

APPENDIX: 6**TITLE: CPAP****REVISED: October 15, 2014**

I. Introduction:

Continuous Positive Airway Pressure (CPAP) is a non-invasive method to provide respiratory support to certain patients. CPAP has been shown to rapidly improve vital signs, gas exchange, work of breathing, decrease the sense of dyspnea, and decrease the need for endotracheal intubation in the patients who suffer from shortness of breath from congestive heart failure (CHF), acute pulmonary edema (APE), and COPD.

II. Mechanism of Action:

CPAP works by providing increased continuous gas pressures at the level of the lower airway structures, improving gas exchange in the alveoli. In patients with CHF, CPAP improves hemodynamics by reducing preload and after load.

III. Indications:

For **consideration** in moderate to severe respiratory distress secondary to asthma/reactive airway disease, near drowning, COPD, CHF, acute pulmonary edema (cardiogenic and non cardiogenic), or pneumonia who present with *any* of the following:

- Pulse oximetry < 88% not improving with standard therapy
- $ETCO_2 > 50\text{mmHg}$
- Accessory muscle use / retractions
- Respiratory rate > 25
- Wheezes, rales, rhonchi
- Signs of respiratory fatigue or failure

IV. Contraindications:***Physiologic***

- Unconscious, Unresponsive, or inability to protect airway.
- Inability to sit up
- Respiratory arrest or agonal respirations (Consider Intubation)
- Persistent nausea/vomiting
- Systolic Blood Pressure less than 90 mmHg
- Inability to obtain a good mask seal

Pathologic

- Suspected Pneumothorax
- Shock associated with cardiac insufficiency

- Penetrating chest trauma
- Facial anomalies / facial trauma
- Has active upper GI bleeding or history of recent gastric surgery

V. Procedure:

General

1. Place patient in a sitting position or similar position of comfort
2. Assess and monitor the patient
 - Vital signs q5 min
 - Lung sounds before and after CPAP, and as feasible thereafter.
 - Attach ECG and pulse oximeter
 - **Medical Control Contact: If BP <90 systolic contact Medical Control prior to beginning CPAP**
3. Explain the procedure to the patient
4. Anticipate and control anxiety
 - The CPAP may produce anxiety in some patients. Verbal coaching is often very effective in reducing this
 - Verbally coach breathing as needed
 - In some patients, **low dose** benzodiazepines may be needed. See *Adult Sedation for Painful Procedures (M-15)*
5. Assemble CPAP. Attach CPAP to O₂ source and adjust starting CPAP pressure:
 - Begin at 5 cmH₂O
 - Consider use of nebulized medications as indicated by patients clinical presentation and suspected etiology
 - Progressively increase the pressure desired cmH₂O There is better tolerance with gradual progression of pressure
 - **MAX CPAP PRESSURE:**
 - i. **CHF: 10 cmH₂O**
 - ii. **All other respiratory conditions: 5 cmH₂O**

6. Apply mask.

- Check for air leaks
- *Consider* having the patient hold the mask in place for a minute or so to reduce anxiety. As an option the medic may hold it in place to ensure a good seal is obtained
- Using the head Straps: The use of the head straps is at the medics discretion based on ability to keep a continuous face mask seal weighed against the increased anxiety the head straps may cause
 - Place head strap over occipitoparietal area
 - Gently hold the delivery device to the patient's mouth and nose
 - Attach the straps, loosely at first, gradually tightening as the patient tolerates. Proceed with tightening the straps until air leaks are eliminated
- Continue to coach patient to keep mask in place and readjust as needed

7. An in line nebulizer may be run simultaneously with the CPAP.

8. Treatment should be given continuously throughout transport to ED.

Removal of CPAP

CPAP therapy needs to be continuous and **should not** be removed unless the patient can not tolerate the mask, requires suctioning or airway intervention, experiences continued or worsening respiratory failure, or a pneumothorax is suspected. Intermittent positive pressure ventilation and/or intubation should be *considered* if patient is removed from CPAP therapy.

Intubation considerations

These patients are often in a state of crisis and respiratory failure. Intubation will be inevitable in some patients regardless of the use of CPAP, and the paramedic must be prepared for rapid intervention by RSI/MAI. Indications to proceed to ET placement are (not all inclusive):

- Deterioration of mental status
- Increase of the EtCO₂
- Decline of SpO₂
- Progressive fatigue
- Ineffective tidal volume
- Respiratory or cardiac arrest

VI. Documentation:

Documentation on the patient care record should include:

- CPAP level →(10cmH₂O)
- F_iO₂ →(100%)
- SpO₂ q5 minutes
- Vital Sign q5 minutes
- Response to treatment
- Any adverse reactions
- Justification for sedation, intubation, or discontinuation of CPAP. Be specific.

Special Notes:

1. This procedure is specific to the Emergent PortO₂Vent CPAP device. When another device is used, and there is a conflict with this procedure and the devices recommended guidelines use the manufacturers recommended guidelines when they will not result in a detriment to patient care.
2. Advise receiving hospital as soon as possible so they can prepare for the patient's arrival.
3. Do not remove CPAP until hospital therapy is ready to be placed on the patient
4. Once CPAP headset is in place, consider early administration of nitro-paste, as nitro spray may be impractical to use in CHF patients.
5. Success is highly dependent upon patient tolerance, and EMT-P ability to coach the patient.
 - a. Instruct patient to breath in through nose and exhale through mouth as long as possible
6. Monitor closely for development of pneumothorax and or hypotension
7. Monitor patients closely for vomiting and or gastric distention
8. Most patients will improve in 5-10 minutes. If no improvement within this time, assess for other causes and problems. Re-evaluate for intermittent positive pressure ventilation or Intubation
9. CPAP is an acceptable treatment option for a patient with a DNR/DNI order who is in respiratory failure