
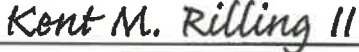




West Virginia Office of Emergency Medical Services Policies and Procedures

Protocol Submission Template

This document shall be completed as part of the requirements for submission to modify, delete, or add a new protocol the WV State-wide EMS protocols. Complete the cover sheet and attach all supporting documentation per policy to this form.

NAME of submitter: Kent M. Rilling II	
Certification Number (if applicable): WV075529	Expiration Date: 03/31/2022
Agency Affiliation: Jefferson County Emergency Services Agency <input type="checkbox"/> Not Affiliated	
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<i>Both signatures below are required for this submission to be reviewed.</i>	
Agency Medical Director:	 _____ <i>Signature</i>
Submitter:	 _____ <i>Signature</i>

Submit to:
WVOEMS Medical Director
West Virginia Office of Emergency Medical Services
350 Capitol Street
Room 425
Charleston WV, 25301

Official Use Only:

Date received by State Medical Director:	
Date Reviewed by EMSAC:	
Date Reviewed By MPCC:	
Decision: <input type="checkbox"/> Approved <input type="checkbox"/> Denied <input type="checkbox"/> Pilot Project <input type="checkbox"/> Requested additional Information	
Posted to 30 day comment period:	
WVOEMS Medical Director Signature: _____	

A. EXPLANATION

Ketamine has been used across many disciplines of medicine since its inception in the early 1960's. It is best known for having many mechanisms of action and a broad range of use. Specifically, its analgesic, anesthetic and dissociative properties make it beneficial throughout prehospital medicine. Ketamine, at the proper dose, will completely dissociate the patient from outside stimuli whilst keeping the respiratory reflexes intact. This facilitates a tolerable experience during the very traumatic intubation procedure and preserves the patient's ability to breathe spontaneously until the administration of a neuromuscular blocking agent. Ketamine's dissociative effect will also ensure that the patient remains properly sedated and comfortable when administered as a post-intubation sedative.

The positive, but, blunted hemodynamic effects of ketamine makes its use very desirable in all situations where RSI is indicated, especially those that involve a state of hemodynamic compromise and extensive TBI. Ketamine stimulates catecholamine receptors and the release of catecholamines causing an increase in heart rate, cardiac contractility, mean arterial pressure and cerebral blood flow. This is very important, as peri-intubation hypotension is associated with increased mortality.

Ketamine's bronchodilatory effect may facilitate ventilation, oxygenation and overall perfusion status in any patient. This is especially beneficial to those patients who are intubated secondary to an exacerbation of a reactive airway disease.

B. INDICATION

Ketamine should be added as an option to Section 4 of WVOEMS Protocol 4903 as a preferred and/or optional sedative agent for RSI.

Ketamine should be added as an option to Section 9 subsection A of WVOEMS Protocol 4903 for post intubation sedation.

C. SUPPORTING EVIDENCE AND LITERATURE

Caro D. (May 11, 2016.) Induction agents for rapid sequence intubation in adults. *UpToDate*. Retrieved July 25, 2016, from www.uptodate.com/contents/induction-agents-for-rapid-sequence-intubation-in-adults.

Eames WO, Rooke A, Wu R, Bishop MJ: Comparison of the effects of etomidate, propofol, and thiopental on respiratory resistance after tracheal

intubation. *Anesthesiology* 1996; 84:1307-11

Huber FC, Reeves JG, Gutierrez J, Corsen G: Ketamine: Its effect on airway resistance in man. *South Med J* 1972; 65:1176-80

Kurdi M, Theerth K, Deva R. Ketamine: Current applications in anesthesia, pain, and critical care. *Anesth Essays Res.* 2014;8(3):283–290.

Lundy PM, Gowdey CW, Calhoun EH: Tracheal smooth muscle relaxant effect of ketamine. *Br J Anaesth* 1974; 46:333-6

Sleigh J, Harvey M, Voss L, et al. Ketamine—more mechanisms of action than just NMDA blockade. *Trends in Anesthesia and Critical Care.* 2014;4(2–3):76–81.

Wu SC, Hildebrandt J, Isner PD, Pierson DJ, Bishop MJ: Efficacy of anticholinergic and [small beta, Greek]-adrenergic agonist treatment of maximal cholinergic bronchospasm in tracheally intubated rabbits. *Anesth Analg* 1992; 75:777-83

D. SUPPORTING WEST VIRGINIA and/or NATIONAL DATA

E. DEFINE AREA OF PROTOCOL CONTENT

1. Patient Care Presentation

Ketamine should be used as a preferred and/or optional sedative agent when RSI is indicated.

