

**NOTE: This is a restricted procedure. A service and paramedic will require specific authorization from the Board prior to utilizing this procedure and skill. RSI and DAI is restricted to Critical Care Transport and Air Medical Programs.**

## ***Rapid Sequence Intubation (RSI) and Drug Assisted Intubation (DAI)***

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### **Definition**

**RSI:** The administration of pharmacologic agents, including paralytic agents, to facilitate endotracheal intubation.

**DAI:** The administration of pharmacologic agents, excluding paralytic agents, to facilitate endotracheal intubation.

**Indications:** Inability to tolerate laryngoscopy due to gag reflex, failure or contraindication of

other means: BNTI, LMA, combitube, King LT and:

- ▶ Hypoxia (SpO<sub>2</sub> < 90 %) with failed interventions to improve oxygenation.
- ▶ Respiratory arrest that cannot be intubated due to non-flaccid state.
- ▶ Head injury with GSC < 9 with need for definitive airway and mechanical ventilation.
- ▶ Unconsciousness or altered mental status with airway compromise or risk of pulmonary aspiration.
- ▶ Potential for airway compromise due to burns or anaphylaxis.
- ▶ Uncontrolled seizure activity requiring airway control.
- ▶ Combative patient with airway compromise.

### **Contraindications**

- ▶ Ability to oxygenate and ventilate with a less invasive approach.
- ▶ Anatomic findings on clinical exam that predict a difficult intubation or cause sufficient doubt about the ability to successfully intubate. Examples:
  - Morbid obesity
  - Obese "bull" neck
  - Obvious malignancy
  - Ankylosis
  - Direct laryngeal trauma
- ▶ Succinylcholine is contraindicated in:
  - Burns greater than 24 hours old.
  - Spinal cord injury greater than 24 hours old.
  - Known neuromuscular disease (Guillain-Barré Syndrome), myasthenia gravis, amyotrophic lateral sclerosis, muscular dystrophy.
  - Chronic failure in hemodialysis presence of hemodialysis.
  - History of malignant hyperthermia.
- ▶ Non-arrested croup or epiglottitis

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### **Procedure**

- ▶ Maintain manual, in-line spine motion restriction by a second provider and remove the anterior portion of the cervical collar during intubation.
- ▶ Assemble and check all necessary equipment: suction, laryngoscopes, BVM, Eschmann stylet, LMA or Combitube.
- ▶ Calculate drug dosages and prepare and label syringes.
- ▶ Assure IV is patent, secure and free flowing.
- ▶ Monitor EKG, B/P, and SpO<sub>2</sub>. Prepare ETCO<sub>2</sub> monitoring and EID.
- ▶ Attempt to raise SpO<sub>2</sub> to > 94 % with 100% oxygen by either NRB oxygen mask or BVM ventilation if necessary.
- ▶ Prior to drug administration, ensure that a neurologic assessment with GCS has been performed and documented.
- ▶ Premedication: (3 min. required for pre-treatment effects)
  - Pediatric patients (newborn to age 7): Atropine 0.01 mg/kg IVP, minimum dose 0.1 mg and maximum dose 0.5 mg
  - Lidocaine 1.5 mg/kg IVP in patients with head injury, CVA, and hypertensive crisis.
  - For patients who are going to receive RSI with Succinylcholine, a defasciculating dose of Vecuronium (Norcuron) 0.01 mg/kg is optional to decrease muscle fasciculations.
- ▶ RSI / DAI drug administration
  - RSI:
    - Sedate the awake patient with Etomidate (Amidate) 0.1-0.3 mg/kg IVP (maximum 20 mg) or Midazolam (Versed) 0.1 mg/kg IVP (maximum 5 mg). Use lower doses in the hypotensive or elderly patient. Sedation drugs can be omitted in the unconscious patient.
    - Paralyze with Succinylcholine (Anectine) 1.5 mg/kg IVP in adults and 2 mg/kg IVP (maximum 100 mg) in children.
    - Flush the IV line with 10 cc of IV fluids following drug administration.
  - DAI:
    - Sedate the awake patient with Etomidate (Amidate) 0.1 -0.3 mg/kg IVP, maximum 20 mg, or Midazolam (Versed) 0.1 mg/kg IVP.
    - Flush the IV line with 10 cc of IV fluids following drug administration.

