Emergency Department/Burn Adult Airway Management Protocol

Purpose: A standardized protocol for management of the airway in the setting of trauma in an academic center, with the goal of maximizing successful first-try Definitive Airway Control (DAC) in a teaching environment.

Disclaimer: The protocols recommended in this document are not a substitute for the expert judgment of the Emergency Department attending. The variable availability of personnel and equipment in the Emergency Department must be integrated into decisions of what is best for the patient.

Definitions and abbreviations:

- DAC: Definitive Airway Control
- DL: Direct Laryngoscopy
- ETI: Endo-Tracheal Intubation
- FAL: Fiberoptic Assisted Laryngoscopy
- Operator: The healthcare provider attempting DAC
    - EM residents are credentialed in > 35 ETI
- RSI: Rapid Sequence Induction
- VAL: Video Assisted Laryngoscopy
- Intubation Attempt: When the tip of the device passes the soft palate. There may be reasons to "pause" an attempt for suctioning or repositioning without counting a new attempt.

Contents: This document is divided into three sections. The first section is an outline format of five nested protocols:

- Main DAC Protocol: This is the first-tier protocol from which others derive
- Crash DAC Protocol: This is the second-tier protocol used when DAC must be established immediately.
- High Risk DAC Protocol: This is the second-tier protocol used when DAC is predicted to be high-risk (difficult) and there is time to perform RSI
- Normal Risk DAC Protocol: This is the second-tier protocol used when DAC is predicted to be normal risk and there is time to perform RSI
- Failed ETI Protocol: This is the third-tier protocol used when second-tier protocols fail.

The second section is a flow sheet format of the same protocols.
In the last section are appendices containing RSI procedure, Mallampati Classification, and the Shock Trauma Center Failed Airway Protocol, for reference.

Main DAC Protocol

1. Assess the need for Definitive Airway Control:

- Trauma patients with GCS < 8
- Significant facial trauma
- Airway obstruction
- Closed head injury or hemorrhagic CVA
- Burn patients with airway involvement and inevitable airway loss
- Class 3-4 hemorrhagic shock
- Failure to maintain adequate oxygenation (PaO2 < 60 despite 100% FiO2)
- Paralysis due to high spinal cord injury
- Need for positive pressure ventilation
- Blunt chest trauma with compromised ventilatory effort
- Mandible fractures with loss of airway muscular support

2. Maximize opportunities to provide supplemental oxygen before and during Definitive Airway Control:

- Temporary/bridging airway adjuncts
    - Oropharyngeal airway (OPA)
    - Nasopharyngeal airway (NPA)
- Supplemental oxygen delivery
    - Nasal cannula
    - Non-rebreather mask
    - Bag-valve-mask (BVM)

3. Assess the emergent nature of the need for Definitive Airway Control:

- Emergent = DAC must be established immediately; no time for Rapid Sequence Induction (RSI).
    - Patient is near death due to airway or respiratory failure
    - Follow **Crash ETI Protocol**
- Urgent = DAC must be established within 5-15 minutes

4. Assess the probability of high-risk (difficult) airway:

- High Risk: Follow the **High Risk ETI Protocol** (below)
    - **LEMON**: Any one of the following abnormalities constitutes a higher probability of failed ETI attempt. Follow High Risk DAC Protocol
        - **L** Look externally (facial/neck trauma)
        - **E** Evaluate 3-3-2 (<3 fingers able to insert inside the open mouth, <3 fingers between the hyoid and tip of the chin, <2 fingers between the hyoid and top of the thyroid cartilage)
        - **M** Mallampati (see Addendum 2)
        - **O** Obstruction/obesity
        - **N** Neck mobility (including cervical immobilization precautions)
- Normal Risk: Follow the **Normal Risk ETI Protocol** (below)

