Pediatric Failed Airway

Definition of Failed Airway:

- Unable to Ventilate and Oxygenate ≥ 90% during or after one (1) or more unsuccessful intubation attempts.

and/ or

- Anatomy inconsistent with continued attempts.

and/ or

- Three (3) unsuccessful attempts by most experienced Paramedic/ AEMT.

Each attempt should include change in approach or equipment

NO MORE THAN THREE (3) ATTEMPTS TOTAL

Call for additional resources if available

Failed Aiway

BVM
Adjunctive Airway NP/ OP
Maintains
Oxygen Saturation ≥ 92%

YES → Continue BVM
Supplemental Oxygen

Exit to Appropriate Protocol(s)

NO

A Airway Video Laryngoscopy Device Procedure ***if available*** ***Optional***

B Attempt Airway Blind Insertion Airway Device Procedure

P Airway Cricothyrotomy Needle Procedure **See Pearls Section**

BIAD / Cricothyrotomy Successful
Or
Oxygenation / Ventilation Adequate

YES → Exit to Post-intubation/ BIAD Management Protocol AR 8

NO

Capnography Monitoring

- **End-tidal (EtCO2) monitoring is mandatory following placement of an endotracheal tube.**
- **EtCO2 monitoring is mandatory following placement of a BIAD once available on scene.**

Protocols AR 3, 5, and 6 should be utilized together (even if agency is not using Drug Assisted Airway Protocol) as they contain useful information for airway management.

Supplemental oxygen
BVM with Airway Adjuncts
Maintain Oxygen Saturation ≥ 92%

Notify Destination or Contact Medical Control

Airway Respiratory Protocol Section

Pediatric Failed Airway

Airway Respiratory Protocol Section

THE PRINCIPLES OF AIRWAY MANAGEMENT IN THE PEDIATRIC PATIENT ARE GENERALLY THE SAME AS IN THE ADULT.

Risk Factors for Difficult Airways in Pediatrics:

- Small airway size which is prone to obstruction from poor positioning and infection / edema.
- Provider stress from managing age, anatomical variants and equipment sizes.
- Few pediatric patient encounters limiting provider's experience.
- While historically not well known in pediatrics obesity may now increase difficulty in airway management similar to adults.

Difficult Airway Management Secondary to Infections:

- Epiglottitis (now more common in adults)
- Croup
- Retropharyngeal abscess
- Infection leads to swelling which may compromise the small airway calipers. When stimulated the child may cry which may also cause a functional airway obstruction in the setting of infection. Allow child to assume position of comfort.

Difficult Airway Management Secondary to Non-infections:

- Foreign Body
- Burns/ Trauma
- Anaphylaxis / Airway edema

Difficult Airway Management Secondary to Congenital Anomalies:

- Craniofacial abnormalities
- Micrognathic mandible (small mandible/ no-chin)

Airway Needle Cricothyrotomy Procedure:

- Absolute last resort when all other airway adjuncts have failed with inability to ventilate/ oxygenate.
- The cricothyroid membrane is small to virtually undetectable in children under 3 – 4 years of age.
- Typical age group where most likely to be utilized is 5 – 10 years of age.

Pearls

This protocol is for use in patients who FIT within a Pediatric Medication/ Skill Resuscitation System Product.

- **For the purposes of this protocol, a secure airway is when the patient is receiving appropriate oxygenation and ventilation.**
- **If an effective airway is being maintained by BVM with continuous pulse oximetry values of ≥ 90%, it is acceptable to continue with basic airway measures.**
- **Ventilation rate:**
  30 for Neonates, 25 for Toddlers, 20 for School Age, and for Adolescents the normal Adult rate of 10 - 12 per minute. Maintain EtCO2 between 35 - 45 and avoid hyperventilation.
- **Ketamine for airway intervention and/ or sedation purposes:**
  Ketamine may be used in pediatric patients (fit within a Pediatric Medication/Skill Resuscitation System product, ≤ 15 years of age, or ≤ 49 kg) with DIRECT ONLINE MEDICAL ORDER by the system MEDICAL DIRECTOR or ASSISTANT MEDICAL DIRECTOR only.
  Agencies using Ketamine in the pediatric population must also be using in their adult population.
- **KETAMINE:**
  Ketamine may be used with or without a paralytic agent in conjunction with either an OPA, NPA, BIAD or endotracheal tube. BIAD is preferred over endotracheal tube until hypoxia and/ or hypotension are corrected.
  Ketamine may be used during the resuscitation of hypoxia or hypotension in conjunction with airway management. Once hypoxia and hypotension are corrected, use of a sedative and paralytic can proceed if indicated.
  Ketamine may be used in the dangerously combative patient requiring airway management IM. IV/ IO should be established as soon as possible.
  Ketamine may be used for sedation once a BIAD or endotracheal tube are established and confirmed.
  Agencies using Ketamine must follow Standards Policy: Medial Policy Section Ketamine Program Requirements. Medical Policy 2.
- **Intubation:**
  Attempt defined as laryngoscope blade passing the teeth or endotracheal tube passed into the nostril.
  Use of a stylet is recommended in all pediatric intubations.
  Endotracheal tube: Depth = 3 x the diameter of the ETT. Estimated Size = 16 + age (years) / 4. Term newborn = 3. 5 mm.
  If First intubation attempt fails, make an adjustment and try again: (Consider change of provider in addition to equipment)
- **NC EMS Airway Evaluation Form:**
  Fully complete and have receiving healthcare provider sign confirming BIAD or endotracheal tube placement.
  Complete online in region specific *ReadyOp* and upload completed form.
  Complete when Ketamine, Etomidate, Succinylcholine and/ or Rocuronium or used to facilitate use of a BIAD and/ or endotracheal intubation. Paramedics/ AEMT should consider using a BIAD if endotracheal intubation is unsuccessful.
- Secure the endotracheal tube well and consider c-collar in pediatric patients (even in absence of trauma) to better maintain ETT placement. Manual stabilization of endotracheal tube should be used during all patient moves / transfers.
- **Airway Cricothyrotomy Percutaneous Needle Procedure:**
  Indicated as a lifesaving / last resort procedure in pediatric patients < 10 years of age.
  Very little evidence to support it's use and safety.
  A variety of alternative pediatric airway devices now available make the use of this procedure rare.
  Agencies who utilize this procedure must develop a written procedure, establish a training program, maintain equipment and submit procedure and training plan to the State Medical Director/ Regional EMS Office.
  ≥ 10 years: Surgical cricothyrotomy or commercial kits based on agency preference recommended.
- **DOPE: D**isplaced tracheostomy tube/ ETT, **O**bstructed tracheostomy tube/ ETT, **P**neumothorax and **E**quipment failure.