

RAPID SEQUENCE INTUBATION (RSI)

Overview

Rapid Sequence Intubation (also known as Rapid Sequence Induction, or RSI) is a method of intubating patients who present with issues that make intubation difficult (e.g., gag reflex, clenched jaw, patient combativeness, etc.). Intubation is accomplished by sedating and paralyzing the patient, allowing for easier intubation. Although the physical endotracheal intubation procedure itself remains the same, the serious nature of using paralytic medications requires excellent critical thinking skills, advanced pharmacology knowledge, and continuous training.

RSI utilizes a sedative, an analgesic, a short-term paralytic, and a long-term paralytic when necessary. In addition, atropine may be utilized for bradycardic patients, while lidocaine may be used in cases of increased intracranial pressure (ICP) per service protocols.

Because of the potential complications involved with RSI, **not all paramedics are eligible to perform the procedure.** A training program approved by the ADH Section of EMS is required for every service applying to practice RSI procedures, as well as a thorough documentation process for each procedure attempted. The performance of this skill by paramedics will be **limited to patients 8 years of age and older.** Air medical services may use RSI for pediatric patients under 8 years of age **only** when performed by a flight nurse. The EMS medical director must play a key role in the selection of RSI-approved paramedic providers, their training, and evaluation of the effectiveness of the program.

Training places a heavy emphasis on quality of skills, enhanced pharmacological knowledge, and critical thinking/decision making (who should and should not receive RSI). Quality Assurance/Quality Improvement (QA/QI) is critical to the success of an RSI protocol. Cases should be reviewed as soon as possible following an RSI procedure with timely feedback given to the paramedic. Paramedics making questionable decisions or having poor intubation rates should be identified and remediated immediately. If improvement criteria are not met, the paramedic must be removed from the approved practicing RSI provider list.

Qualifications to Participate in RSI:

The service medical director and training coordinator will select individuals to participate in the program.

Responsibilities of Ambulance Service Medical Director:

- Approve the RSI program to be submitted for review/approval by the Section of EMS
- Select/approve participant providers

- Monitor RSI training. All paramedics should receive RSI skills validation annually.
- Evaluate and monitor the skills of participants- The paramedic must have a minimum of three (3) successful intubations every six (6) months.
- Review all RSI attempts through submitted patient care reports (PCR) in an expeditious manner
- Initiate retraining/remediation as needed. If a paramedic has not performed an RSI procedure within six (6) months, the paramedic must be checked off by the EMS agency training department and medical director.

Implementation of an RSI Protocol

RSI utilization in the pre-hospital emergency setting:

Ambulance services electing to perform RSI procedures will be required to submit the following to the Section for **review and approval prior to initiation of the protocol**:

- Paramedics who wish to be approved by the Section of EMS to perform RSI must complete the mandatory training courses (outlined in Section VI). All paramedics providing RSI must be signed off by an approved list of instructors and by their service medical director.
- The service medical director's proposed RSI procedure protocol
- A statement must be attached to the protocol stating that appropriate education and training will be provided to approved paramedics prior to utilization of skill/procedures.

Paramedics performing RSI procedures in a hospital setting:

Pursuant to ACT 293 of 1981, if a hospital wishes to permit an Arkansas licensed Emergency Medical Services Provider (EMSP) to perform specified procedures within the emergency department or as a member of an emergency code team functioning elsewhere in the hospital, the following action must be taken:

- The medical staff must approve the privileges granted to the individual functioning as an EMSP with the concurrence of the hospital's governing body. Specific policies governing the supervision and the procedures to be performed by the EMSP must be developed by the medical staff and approved by the hospital's governing body. In no event, however, may an EMSP perform a procedure on a patient in a hospital that he or she is not certified to do by the Section of EMS and Trauma Systems, Arkansas Department of Health (ADH).

