I. BACKGROUND:
Also known as Rapid Sequence Induction (RSI), Rapid Sequence Intubation (RSI), Crash Airway Procedures (CAP), and other names, the use of medications to assist in intubation is both lifesaving and risky.

The paramedic should be thoroughly familiar with ALL DRUGS DISCUSSED WITHIN THIS SECTION. Endotracheal intubation in this context, should only be initiated when it can be completed in a short period of time so as not to unduly delay provision of adequate ventilation.

Pharmacological agents should be used to assist the paramedic in performing intubation in patients who are difficult to intubate due to excessive gag reflex in instances for which protecting the airway is a potential life-saving maneuver. Specific examples of circumstances in which such agents could be utilized are:

- Isolated head trauma
- Cerebrovascular accidents
- Multiple system trauma
- Overdose
- Status epilepticus
- Acute pulmonary edema
- Respiratory failure
- Severe burns
- And based on anticipated clinical course

The above indications are applicable when in those instances it is necessary to manage severe respiratory distress, optimize airway protection, hyperventilate for central nervous system lesions, or to provide ventilatory assistance in the presence of hypoventilation and hypoxia when other means of doing so are ineffective or contraindicated.

II. MEDICATIONS (NOT ALL INCLUSIVE):

Sedative Hypnotics: To be used before paralyzing agents as an induction agent.

- Etomidate (Amidate): for adults and children greater than 2 years of age
  - ADULTS and PEDS: IV/IO 0.2 – 0.4 mg/kg

Dissociative Anesthetic: Induction agent used alternatively to Etomidate, before before paralyzing agents.

- Ketamine:
  - ADULTS and PEDS: IV/IO 1-2mg/kg SLOW IV push 1 min prior to paralytic administration

Depolarizing Neuro-muscular Blocking Agents: To be used after Etomidate or Ketamine.

- Succinylcholine Chloride (Anectine):
  - ADULTS: IV, and IO 1-2 mg/kg, Repeat 1 time only
  - PEDS: IV and IO 1-2 mg/kg for children, 2 mg/kg for infants

Other medications used in specific situations:

- Atropine for children > one month of age
  - ADULTS and PEDS: IV/IO 0.02 mg/kg. Minimum dose of 0.1 mg Maximum single dose of 0.5 mg
III. PROCEDURE:

PREPARATION:

Have the following ready:

- Bag-valve-mask connected to functioning oxygen delivery system
- Working suction with Yankauer suction tip attached
- Full Intubation set to include:
  - Endotracheal tube(s) with stylet, syringe and intact cuff and ETT
  - Laryngoscope with blades and bright light source.
  - Scalpel (full cricothyrotomy kit preferred)
  - Alternative airway (example: Combitube, LMA, KING or other device, if available and appropriate)
  - Endotracheal tube introducer (AKA the “bougie”, Flexiguide)
  - Anticipated pharmacological agents
  - Manpower to adequately manage the patient in the event of desaturation or other adverse event (i.e. Cardiac Arrest)
  - Check to be sure that a functioning, secure vascular access device (IV or IO) is in place.
    - Note: If unable to establish IV or IO access certain drugs may be given IM instead
  - Cardiac monitor and SPO2. Be alert for the possibility of bradycardia or other dysrhythmias. Bradycardia and desaturation can be peri-arrest indicators.

Assess the patient for likelihood of successful intubation and need for definitive airway, and the feasibility of alternative methods (Nasal ETT, BVM use only).

Ensure adequate oxygenation, with a BVM if required, while preparing the equipment.