2. Treatment

- i. Basic Life Support – N/A
- ii. Advanced Life Support – Preferred and/or optional induction agent and post-intubation sedation for RSI
- iii. Adult – Ketamine 2mg/kg IV
- iv. Pediatric
- v. Geriatric – Ketamine 2mg/kg IV
- vi. Medical Command – Standing orders
- vii. Algorithm – See attached proposal

viii. Alerts – N/A

3. Procedure/ Skill

- i. Purpose – N/A
- ii. Indication – N/A
- iii. Contraindications – N/A
- iv. Potential Adverse Effects/Complications Precautions – N/A
- v. Procedure – N/A

4. Medication

- i. Indication – Any RSI. Especially those in a state of hemodynamic instability, head trauma and reactive airway disease.
- ii. Pharmacokinetics – Onset: 30-60 seconds. Duration: 10-20 minutes
- iii. Adverse Effects – Increased secretions, caution in cardiovascular disease (due to hypertension and tachycardia secondary to catecholamine response), laryngospasm (rare), and raised intra-ocular pressure.
- iv. Precautions – Use caution when administering to patients with known hepatic insufficiencies, CAD, CHF and present profound hypertension.
- v. Contraindications – N/A
- vi. Preparations – 500mg/10mL vial
- vii. Dosage
 - a. Adult – Induction: 2mg/kg IV.
Post-intubation sedation: 2mg/kg IV
 - b. Pediatric – N/A
 - c. Geriatric – Induction: 2mg/kg IV.
Post-intubation sedation: 2mg/kg IV

d. Medical Consultation – Standing order

F. FISCAL IMPACT STATEMENT COVERING THE START-UP AND MAINTENANCE COST OF THE MEDICATION, DEVICE, REPLACEMENT PARTS, AND ANY UNIQUE REQUIREMENTS TO IMPLEMENT THE PROTOCOL.

No fiscal impact noted as ketamine is already listed as an optional medication on the state list.

G. IMPACT ON THE EXISTING WEST VIRGINIA STATE-WIDE EMS PROTOCOLS

See attached draft revision of WVOEMS Protocol 4903

RAPID SEQUENCE INTUBATION (RSI)

This protocol is ONLY for paramedics who have been specifically trained to perform this skill and have approval from the WVOEMS State Medical Director and corresponding Squad Medical Director.

Rapid Sequence Intubation (RSI) should only be performed if a rapid airway is indicated, and benefits outweigh potential risks. This guideline is for patients that require intubation but are awake, continue to have respiratory effort, and intact cough/gag reflex. Whenever possible, RSI should be performed prior to transport. This guideline is not intended for patients in cardiac arrest because they should be intubated without drugs per **Airway Management Protocol 4901**.

The EMS provider must have a backup/rescue airway plan (Supraglottic device or **OPTIONAL** Percutaneous Cricothyrotomy, etc.) in mind and immediately accessible for all patients under consideration for RSI prior to proceeding:

A. General Information:

1. Two (2) paramedics must be present, one (1) of which is an "RSI trained Paramedic."
2. Patient must be on a cardiac monitor and pulse oximeter. Maintain patient on high flow supplemental oxygen either by mask or bag-valve-mask. Confirm or initiate two (2) IVs, if possible, preferably large bore. Have suction hooked up, turned on, and within reach. Have bag-valve-mask attached to oxygen regulator and immediately available.
3. Pre-oxygenate the patient using 100% oxygen. Assure that you can assist ventilations with a bag-valve-mask prior to proceeding. **DO NOT BAG VENTILATE** the patient unless necessary—this only causes increased gastric distention and the increased risk of aspiration.

B. Indications: Patients ≥ 12 years old whose airway cannot be controlled by any other means as outlined in the **Airway Management Protocol 4901** and one (1) of the following:

1. Inability to maintain airway patency.
2. Inability to protect the airway against aspiration.
3. Ventilatory compromise.
4. Failure to adequately oxygenate pulmonary capillary blood.
5. Anticipation of a deteriorating course that will eventually lead to the inability to maintain airway patency or protection.