Crash ETI Protocol

1. **First Attempt**
   - Operator: PGY 2 or 3 ED Resident, or ED attending
   - Equipment/Technique: Direct Laryngoscopy (DL) or Video Assisted Laryngoscopy (VAL), if immediately available, with Endotracheal Intubation (ETI)
   - In the event of a failed First Attempt:
     - Resume BVM
       - If BVM fails, go to **Failed ETI Protocol**
     - Prepare for Second Attempt
2. **Second Attempt**
   - Operator: PGY 3 ED resident, or ED Attending
   - Equipment/Technique: DL or VAL to ETI
   - In the event of a failed Second Attempt:
     - Resume BVM
       - If BVM fails, go to **Failed ETI Protocol**
     - Prepare for Third Attempt
     - Consider anesthesia consult
3. **Third Attempt**
   - Operator: ED Attending
   - Equipment/Technique: DL, VAL, or FAL to ETI
   - In the event of a failed Third Attempt, go to **Failed ETI Protocol**

High Risk ETI Protocol

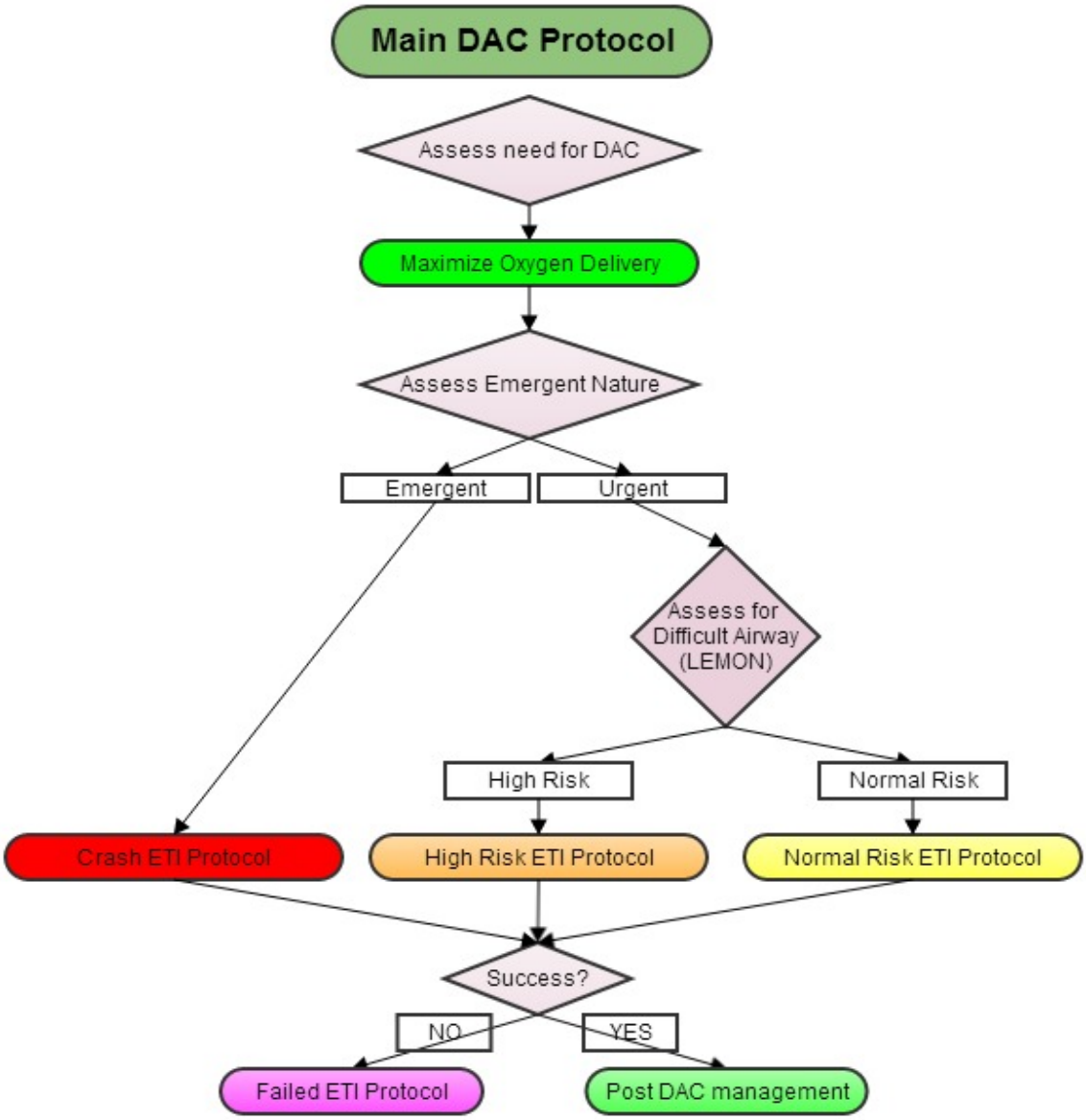
1. **Perform Rapid Sequence Induction (RSI)**
2. **First Attempt**
   - Operator: PGY 2 or 3 ED Resident, or ED Attending
   - Equipment/Technique: VAL or DL (± bougie) to ETI
   - In the event of a failed First Attempt
     - Resume BVM
       - If BVM fails, go to **Failed ETI Protocol**
     - Prepare for Second Attempt
3. **Second Attempt**
   - Operator: PGY 3 ED resident or ED Attending
   - Equipment/Technique: DL, VAL, or FAL to ETI
   - In the event of failed Second Attempt:
     - Resume BVM
       - If BVM fails, go to **Failed ETI Protocol**
     - Prepare for Third Attempt, or consider moving immediately to **Failed ETI Protocol**
     - Consider anesthesia consult
4. **Third Attempt**
   - Operator: ED Attending
   - Equipment/Technique: DL, VAL, or FAL to ETI
   - In the event of failed Third Attempt:
     - Resume BVM, go to **Failed ETI Protocol**

