting the rise in ICP may be critical in patients with impaired cerebral autoregulation from central nervous system illness/injury. Similarly, avoiding an increase in IOP may be desirable in the patient with glaucoma or an acute eye injury. RSI eliminates the normal protective airway reflexes (such as coughing, gagging, increased secretions, and laryngospasm) that can make intubation more difficult. Use of RSI may limit cervical spine movement, thus, allowing for better control of the cervical spine during intubation with less potential for injury. RSI decreases the trauma to the airway that occurs with intubation. RSI should also decrease or eliminate the discomfort that occurs with intubation and the patient’s recall of the intubation.¹

Disadvantages of RSI are (1) the potential for side effects or complications related to the drugs administered for RSI, (2) prolonged intubation leading to hypoxia, and (3) “emergent” or a “crash” airway resulting in a cricothyroidotomy or other “emergent” airway procedure.¹

RAPID SEQUENCE INTUBATION: THE PROCEDURE

RSI generally consists of seven steps: (1) preparation, (2) preoxygenation, (3) pretreatment, (4) paralysis with induction, (5) protection and positioning, (6) placement of the tube in the trachea, and (7) postintubation management.^{1,17} These seven steps can be modified when appropriate to fit the clinical situation.²¹

Step 1—Preparation

Preparation involves having all the necessary equipment and supplies including medications that may be needed for an emergency intubation such as oxygen, suction, bag-valve mask (BVM), laryngoscope and blades, endotracheal (ET) tubes with a stylet with one size larger and smaller than the anticipated ET size, resuscitation equipment, and supplies for rescue maneuvers (eg, laryngeal mask airways [LMA] or cricothyrotomy) in case of a failed intubation according to the Can’t Intubate, Can’t Ventilate American Society of Anesthesiologists (ASA) guidelines.²² The patient should have an intravenous line placed and be put on continuous monitoring to include vital signs (heart rate, respirations, blood pressure, pulse oximetry), cardiac rhythm monitoring, and, preferably, capnography.

The mnemonic “SOAPME” is one way to remember the essential equipment needed for intubation: Suction, Oxygen, Airway, Pharmacology, Monitoring, Equipment.²³ For the airway, include the ET tubes, laryngoscopes, blades, stylets, and BVM. For pharmacology, select, draw up, and label the appropriate medications (sedative, neuromuscular blocker, ancillary drugs) based on the history, physical

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