



Definition

Basic airway management is known to improve patient survival rates in the prehospital field. Once the need for airway intervention has been identified, basic maneuvers and equipment must be used before proceeding with more advanced techniques.

Pediatric Considerations

Problems with oxygenation and ventilation are the major cause of cardiac arrest in infants and children. Respiratory failure can occur quickly and without warning. The first priority in managing any seriously ill or injured child is evaluating and treating airway and breathing. You must anticipate and recognize respiratory distress / failure and initiate treatment immediately.

Initial airway management of the pediatric patient is focused on positioning and effective bag valve mask (BVM) ventilations. Proper BVM ventilation must be attempted prior to considering the Pediatric Airway – Advanced Protocol. When resources permit, 2 -person BVM ventilation should be used.

Interventions

Positioning the patient is the key first step in airway management:

1. Ensure there is adequate padding behind the shoulders, if required, to maintain an open airway

Bag Valve Mask (BVM) Ventilations:

1. If the patient's intrinsic ventilations are adequate, do not intervene
2. Use an appropriate sized BVM to deliver adequate chest rise without hyperinflating the lungs
3. Placing the mask tightly on the face without opening the airway (e.g. head-tilt / chin-lift, modified jaw thrust) can cause an airway obstruction because of improper positioning
4. An OPA/NPA should be used, if tolerated, whenever a BVM is utilized

Airway Management

Most pediatric airways can be effectively managed with proper positioning and an OPA/NPA and BVM with high flow 15 LPM nasal cannula and often will not require further airway interventions. **The gold standard for airway management is the patient maintaining their own airway, not advanced airway placement.** Both the International Liaison Committee on Resuscitation (ILCOR) and American Heart Association (AHA) recommend BVM as the preferred technique for airway management in pediatric resuscitation.

Airway management in pediatric patients follows a stepwise approach:

1. OPA/NPA and BVM with oxygen 15 LPM via nasal cannula
The majority of pediatric airways can be effectively managed by this route and will not require further intervention
2. LMA
LMA use is indicated in patients who you are having difficulty effectively ventilating with an OPA/NPA and BVM with oxygen 15 LPM via nasal cannula. Repositioning, suction and BVM (2-person BVM when resources are available) should be attempted first
 1. Routine confirmation of airway placement with EtCO₂ monitoring is required. It is the presence of a waveform, not the absolute value, which confirms airway placement
 2. Continuous EtCO₂ monitoring provides valuable information on airway placement and effectiveness of ventilation (OPA/NPA, BVM)
 - a. A flat or absent EtCO₂ tracing likely indicates a misplaced or dislodged airway
 - b. Waveform and numerical value can be used to monitor hyper and hypoventilation

Possible Causes of Increased EtCO₂

| CO ₂ Output | Pulmonary Perfusion | Alveolar Ventilation | Technical Errors |
|---------------------------------|--------------------------|----------------------------|----------------------------|
| Fever | Increased BP | Hypoventilation | Faulty valves |
| Malignant Hyperthermia | Increased cardiac output | Bronchial intubation | Inadequate fresh gas flows |
| NaHCO ₃ | | Partial airway obstruction | |
| Tourniquet release | | Rebreathing | |
| Venous CO ₂ embolism | | | |

Possible Causes of Decreased EtCO₂

| CO ₂ Output | Pulmonary Perfusion | Alveolar Ventilation | Technical Errors |
|------------------------|------------------------|--------------------------------|---------------------------|
| Hypothermia | Reduced cardiac output | Accidental tracheal extubation | Malfunction of ventilator |
| | Hypotension | Hyperventilation | Circuit disconnect |
| | Hypovolemia | Apnea | Sampling tube leak |

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|--|--------------------|----------------------------|--|
| | Pulmonary embolism | Total airway obstruction | |
| | Cardiac arrest | Partial airway obstruction | |

Pharmacology

Not applicable

Special Circumstances

Not applicable

Infection Prevention and Control (IP&C) Considerations

Many Therapies for respiratory conditions and airway management techniques are known as aerosol generating medical procedures (AGMPs). These often produce splashes of oral secretions, as well as blood, and emesis when they are present. In the presence of an infectious state, oral secretion can transmit harmful pathogens. Personal protective equipment (PPE) that protects the pre-hospital care provider's eyes, nose and mouth as a minimum is mandatory.

Appropriate PPE must be worn while caring for all suspected ILI patients. Refer to AHS Interim Guidance for PPE requirements.

AGMPs should be avoided when possible, and only performed in consultation with OLMC. Common AGMPs Performed by pre-hospital care providers:

- Airway management e.g. intubation or BVM ventilation
- Suctioning
- Nebulization of medication
- CPAP

The patient should wear a procedure mask, if tolerated. Oxygen can be administered while the patient is wearing the procedure mask via a nasal cannula. If the patient requires additional oxygen, a NRB can be used without the accompanying procedure mask

Pre-notification of the receiving facility is mandatory and must be done as soon as possible