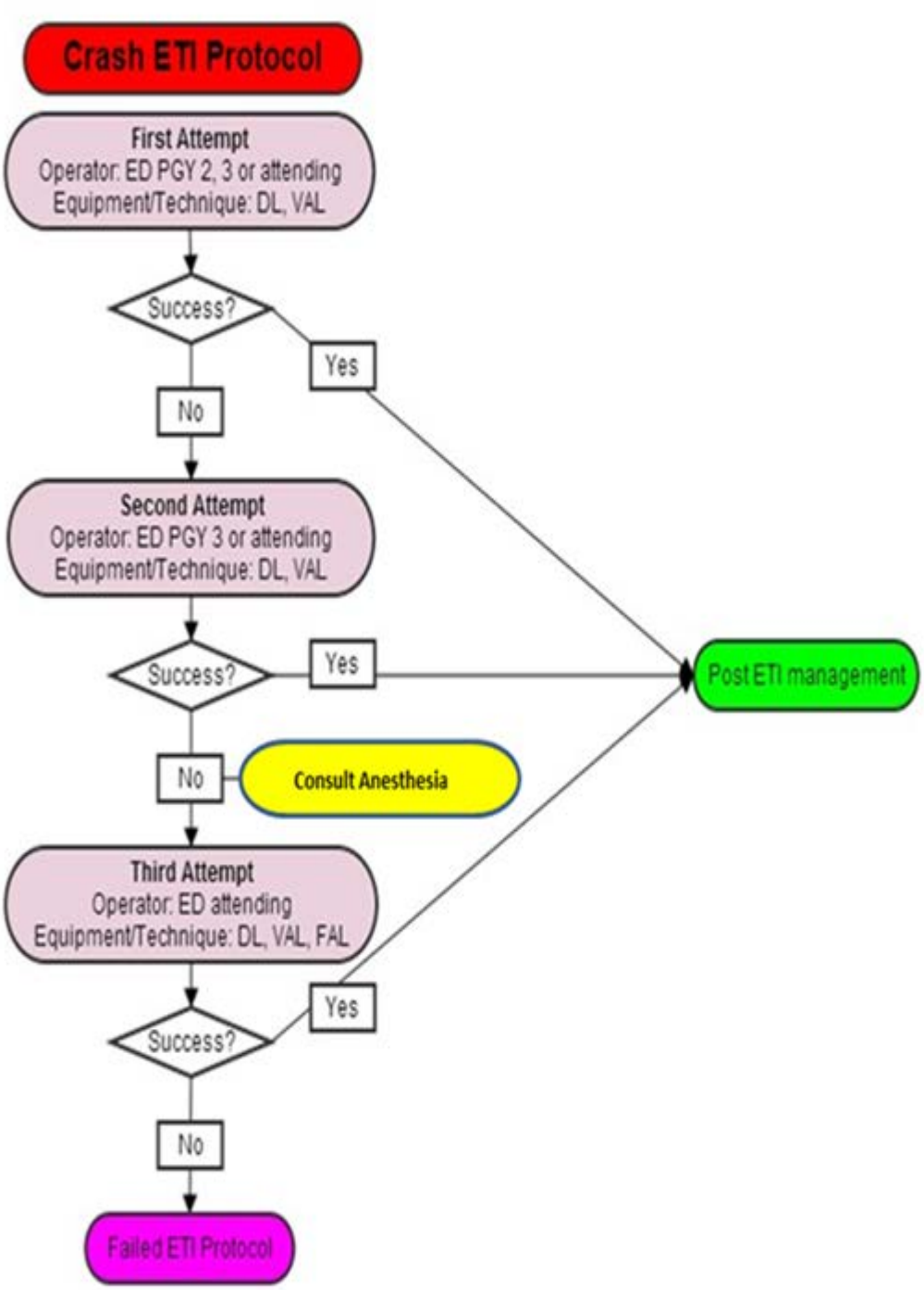
Normal Risk ETI Protocol

1. **Perform Rapid Sequence Induction (RSI)**
2. **First Attempt**
   - Operator: MS 4, any service/any PGY resident, or ED Attending
   - Equipment/Technique: DL or VAL to ETI
   - In the event of a failed First Attempt
     - Resume BVM
       - If BVM fails, go to **Failed ETI Protocol**
     - Prepare for Second Attempt
3. **Second Attempt**
   - Operator: PGY 2 or 3 ED resident, or ED Attending
   - Equipment/Technique: DL, VAL, or FAL to ETI
   - In the event of failed Second Attempt:
     - Resume BVM
       - If BVM fails, go to **Failed ETI Protocol**
     - Prepare for Third Attempt, or consider moving immediately to **Failed ETI Protocol**
     - Consider anesthesia consult
4. **Third Attempt**
   - Operator: ED Attending
   - Equipment/Technique: DL, VAL, or FAL to ETI
   - In the event of failed Third Attempt:
     - Resume BVM and go to **Failed ETI Protocol**

Failed ETI Protocol

1. **Attempt Supra-glottic airway control while preparing for cricothyroidotomy**
   - Operator: PGY 3 ED Resident or ED Attending
   - Equipment/Technique: LMA, Combitube, blind nasotracheal (unless contraindicated)
     - If successful, and time allows, attempt to convert supra-glottic airway to ETI
     - If unsuccessful, move immediately to cricothyroidotomy
2. **Cricothyroidotomy**
   - Operator: PGY 3 ED Resident, Senior Trauma Resident, ED Attending, or Trauma Surgery Attending
   - Equipment/Technique: Cricothyroidotomy with Shiley or endotracheal tube


Main DAC Protocol
Assess need for DAC
Maximize Oxygen Delivery
Assess Emergent Nature
Emergent
Urgent
Assess for Difficult Airway (LEMON)
High Risk
Normal Risk
Crash ETI Protocol
High Risk ETI Protocol
Normal Risk ETI Protocol
Success?
NO
YES
Failed ETI Protocol
Post DAC management