RAPID SEQUENCE INTUBATION (RSI)

C. RSI Procedure:

1. If suspected closed head injury or other reason for high ICP, administer, Lidocaine - 1.0 mg/kg IV/IO at least three (3) minutes prior to intubation.
2. Fentanyl (Sublimaze®): 1 microgram/kg IV/IO. Withhold if hypotensive.
3. Apply cricoid pressure (Sellick's Maneuver).
4. Sedative agent:
 - a. Etomidate* (Amidate®): 0.3 mg/kg IV/IO OR
 - b. (Optional): Ketamine* (Ketalar®): 2 mg/kg IV/IO OR
 - c. Midazolam (Versed®): 0.1 mg/kg IV/IO (max. dose 10 mg)
Do not use Midazolam in hypotensive patients.

Note: *Etomidate and Ketamine are the preferred sedatives, especially in patients with possible hemodynamic compromise. If Etomidate is used, Succinylcholine should already be drawn up and immediately follow Etomidate administration.

5. If not contraindicated, administer Succinylcholine (Anectine®): 1.5 mg/kg IV push. When paralysis is achieved and muscle fasciculation have stopped (in about 30 - 45 seconds), orally intubate, inflate cuff, and confirm tube placement with bilateral breath sounds, appropriate end-tidal carbon dioxide waveform, etc.

Note: Contraindications include high intraocular pressure, high potassium (K > 5.5), burns and spinal cord injuries > 24 hours old, pseudocholinesterase deficiency.

6. If there is no jaw relaxation or decreased resistance to ventilation within two (2) minutes, or if the patient begins to resist, repeat Succinylcholine (Anectine®) 1.5 mg/kg IVP
7. If unable to intubate, consider suctioning, jaw thrust, changing operators, using a different blade, etc.; monitor oxygen saturations and use BVM to ventilate between attempts, if needed.

RAPID SEQUENCE INTUBATION (RSI)

8. Use rescue airway plan (Supraglottic device, video laryngoscopy (required), needle cricothyrotomy or OPTIONAL percutaneous cricothyrotomy, etc.) and/or bag-valve-mask if unable to intubate after three (3) attempts.
9. Once intubation is confirmed, if patient requires continued sedation, long term paralytics, or analgesics, consider the following drugs and repeat, as necessary, based upon patient response and drug duration of action:
 - a. Sedation:
 - i. **(Optional): Ketamine (Ketalac®): 2 mg/kg IV/IO, OR**
 - ii. **Midazolam (Versed®): 0.1 mg/kg IV/IO (if not hypotensive)**
 - b. Analgesia:
 - i. **Fentanyl (Sublimaze®): 1 microgram/kg slow IV/IO push, OR**
 - ii. **Morphine: 0.1 mg/kg slow IV/IO push.**
 - c. Long-term paralytic:
 - i. **Vecuronium (Norcuron®): 0.1 mg/kg IV/IO**

Note: An agent for long term paralysis MUST never be given until endotracheal tube placement is fully confirmed.

10. All patients given a long-term paralytic agent *must* also periodically be given sedation while they remain paralyzed.

D. **Contact Medical Command** once en route to hospital with patient update for all patients requiring intubation.



RAPID SEQUENCE INTUBATION (RSI) - GUIDELINES

- A Squad Medical Director (SMD) must apply in writing to the WVOEMS State Medical Director for a particular squad to be considered for the RSI program. A Memorandum of Understanding (MOU) shall be established between the Squad Director, Squad Medical Director, and WVOEMS State Medical Director.
- Each individual Squad Medical Director will choose candidates for the program.
- The Squad Medical Director will be responsible for establishing initial and continuing education, performance improvement, etc.
- Continuing education by the SMD will be held monthly for the first year. The Squad Medical Director should directly observe the RSI paramedic perform an intubation and RSI sequence once a quarter (this can be in a clinical or classroom setting).
- The RSI protocol is for adults only at this time (12 years old and up).
- The Squad must agree to purchase, store, and replace the necessary medications.
- Squads entering the program shall be required to have video assisted laryngoscopy equipment.
- Squads participating in this program shall be required to have wave form capnography available.
- Every RSI intubation is to be enrolled in the squad's quality assurance program.
- A minimum of two (2) Paramedics is required throughout transport on any RSI call.
- At the 12 month point in the program, the SMD must reapply with the WVOEMS State Medical Director to continue the program.

RAPID SEQUENCE INTUBATION (RSI) - GUIDELINES

- Candidates shall have at least three (3) years experience as an active and certified WVOEMS ALS EMS provider.
- All candidates shall be required to perform a minimum of ten (10) intubations at a WVOEMS accredited training facility utilizing simulation. These intubations must be directly observed by a WVOEMS approved instructor and/or the Squad Medical Director. These intubations may also be obtained in an operating room setting, if available.

Draft

RAPID SEQUENCE INTUBATION (RSI) - ALGORITHM

