DIFFICULT AIRWAY ALGORITHM

1. Assess the likelihood and clinical impact of basic management problems:
   - Difficulty with patient cooperation or consent
   - Difficult mask ventilation
   - Difficult supraglottic airway placement
   - Difficult laryngoscopy
   - Difficult intubation
   - Difficult surgical airway access

2. Actively pursue opportunities to deliver supplemental oxygen throughout the process of difficult airway management.

3. Consider the relative merits and feasibility of basic management choices:
   - Awake intubation vs. intubation after induction of general anesthesia
   - Non-invasive technique vs. invasive techniques for the initial approach to intubation
   - Video-assisted laryngoscopy as an initial approach to intubation
   - Preservation vs. ablation of spontaneous ventilation

4. Develop primary and alternative strategies:
   - **Awake Intubation**
     - Airway approached by noninvasive intubation
     - Invasive Airway Access
     - Succeed
     - Fail
     - Cancel Case
     - Consider feasibility of other options
     - Invasive airway access

   - **Intubation After Induction of General Anesthesia**
     - Initial intubation attempts successful
     - Initial intubation attempts UNSUCCESSFUL
     - FROM THIS POINT ONWARDS CONSIDER:
       1. Calling for help.
       2. Returning to spontaneous ventilation.
       3. Awakening the patient.

   - **Face Mask Ventilation Adequate**
     - Ventilation adequate, intubation unsuccessful
     - Alternative approaches to intubation
     - Successful intubation
     - Fail after multiple attempts
     - Invasive airway access
     - Consider feasibility of other options
     - Awaken patient

   - **Face Mask Ventilation Not Adequate**
     - SGA adequate or not feasible
     - Emergency pathway
     - Ventilation not adequate, intubation unsuccessful
     - Call for help
     - Emergency noninvasive airway ventilation
     - Successful ventilation
     - Fail
     - Emergency invasive airway access

*a. Other options include (but are not limited to): surgery utilizing face mask or supraglottic airway (SGA) anesthesia (e.g., LMA, ILMA, laryngeal tube), local anesthesia infiltration or regional nerve blockade. Pursuit of these options usually implies that mask ventilation will not be problematic. Therefore, these options may be of limited value if this step in the algorithm has been reached via the Emergency Pathway.
b. Invasive airway access includes surgical or percutaneous airway, jet ventilation, and retrograde intubation.
c. Alternative difficult intubation approaches include (but are not limited to): video-assisted laryngoscopy, alternative laryngoscope blades, SGA (e.g., LMA or ILMA) as an intubation conduit (with or without fiberoptic guidance), fiberoptic intubation, intubating stylet or tube changer, light wand, and blind oral or nasal intubation.
d. Consider re-preparation of the patient for awake intubation or canceling surgery.
e. Emergency non-invasive airway ventilation consists of a SGA.*
Rapid Sequence Intubation (RSI)

Patients without a pulse do not require medications to facilitate intubation.

Maximize your chances for (first pass) success with:
Preparation: room, airway equipment, suction, monitor, IV, RSI meds, vasopressors
Pre-Oxygenation: non-rebreather mask, non-invasive ventilation, BMV
Positioning: ear above sternum, sniffing position, ramp
Paralysis with induction: improve laryngoscopic view, minimize aspiration risk
Placement: women 21 cm, men 23 cm @ teeth; ETCO2, auscultation
Post-intubation: CXR, monitor for hypotension, additional sedation
Avoid paralysis without sedation.

Avoid paralysis when difficult ventilation or intubation is anticipated.

Difficult mask ventilation

Anatomy (burn, trauma, epiglottitis)
Morbid obesity
Diaphoresis
Beard
Edentulous

Oral airway, Nasal airway, 2-handed

Technique, Assistant

Difficult Intubation

Long incisors (< 3 fingers)
Thyromental distance (< 3 fingers)
Overbite
Shape of palate (narrow, high arch)
Mallampati ≥ 3
Short or thick neck
Limited neck range of motion

Call for help, consider awake intubation

Proceed with RSI using sedative and +/- paralytic. Be prepared to manage hypotension.

<table>
<thead>
<tr>
<th>Medication</th>
<th>Dose</th>
<th>Utility</th>
<th>Contraindication/Caution</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pre-Treatment</strong></td>
<td></td>
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<tr>
<td>Lidocaine</td>
<td>1-1.5 mg/kg</td>
<td>Head trauma/↑ ICP</td>
<td></td>
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<tr>
<td>Fentanyl</td>
<td>0.5-3 mcg/kg</td>
<td>Prevention ↑ HR/BP</td>
<td>Chest wall rigidity</td>
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<tr>
<td>Glycopyrrolate</td>
<td>0.2-0.4mg</td>
<td>↓ Secretions</td>
<td></td>
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<tr>
<td><strong>Sedation/Induction</strong></td>
<td></td>
<td></td>
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<tr>
<td>Etomidate</td>
<td>0.1-0.3 mg/kg</td>
<td>Patients in shock</td>
<td>may cause adrenal insufficiency</td>
</tr>
<tr>
<td>Propofol</td>
<td>0.5-2.5 mg/kg</td>
<td></td>
<td>↓ BP, ↓ HR</td>
</tr>
<tr>
<td>Ketamine (IV)</td>
<td>1-4.5 mg/kg</td>
<td>Asthma</td>
<td>↑ Secretions</td>
</tr>
<tr>
<td>Ketamine (IM)</td>
<td>6-13 mg/kg</td>
<td>Lack of IV access</td>
<td></td>
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<tr>
<td>Midazolam</td>
<td>0.15-0.3 mg/kg</td>
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<tr>
<td><strong>Paralytics</strong></td>
<td></td>
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<tr>
<td>Succinylcholine</td>
<td>1-1.5 mg/kg</td>
<td>Onset 30-60 seconds</td>
<td>See below. Duration 4-10 mins.</td>
</tr>
<tr>
<td>Rocuronium</td>
<td>1.2 mg/kg</td>
<td>Onset 60-90 seconds</td>
<td>Duration ~ 1 hour</td>
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</tbody>
</table>

Vasopressor Boluses

- Phenylephrine
  - 100-300 mcg IV q 3 min
- Ephedrine
  - 5-10 mg IV q 5 min
- Tachyphylaxis w/ multiple doses
- Norepinephrine
  - 4 - 10 mcg IV q 3min

Contraindications to Succinylcholine

- Hyperkalemia
- History of malignant hyperthermia
- Burns > 24-72 hours
- Rhabdomyolysis (crush injury)
- Spinal cord injury, stroke (> 72 hours)
- Neuromuscular disease or myopathy