- Approved EMSPs in a hospital setting must function in accordance with the physician's orders and under the direct supervision of either the physician or the registered nurse responsible for emergency services within a hospital.
- A roster with the delineation of privileges will be maintained in the files of the supervisor for the respective department of employment and the files of the administrator.
- Participants must complete the training program as outlined below (Section III, Outline of Initial Training) and documentation of training will be kept on file in the employee's training file at the facility. A verification form regarding the monitoring of two RSI procedures must also be kept on file by the hospital. Participants must complete a training and monitoring program prior to utilization of the skill set.

Each paramedic participant must complete the specified training program for the ambulance service/hospital where he/she is employed. If a paramedic works at multiple ambulance services or hospitals, he/she must complete the training program for each employer and obtain approval from each service medical director or hospital governing body by which they are employed.

RSI Requirements

Once approval of an RSI protocol has been obtained from the Section of EMS, the following must be conducted:

- A copy of all RSI ePCRs will be sent to the ambulance service medical director and training coordinator **immediately** following the call. The ambulance service medical director will review each call for appropriate and inappropriate treatment decisions to use RSI.
- Ambulance services will utilize the Section of EMS RSI Tracking Form (which may be found on ADH website) for **each patient** on whom the RSI procedure is performed. The electronic form shall be submitted on the first day of the month listing all RSI procedures performed for the previous month.
- The participating ambulance service will be required to provide a quarterly report to the Section of EMS regarding utilization of procedures and a QA/QI program update related to RSI procedures, including remediation and/or removal of RSI-approved providers.
- Reports shall consist of the following:
 - Number of employees trained to perform RSI
 - Number of patients receiving RSI procedures
 - Reason patient required RSI procedure

Outline of Initial Training:

All participants must meet training requirements as outlined. Successful completion of an approved “Difficult Airway” course is required for all paramedics prior to performing RSI procedures. Additionally, Department approved instructors are to teach the following educational guidelines for RSI training:

A. Comprehensive ventilation assessment

1. Purpose
2. Procedure
3. Minute volume
4. Alveolar volume
5. Evaluating the effects of artificial ventilation
6. Pulse oximetry
 - a. Purpose
 - b. Indications
 - c. Contraindications
 - d. Complications and limitations of the technology
 - e. Procedure
7. Blood gas analysis
 - a. pH
 - b. PaCO₂
 - c. PaO₂
 - d. Bicarbonate
 - e. Base deficit
8. Capnography review
 - a. Purpose
 - b. Indications
 - c. Contraindications
 - d. Complications and limitations
 - e. Procedure

B. Review of ventilation devices used by EMTs and AEMTs

1. Manual devices
 - a. Purpose
 - b. Indications
 - c. Contraindications
 - d. Complications
 - e. Procedures
2. Mechanical devices
 - a. Purpose
 - b. Indications
 - c. Contraindications
 - d. Complications
 - e. Procedures

C. Assisting patient ventilations

1. Review of techniques used by EMTs and AEMTs
 - a. Purpose
 - b. Indications
 - c. Contraindications
 - d. Complications
 - e. Procedures
2. Review of the physiologic differences between normal and positive pressure ventilation
3. BiPAP/CPAP
 - a. Purpose
 - b. Indications
 - c. Contraindications
 - d. Complications
 - e. Procedure
4. Positive End Expiratory Pressure (PEEP)
 - a. Purpose
 - b. Indications
 - c. Contraindications
 - d. Complications

D. Assessing the airway for successful RSI (look before you leap)

1. LEMON
 - a. Look externally
 - b. Evaluate 3-3-2
 - c. Mallampati score
 - d. Obstruction
 - e. Neck mobility
2. HEAVEN
 - a. Hypoxemia
 - b. Extremes of size.
 - c. Anatomic abnormalities
 - d. Vomit/blood/fluid
 - e. Exsanguination
 - f. Neck mobility issues.