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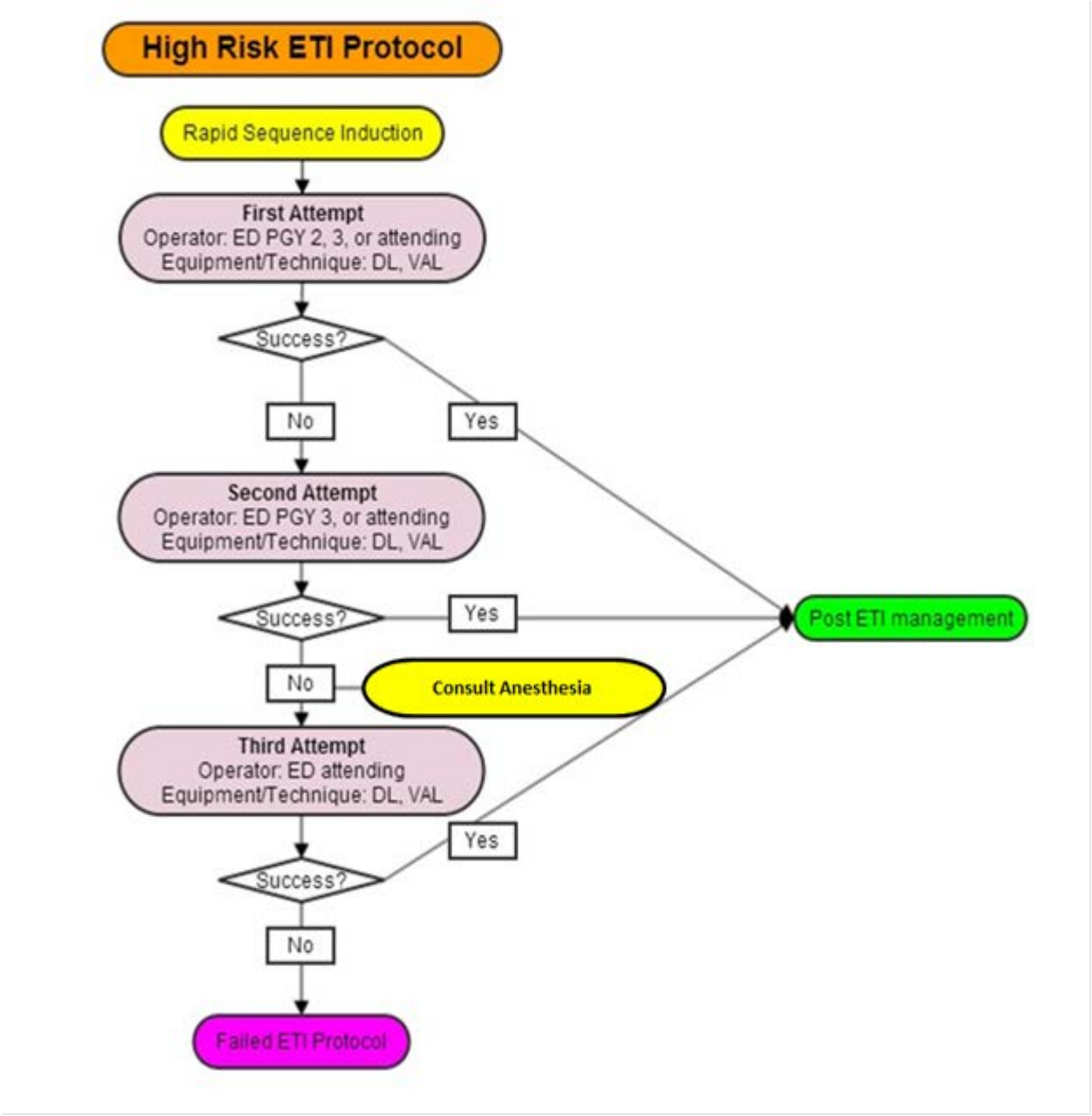

