APPENDIX 01

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TITLE: BASIC AIRWAY SUPPORT PROCEDURES

REVISED: November 1, 2017

BASIC AIRWAY SUPPORT

I. BASIC OXYGEN ADMINISTRATION

Supplemental oxygen shall be administered to all patients at risk for hypoxia/hypoxemia. Current AHA guidelines also recommend supplemental oxygen administration for patients with SPO2 ≤ 94% unless otherwise contraindicated.

Adjunct	Flow Rate
Nasal Cannula	1-6 L/min
Simple Mask	8-10 L/min
Non-Rebreather Mask	12-15 + L/min
Bag-Mask w/ Reservoir	12-15 + L/min
FROPVD/ Demand Valve	(good seal)

If hypoventilation is present, utilize bag/mask or demand valve with 100% oxygen to insure adequate ventilation and oxygenation.

Other devices, such as a trach mask, venture mask, or other device may also be used based on clinical judgment and presentation of the patient.

Pre-oxygenation including the use of apniec oxygenation using nasal cannula (with or without the use of a NRB or BVM) at higher than normal is permissible based on clinical judgment and presentation of the patient. Flow rates are:

- 6+ LPM for PEDS
- 15+ LPM for ADULTS

II. BASIC VENTILTORY SUPPORT

If supplemental oxygen support is inappropriate, ineffective, or impractical, and the patent is considered to be at risk for hypoventilation, hypoxia, or respiratory failure/compromise, then more aggressive respiratory support be indicated. Interventions include, but are not limited to,

- *Intermittent Positive Pressure Ventilation* (IPPV) using a bag valve manual resuscitator with a traditional face mask, an intra-oral mask (IOM), CETT, other advanced airway (i.e. supra-glottic airways) , or to a tracheostomy tube.
- *Flow-restricted, oxygen-powered ventilation device* (FROPVD), AKA Demand Valve, or an Elder valve, as available or indicated, using a traditional face mask, an intra-oral mask (IOM) CETT, other advanced airways (i.e. supra-glottic airways) , or to a tracheostomy tube.
- CPAP/PEEP (See Appendix 6)

When possible, providers should maintain strict ventilatory discipline to reduce adverse hemodynamic effects and baro-trauma, particularly during cardiac arrest, low perfusion states, and those with fragile respiratory anatomy (i.e. Asthmatics, COPD).

Providers should adjust mechanical ventilatory support based on the measured SPO2, ETCO2, and patient-ventilator synchrony/compliance. As spontaneous ventilation becomes more efficient and as concurrent medical conditions allow, the level of support may be adjusted.

III. PULSE OXIMETRY

Pulse Oximetry monitoring shall be utilized on all patients at risk for hypoxemia or receiving medications. Oxygen saturation data shall be documented in the objective findings portion of patient run reports as oxygen saturation in terms of percentage (%) of hemoglobin saturation.

NOTE: Hemoglobin binding gases (CO, etc.), acidosis, and low peripheral perfusion may give false high or low pulse oximetry data.

IV. EXPIRED CO2 MONITORING

Expired/End Tidal CO2 (ETCO2) monitoring shall be utilized and documented on all intubated patients using the most appropriate device available.

ETCO2 is a useful adjunct for determining perfusion and measuring expired C02 in the intubated patient. Correctly interpreted end tidal volume capnometry is an excellent method of confirming correct CETT placement. It is a reliable method, but it is only a tool and has several limiting factors in its interpretation.
Some factors that can cause false or misleading readings are:

- Pulmonary shunt – limits the perfusion of available lung parenchyma causing poor gas exchange
- Hypovolemic shock – limits available hemoglobin for gas exchange by limiting pulmonary perfusion and circulating RBC's
- Cardiogenic shock – poor gas exchange from limited perfusion of blood through the lungs
- Neurogenic shock – limits available hemoglobin for gas exchange by limiting pulmonary perfusion
- Lack of C02 production – i.e. cellular death
- Tube dislodgement, kinking, obstruction

The major limitation of any ETCO2 is the user, not the device. Appropriate decision-making must utilize all available information and good judgment. In the intubated patient with good breath sounds, fogging of the tube, equal chest excursion and direct visualization of the cords with observation of the tube passing between them, a low reading with ETCO2 is not an absolute indication for extubation. It is, however, always appropriate to recheck CETT placement through multiple independent means if any question of patency or placement arises and extubate promptly if CETT placement cannot be satisfactory confirmed.

IV. USE OF PEEP WITH VENTILATION

Positive End Expiratory Pressure (PEEP) should be considered in patients receiving artificial ventilation, of all age groups; to increase alveolar recruitment, reduce risk of repetitive alveolar collapse injury, and increase oxygenation. It may be applied either via a "PEEP" valve on a Bag-Valve-Mask device or with a mechanical ventilator.

Patients presenting with the following history or signs may benefit from PEEP:

- Conditions prior to respiratory arrest that would indicate CPAP (but it is not available).
  - See *Appendix 6: CPAP*
- Hypoxia
- Lung disease prior to intubation such as ARDS or COPD
- Suspected atelectasis (alveoli collapse)
- Extended duration of artificial respiration such as interfacility transfer (Greater than 30 minutes)
- Pulmonary contusion or flail chest
- Drowning and Aspiration related conditions.
- Conjestive Heart Failure.

PEEP is contraindicated with:

- Hypotension (Systolic BP less than 90)
- Cardiac Arrest (reduces effectiveness of CPR)
- Pneumothorax

Special Considerations with PEEP

- Patients should be monitored closely for pneumothorax.
- The airway should be monitored closely for the need to suction.
- Higher levels of PEEP can decrease ETCO2.
- Monitor for stacked breaths (Auto-PEEP) due to incomplete exhalation.
- If at any time ventilation becomes difficult, or hypotension occurs, the PEEP valve should be removed.
- Decreased tidal volumes are often required to achieve adequate chest rise with PEEP.
- Nebulized medications can be administered during PEEP use.

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