E. Induction agents

1. Barbiturates and sedatives
 - Thiopental
 - Methohexital
 - Propofol
 - Ketamine

Etomidate

2. Opiates
 - Morphine
 - Fentanyl
 - Alfentanil
3. Neuroleptics
 - Ketamine
4. Benzodiazepines
 - Midazolam
 - Diazepam
 - Lorazepam
5. Premedication agents
 - Atropine
 - Lidocaine
6. Neuromuscular blocking agents
 - Succinylcholine
 - Vecuronium
 - Mivacurium
 - Rocuronium
 - Pancuronium
 - Cisatracurium
 - Curare
7. Depolarizing agents
 - Succinylcholine
8. Maintenance medications and reversal agents.
 - Neostigmine
 - Pyridostigmine
 - Edrophonium
9. Procedure: See AHA RSI Protocol

F. Age-Related Variations in Pediatric and Geriatric Patients

Based on the following resources:

National Emergency Medical Services Education Standards, Paramedic Instructional Guidelines published by NHTSA

Kuzmack Edward. April 2018, Volume 54, Issue4, Pages 395-401. Journal of Emergency Medicine. A Novel Difficult- Airway Prediction Tool for Emergency Airway Management: Validation of the HEAVEN Criteria in a Large Air Medical Cohort.

Bledsoe, Bryan E. 2006. *Critical Care Paramedic*. Brady, Pearson. Prentice Hall. Airway Management and Ventilation.

American Heart Association. *2015 Handbook of Emergency Cardiovascular Care for Healthcare Providers*. Rapid Sequence Intubation.

Data Collection Requirements

These data points must be captured within the patient care report (PCR). All other required electronic PCR (ePCR) data fields must also be included. All PCR's where RSI was performed must be reviewed by the EMS agency's medical director to ensure all data points below are included.

- Date of run: (month/day/year)
- EMS run number
- Name of ambulance service
- Names of all EMS providers providing care. Intubation performed by EMT-P name
- All patient demographics
- Patient weight
- Vital signs for both pre-RSI procedure and post-RSI procedure (blood pressure, pulse, heart rate/EKG interpretation, respiratory rate, Glasgow Coma Scale (GCS)score, oxygen saturation, ETCO2) **ETCO2 monitoring is required for all RSI procedures.** Vital signs should be recorded every 5-10 minutes.
- Equipment used and size – laryngoscope blade, ET tube size, etc.
- Medications – drug, dose, route, time

The narrative must include the following:

- Indications for RSI procedure vs standard endotracheal intubation
- Type and size of laryngoscope blade used
- The number of attempts of successful intubation (if not included in the main body of the PCR)
- Total time for the procedure (time from the first drug in RSI procedure until successful intubation)
- ET tube confirmation method (examples: bilateral breath sounds, rise/fall of the chest wall, ETCO2 detector, abdominal sounds absent, ET tube misting, Esophageal Detector Device (EDD), visualization of ET tube passing through vocal cords, patient clinically improved, pulse oximetry improvement)
- Device used to secure ET tube
- Neck stabilization device utilized (if applicable)
- Complications of RSI procedure, if any (e.g., cervical vertebral injury, aspiration, bradycardia, vomiting, hypertension, etc.)

Additional data is required if RSI was unsuccessful. The following must be documented:

- Unsuccessful attempts*(note paramedic name)

- Rescue airway device attempted and if it was successful
- Suspected reasons for failed intubation (e.g., difficult anatomy, inability to visualize cords, orofacial trauma, inadequate patient paralysis/relaxation, etc.)

*For the purposes of documentation, the Section of EMS defines an endotracheal intubation (ETI) attempt as placing a laryngoscope blade into the mouth/oropharynx with an intent to intubate. A nasotracheal intubation (NTI) attempt is defined as when the tube is placed into the nose with the intent to intubate.

Using the laryngoscope blade as an adjunct to using Magill's forceps is not an ETI. Providers should ensure documentation of the use of Magill's is noted in the procedure section for each attempt. Providers should ensure documentation of the use of suction is noted in the procedure section for each attempt, and it should be noted if the laryngoscope blade was utilized on the first suction.

Inappropriate Treatment:

In the instance that RSI is performed inappropriately, the ambulance service medical director will make a written recommendation detailing a plan for the provider's remediation. If remediation is inadequate, unsuccessful, or refused, the paramedic will be removed from the approved provider's list.