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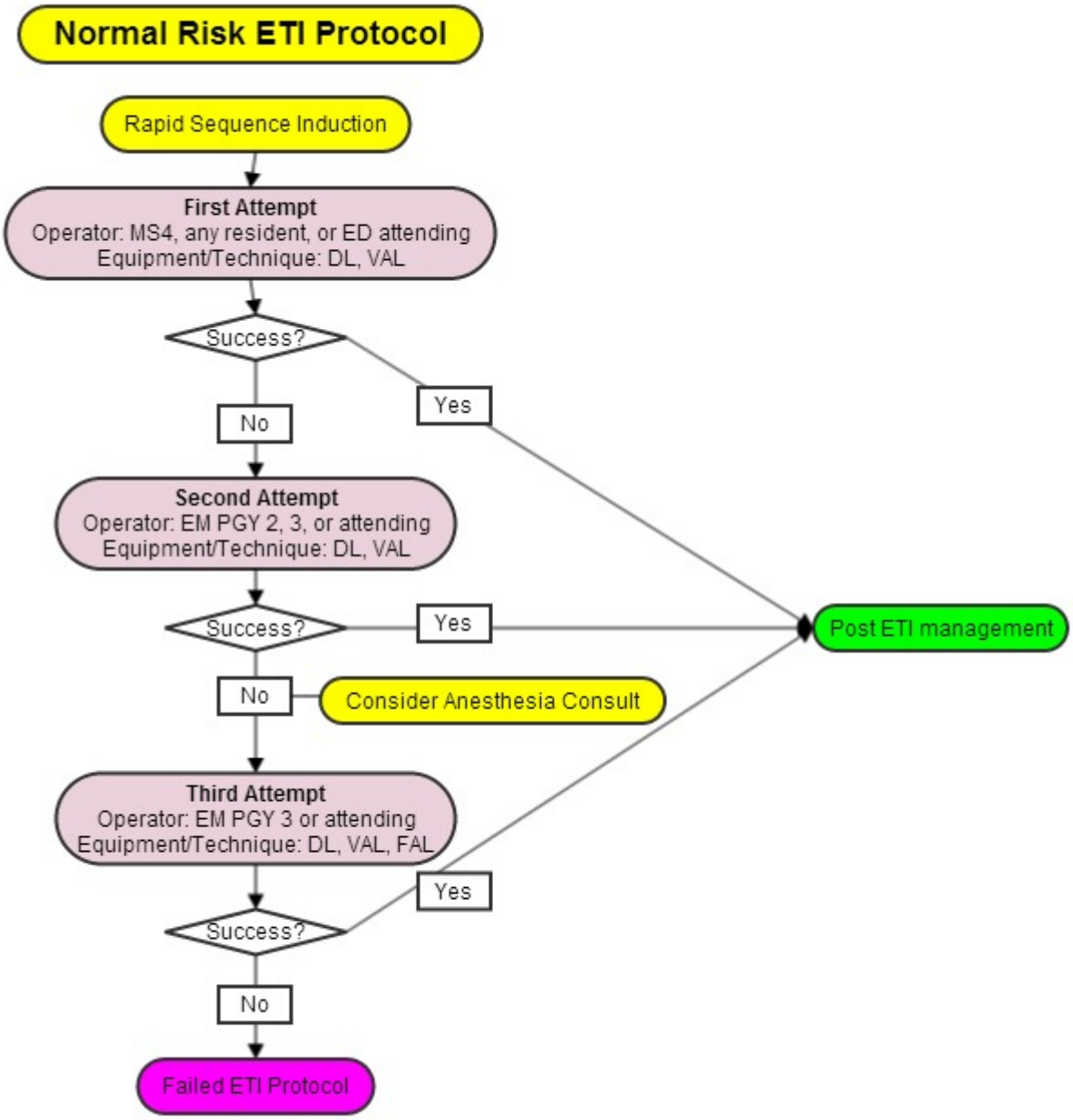

