Medication Assisted Intubation (M.A.I.)

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Also known as Rapid Sequence Intubation (RSI), Crash Airway Procedures (CAP), and other names, is the use of medications to assist in intubation is both life saving and risky. Rapid sequence intubation (RSI) is an airway management technique that produces inducing immediate unresponsiveness (induction agent) and muscular relaxation (neuromuscular blocking agent) and is the fastest and most effective means of controlling the emergency airway.

RSI is useful if the following are present:
- Dynamically deteriorating clinical situation, i.e., there is a real “need for speed”
- Non-cooperative patient
- Respiratory and ventilatory compromise
- Impaired oxygenation
- Full stomach (increased risk of regurgitation, vomiting, aspiration)
- Extremely short safe apnea times
- Secretions, blood, vomitus, and distorted anatomy

PROCEDURE

The basic procedures of rapid sequence intubation can be remembered by the "9’ Ps":

1. Prepare: Equipment, meds, team, patient (basic airway management, positioning)
2. Preoxygenate: 100% O₂, 3 to 5 minutes
3. Premedicate: Atropine (0.02 mg/kg IV; peds minimum 0.1 mg in children <8 years)
Lidocaine 1.5 mg/kg IV (head injury, asthma)
4. Push the sedative: Use one:
   Etomidate 0.3 mg/kg IV: Use with caution in septic shock.
   Consider alternative sedation or supplemental corticosteroids
   Midazolam 0.1 mg/kg IV (adults) PEDS: 0.3 mg/kg IV:
   Suggested maximum single dose 10 mg; reduce dose or consider alternative in hypotension or elderly
   Ketamine 1 to 2 mg/kg IV (bronchodilator)
   Raises intracranial pressure; avoid in head injury.
5. Paralyze: Use one:
   Succinylcholine 2 mg/kg IV Avoid in hyperkalemia, neuromuscular disease, or ocular trauma
   Vecuronium 0.1 mg/kg IV OR Rocuronium 1 mg/kg IV
   Wait for relaxation (45-60 sec). Do not bag unless hypoxic.
6. Position airway: Head/neck position; laryngeal manipulation, BURP, cricoid pressure as needed
7. Pass the tube: Maintain in-line cervical immobilization in head/neck trauma
9. Post-intubation plan: Drugs and dosages depend on medications used during intubation
Sedation: Midazolam 0.05 to 0.3 mg/kg IV. Suggested maximum single dose 10 mg; reduce
**MEDICATIONS USED IN RSI**

A) Sedative Hypnotics: To be used before depolarizing agents as an induction agent.
   - **Etomidate (Amidate):** for adults and children greater than 2 years of age, IV, IO: 0.3 mg/kg

B) Depolarizing Neuro-muscular Blocking Agents: To be used after Etomidate and/or Benzodiazepines.
   - **Succinylcholine Chloride (Anectine):** IV, and IO: 1-2 mg/kg, Repeat 1 time only.
     1-2 mg/kg for children, 2 mg/kg for infants,

C) 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. Adults and Peds: IV/IO 0.1mg/kg repeated PRN.

D) Benzodiazepines (BZD): 
   - **Midazolam (Versed) IV, IO, IM:** 0.5-5 mg, Max of 10mg
     PEDS: 0.1-0.2 mg/kg IV/IO to a max of 5 mg/dose. Max of 10 mg
   - **Diazepam (Valium):** IV, IM, and IO: 5-10 mg.
     PEDS: IV/IO: 0.2-0.3 mg/kg IV/IO PRN. Max of 20 mg.

E) Opiates: Cautionary use with hypotension
   - **Morphine Sulfate (MS):** IV, IO: 2-5 mg, repeat up to 20 mg as needed.
     Peds: IV/IM/IO: 0.2-0.3 mg/kg, repeated PRN every 5-10 min.
   - **Fentanyl, (Sublimaze):** IV, IO, IM: 25-50 mcg. Max of 200 mcg.
     Peds: 2-5 mcg/kg. Max of 100 mcg

F) Other medications used in specific situations:
   - **Lidocaine** (for suspected increased ICP, CVA, etc.) IV, IO: 1 mg/kg
   - **Atropine** for children: IV, IO: 0.02 mg/kg. Minimum dose of 0.1 mg

**RESCUE AIRWAYS MAY BE NEEDED WHEN RSI FAILS**

The worst-case scenario being a “Can’t Intubate, Can’t Ventilate” (CICV) situation. While there are many procedures endorsed among the medical professionals, common actions include:

<table>
<thead>
<tr>
<th>Method</th>
<th>Typical Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>Combitube</td>
<td>Upper airway anatomy relatively intact</td>
</tr>
<tr>
<td>Blind</td>
<td>The patient is obtunded with sedation/analgesia</td>
</tr>
<tr>
<td>Failed RSI—follow</td>
<td>Two sizes available:</td>
</tr>
<tr>
<td>Combitube SA 37F</td>
<td>(4 to 5 ½ feet)</td>
</tr>
<tr>
<td>Combitube 41F</td>
<td></td>
</tr>
<tr>
<td>Laryngeal Mask Airway</td>
<td>Upper airway anatomy relatively intact</td>
</tr>
</tbody>
</table>

Transtracheal Needle

Cricothyrotomy Use if failure of other methods . Peds: The patient is older than about 8 years. May be first choice in facial trauma

Tracheotomy Laryngeal trauma with obstruction. Peds: Failure of other methods in children less than 8 years

**REFERENCES:**

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