Difficult Airway Algorithm

STEP 1
Assess the likelihood and clinical impact of basic management problems:

A. Difficult Ventilation
   - History of prior difficulty
   - Facial hair
   - Obesity (BMI > 26 kg/m²)
   - History of snoring
   - OSA
   - No teeth
   - Age > 55 years

B. Difficult Intubation
   - History of prior difficulty
   - Underlying pathology (e.g., laryngeal/tracheal stenosis, epiglottitis, tumors
   - Neck range of motion
   - TMJ range of motion
   - Thyromental distance
   - Mallampati score (see next slide)

C. Difficulty with patient cooperation
   - Age
   - Mental capacity
   - Level of consciousness

D. Difficulty with tracheostomy
   - Obesity
   - Facial hair
   - Prior ENT surgery
   - Prior radiation to neck

STEP 2
Actively pursue opportunities to deliver supplemental O₂ throughout the process of difficult airway management

- Face mask
- LMA
- FOB swivel adaptor ETT connector
- Patil-Syracuse mask (mask with fiberoptic port)
- FOB side port
- Rigid bronchoscope side port
**STEP 3**
Consider the relative merits and feasibility of basic management choices

- **A** Awake intubation vs. Intubation attempt after induction of GA
- **B** Non-invasive technique for initial approach to intubation vs. Invasive technique for initial approach to intubation
- **C** Preservation of spontaneous ventilation vs. Ablation of spontaneous ventilation

**STEP 4**
Develop primary and alternate strategies:

**Algorithm A: Awake Techniques**

1. **Awake Intubation**
   - Airway Approach by Non-Invasive Intubation
     - Succeed
     - Fail
     - Cancel Case
     - Consider Feasibility of Other Options
   - Invasive Airway Access
   - Awake trach

   - - Mask ventilation
   - - Local anesthetic
   - - Regional technique
   - - Awake trach
   - - Cricothyroidotomy

**Algorithm B: Intubation After Induction of GA**

1. **Intubation Attempts 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

   - Continue to next slide
Algorithm B

Non-Emergent Pathway
- CALL FOR HELP
- Mask ventilate with cricoid pressure
- Ensure optimal positioning
- Re-attempt DL with different blade
- Consider alternative techniques to secure airway
  - Gum elastic Bougie
  - LMA or intubating LMA
  - Light wand
  - Fiberoptic intubation
  - Retrograde intubation

Algorithm B

Emergent Pathway
- “Can’t intubate, can’t ventilate”
- CALL FOR HELP
- Emergency Non-Invasive Airway Ventilation
  - Rigid bronch
  - Combitube
  - Transtracheal Jet Ventilation
- Emergency Invasive Airway Ventilation
  - Cricothyroidotomy
  - Surgical trach

Basics of Airway Management

Oral Airway
Nasal Airway

Direct Laryngoscopy Views

Positioning and Airway Axis

Head elevation helps to align PA & LA before DL
Ramp up obese patients until tragus is aligned with sternum
Pearls

• CALL FOR HELP
• Always pre-oxygenate (de-nitrogenate)
  – A pre-oxygenated patient can be apneic for 8-10 minutes until desaturation occurs
• The first attempt at DL is the best attempt
• Consider other airway options after 3 attempts at DL
  – Further attempts can cause airway edema and trauma
• Know airway anatomy
• Know pharmacology of anesthetic agents

References

1. Assess the likelihood and clinical impact of basic management problems:
   A. Difficult Ventilation
   B. Difficult Intubation
   C. Difficulty with Patient Cooperation or Consent
   D. Difficult Tracheostomy

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:
   A. Awake Intubation
   VS.
   Intubation Attempts After Induction of General Anesthesia
   B. Non-Invasive Technique for Initial Approach to Intubation
   VS.
   Invasive Technique for Initial Approach to Intubation
   C. Preservation of Spontaneous Ventilation
   VS.
   Ablation of Spontaneous Ventilation

4. Develop primary and alternative strategies:

   A. **Awake Intubation**
      
      Airway Approached by
      Non-Invasive Intubation
      
      Invasive
      Airway Access(b)*
      
      Succeed*          FAIL
      
      Cancel
      Case
      Consider Feasibility
      of Other Options(a)
      
      Invasive
      Airway Access(b)*

   B. **Intubation Attempts After Induction of General Anesthesia**
      
      Initial Intubation
      Attempts Successful*
      
      Initial Intubation
      Attempts UNSUCCESSFUL
      FROM THIS POINT
      ONSWARDS CONSIDER:
      1. Calling for Help
      2. Returning to Spontaneous
         Ventilation
      3. Awakening the Patient

   **FACE MASK VENTILATION ADEQUATE**
   
   **FACE MASK VENTILATION NOT ADEQUATE**

   **NON-EMERGENCY PATHWAY**
   
   Ventilation Adequate, Intubation Unsuccessful
   
   Alternative Approaches
   to Intubation(a)
   
   Successful
   Intubation*
   
   FAIL After
   Multiple Attempts
   
   Invasive
   Airway Access(b)*
   
   Consider Feasibility
   of Other Options(a)
   
   Awaken
   Patient(b)

   **EMERGENCY PATHWAY**
   
   Ventilation Not Adequate, Intubation Unsuccessful
   
   Call for Help
   
   Emergency Non-Invasive Airway Ventilation(a)
   
   Successful Ventilation*
   
   FAIL
   
   Emergency
   Invasive Airway
   Access(b)*

   * Confirm ventilation, tracheal intubation, or LMA placement with exhaled CO₂

   a. Other options include (but are not limited to): surgery utilizing face
      mask or LMA anesthesia, 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
      tracheostomy or cricothyrotomy.

   c. Alternative non-invasive approaches to difficult intubation include
      (but are not limited to): use of different laryngoscope blades, LMA
      as an intubation conduit (with or without fiberoptic guidance),
      fiberoptic intubation, intubating stylet or tube changer, light
      wand, retrograde intubation, and blind oral or nasal intubation.

   d. Consider re-preparation of the patient for awake intubation or
      canceling surgery.

   e. Options for emergency non-invasive airway ventilation include (but
      are not limited to): rigid bronchoscope, esophageal-tracheal combitube
      ventilation, or transtracheal jet ventilation.