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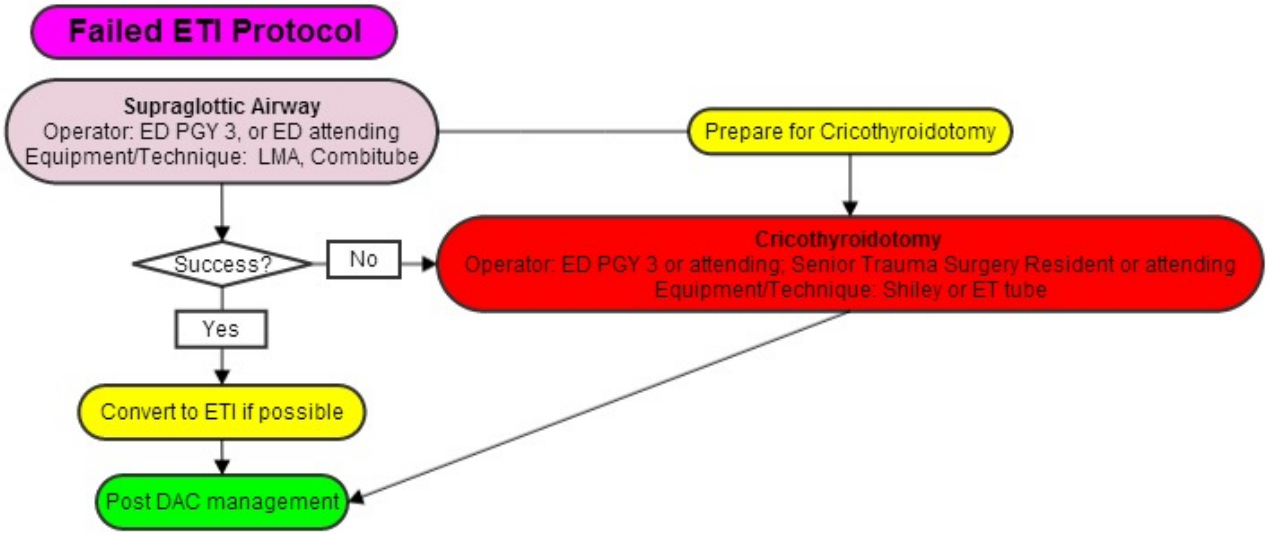