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- ▶ A third provider applies cricoid pressure immediately after the sedatives and paralytics are administered and maintains cricoid pressure until the endotracheal tube is secured in the trachea.
- ▶ Wait 30-60 seconds after the Succinylcholine administration to begin intubation. Muscle fasciculations may not occur especially if pretreated with Vecuronium. Jaw relaxation correlates with vocal cord paralysis.
- ▶ After two attempts at intubation by any one provider, the Failed Airway Algorithm should be followed. If a second provider is available, he or she may be allowed two attempts at intubation provided the SpO2 is maintained at > 90 % with BVM between attempts. A maximum of four (4) attempts is allowed.
- ▶ Second attempts at intubation should include at least one of the following:
  - Improved positioning
  - Use of the Eschmann stylet
  - Manual laryngeal movement: OELM / BURP
  - Suction to clear the airway
  - Change laryngoscope blades
  - Change to a second provider
- ▶ If intubation cannot be successfully accomplished, oxygenation and ventilation may be provided with a BVM and a combination of oral and nasal airways. If unable to ventilate a *rescue airway* must be established.
- ▶ If intubation is unsuccessful and oxygenation cannot be maintained with a SpO2 > 90 % with either the BVM or *rescue airway* then a cricothyrotomy should be performed by either the needle, basic surgical, or Melker Percutaneous Guidewire techniques.
- ▶ Following endotracheal tube placement, correct position is confirmed by both clinical and technical measurements:
  - Direct visualization of ETT passing through the cords and the ETT balloon inflating below the cords.
  - Absence of epigastric sounds on ventilation.
  - Presence of breath sounds on ventilation.
  - Chest rise on ventilation.
  - Presence of ETCO2 waveform on capnography or correct color change on colorimetric ET CO2 analysis.
  - Correct re-inflation of EID device.
  - Sustained improvement in SpO2.

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- ▶ Secure the successfully placed oral ETT with a commercial device or with circumferential tape and an oral airway. In CVA or head injured patients be careful not to occlude the jugular veins and obstruct blood flow from the head. Place a C-collar and cervical immobilization device for the purpose of ETT stabilization.
- ▶ Ventilatory management should consist of a tidal volume of about 7 cc/kg or just enough to see the chest rise and a ventilatory rate of 12-15 breaths per minute. Avoid hyperventilation except in the case of head injury and signs of herniation syndrome and even then, avoid extremes of hyperventilation.
- ▶ Consider placing an oral or nasogastric tube to decompress the stomach. This is especially important in the pediatric patient and can be accomplished with a straight suction catheter.
- ▶ Frequently assess ETT positioning. Continuous capnography with data storage and download capability is the best tool for ETT monitoring. Reassess ETT position after every patient move and on change of providers.
- ▶ Bradycardia developing during intubation is usually due to hypoxia and is best treated by improving oxygenation by halting the intubation attempt and ventilating with 100% oxygen by BVM with oral and/or nasal airways. Bradycardia in the adult that is not responsive to improved oxygenation can be treated with Atropine 0.5 mg IVP.
- ▶ Maintenance of sedation and paralysis
  - To maintain paralysis administer Vecuronium (Norcuron) 0.1 mg/kg IVP immediately after the ETT is secured and repeat with 0.05-0.1 mg/kg as needed. Continuous ETCO<sub>2</sub> capnography must be used.
  - If the patient was conscious, sedation can be maintained with Midazolam (Versed) 0.05-0.1 mg/kg IVP as needed.
  - If pain control is required in the hemodynamically stable trauma patient, Fentanyl 1-2 mcg/kg IVP may be administered as needed.
- ▶ During transport, monitoring should include EKG, B/P, SpO<sub>2</sub>, ETCO<sub>2</sub>, breath sounds.