PRE-OXYGENATION AND MEDICATION:

Pre-medicate as appropriate and feasible:

- Atropine Sulfate 0.02 mg/kg for children > one month of age

Oxygenate:

- Assist ventilations/oxygenate 2-3 minutes prior to intubation attempt unless patient’s situation precludes this (inability to ventilate with BVM and inability to protect airway). Oxygenate as best as possible based on patient’s condition using a BVM or similar means.
- Good pre-oxygenation is a vital component to successful M.A.I. This ensures sustained oxygenation during the intubation attempt (“Safe Apnea”).
  - Place patient on high flow nasal cannula during RSI procedures
    - 6+ LPM for PEDS
    - 15+ LPM for ADULTS

Administer induction agent(s) and paralytic 45-60 seconds prior to intubation:

- Ketamine 2 mg/kg or Etomidate 0.2 mg/kg
- Succinylcholine 1-2 mg/kg
As patient relaxes:

- Consider applying cricoid pressure to occlude the esophagus until intubation is successfully completed, the endotracheal tube cuff is inflated, and tube position confirmed.
- After fasciculation’s stop (if they occur), demonstrate adequate jaw relaxation by manipulating the mandible. Jaw relaxation and decreased resistance to bag-mask ventilations indicate that the cords are paralyzed and that it is time to proceed with intubation. If inadequate relaxation is present, give either a:
  - Second dose of Etomidate/Ketamine
  - Initial or second dose of Succinylcholine

**INTUBATION:**

- See Appendix 2

**POST INTUBATION MEDICATIONS:**

**Non Depolarizing Neuro-muscular Blocking Agents:** These are long acting paralytics to be used only after the ET is secured.

- **Vecuronium (Norcuron):** To be used only with estimated intubation times greater than 15-20 minutes, **on medical control order**, or as otherwise indicated in these SWOs.
  - **ONLY TO BE GIVEN AFTER TUBE IS CONFIRMED, AND SECURED.**
  - **ADULTS and PEDS: IV/IO 0.1mg/kg repeated PRN**
  - **Rocuronium Bromide (Zemuron):** Paralytic agent used *alternatively* to Vecuronium. To be used with estimated intubation times greater than 15-20 minutes, **on medical control order**, or as otherwise indicated in these SWOs.
  - **ONLY TO BE GIVEN AFTER TUBE IS CONFIRMED, AND SECURED.**
  - **ADULTS and PEDS: IV/IO 1mg/kg repeated PRN**

**Benzodiazepines (BZD):** Versed is the preferred benzodiazepine in this setting.

- **Midazolam (Versed):**
  - **ADULTS: IV/IO/IM 0.5-5 mg, Max of 10mg**
  - **PEDS: IV/IO 0.1-0.2 mg/kg to a max of 5 mg/dose. Max of 10 mg**
- **Diazepam (Valium):**
  - **ADULTS: IV/IO/IM: 5-10 mg. Repeat as needed up to max of 20 mg**
  - **PEDS: IV/IO: 0.2-0.3 mg/kg IV/IO PRN. Max of 20 mg**

**Opiates:** Cautionary use with hypotension.

- **Morphine Sulfate (MS):**
  - **ADULTS: IV/IO/IM: 0.1 mg/kg initial dose (Max initial dose 10 mg) Repeat at 0.05mg/kg every 10 min PRN, max total dose 20mg**
  - **PEDS: IV/IM/IO: 0.1 mg/kg (max single dose 5 mg), repeat at 0.05 mg/kg PRN every 10 min. Max of 15 mg**
- **Fentanyl, (Sublimaze):**
  - **ADULTS: IV/IO/IM: 1 mcg/kg initial dose (max initial dose 100 mcg) May repeat PRN every 10 min to a total of 200 mcg**
  - **PEDS: IV/IO 1 mcg/kg (max single dose 75 mcg) repeat every 10 min PRN to a max of 150 mcg**
Physician Pearls:

Previously, lidocaine was used for pre-treatment of increased intracranial pressure during RSI. A review of the evidence has shown no clear benefit of this practice, and an associated increased risk of hypotension which can be detrimental in the neuro-critically ill. Therefore the use of Lidocaine during RSI for increased ICP is no longer recommended.