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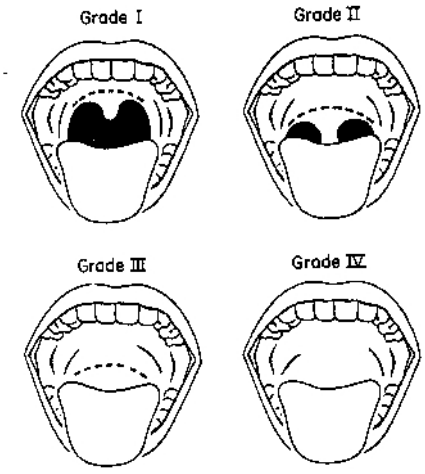
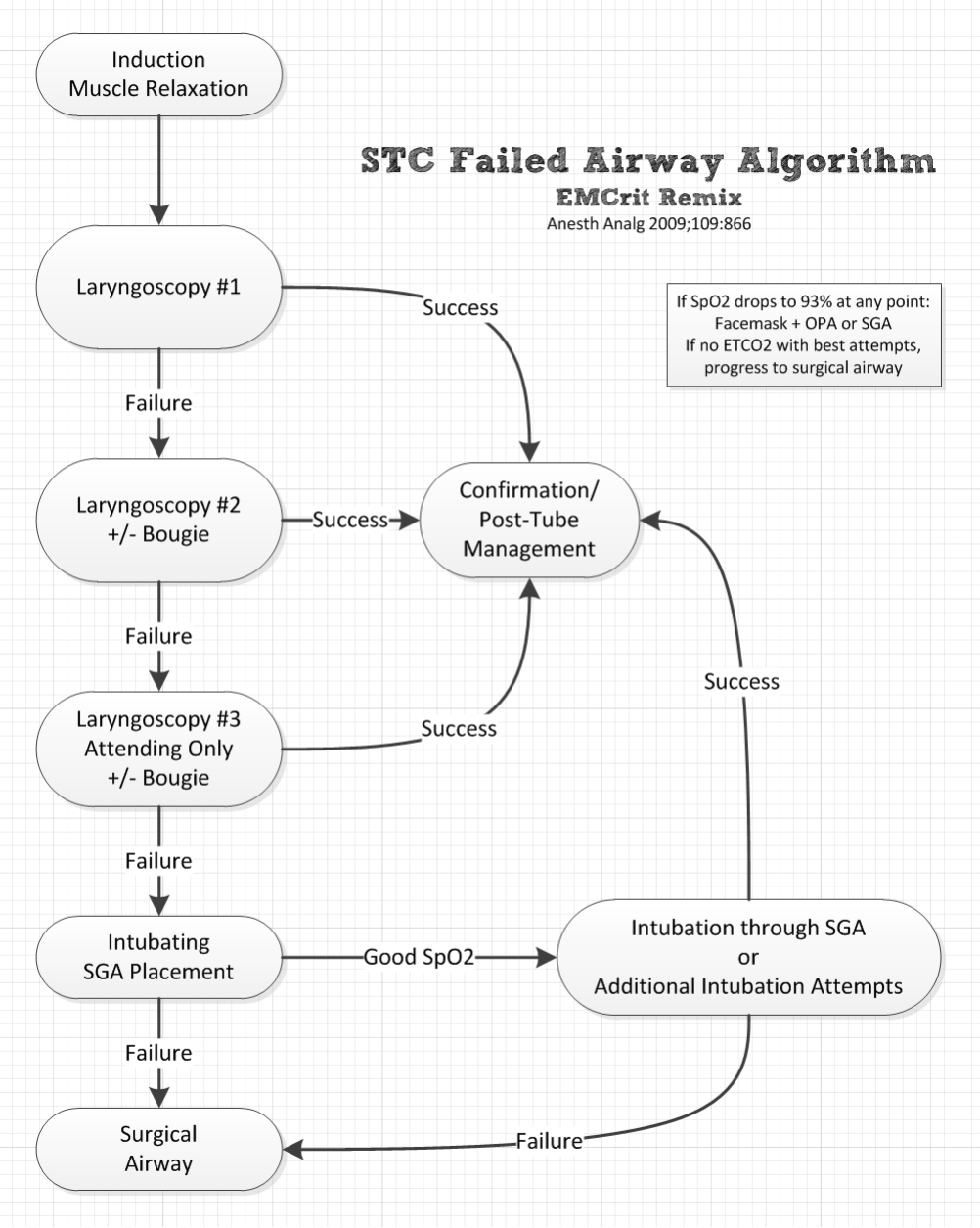
Appendix 1
Rapid Sequence Induction

The 5 P's of rapid sequence induction
Preparation
Preoxygenation
Pretreatment
Paralysis (with anesthesia)
Placement (of the endotracheal tube)

1. Preoxygenation with 100% oxygen for 3-5 minutes via NRB mask (or 3 vital capacity breaths, avoid BVM if possible).
2. Secure IV's, ECG, pulse oximeter.
3. Prepare intubation equipment: ETT with stylet, suction, BVM, laryngoscope.
4. Premedication:
    Lidocaine (head injury) 1.5 mg/Kg
    Vecuronium (defasciculating dose) 0.01 mg/Kg
    Versed 0.1 mg/Kg
    Atropine (peds) 0.01 mg/Kg
    Etomidate 0.3 mg/Kg
5. Perform Sellick maneuver, maintain maneuver until after confirmation of tube placement.
6. Succinylcholine 1.5 mg/Kg (Peds: 2.0 mg/Kg)
7. Wait 30-60 sec, place ETT.
8. Confirm ETT placement by: listening for bilateral breath sounds, chest rise and fall, tube fogging, & positive ETCO2. Final confirmation by CXR.
9. Release Sellick maneuver.
10. Secure ETT.

Appendix 2
Mallampati Classification



Appendix 3
Shock Trauma Center Protocol