



## Continuous Positive Airway Pressure - CPAP

APPROVED:   
EMS Medical Director

  
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### 1 Goal/Introduction

- 1.1 Prehospital continuous positive airway pressure (CPAP) may be used to improve ventilation and oxygenation in patients with acute pulmonary edema, resulting in a reduced need for intubation and mechanical ventilation. CPAP may also be of benefit to victims of near drowning as well as patients with other types of acute respiratory failure
- 1.2 CPAP works by increasing pressure in the alveolar spaces of the lungs.
- 1.3 CPAP may be beneficial in COPD or asthma non-responsive to nebulized bronchodilators in delivering medications to collapsed alveoli
- 1.4 Bag-valve-mask ventilation or endotracheal intubation should be considered if the patient fails to show improvement
- 1.5 If successful, CPAP should be continued to the hospital

### 2 Indications

- 2.1 Age greater to or equal to 8 years
- 2.2 Patients with severe respiratory distress and a history of congestive heart failure or pulmonary edema unresponsive to breathing treatments and with one or more of the following:
  - 2.2.1 Rales / crackles
  - 2.2.2 Pedal Edema
  - 2.2.3 History of taking digoxin or diuretics
  - 2.2.4 Orthopnea
  - 2.2.5 Anxiety
  - 2.2.6 Hypertension
  - 2.2.7 Diaphoresis
- 2.3 Near Drowning
- 2.4 Severe respiratory distress unresponsive to 3 rounds of bronchodilators

### 3 Contraindications

- 3.1 Absolute Contraindications: (DO NOT USE)
  - 3.1.1 Age under 8 years old
  - 3.1.2 Respiratory or cardiac arrest
  - 3.1.3 Agonal respirations or respiratory rate less than 8/min.
  - 3.1.4 Severely depressed level of consciousness
  - 3.1.5 Systolic BP <90 mmHg

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- 3.1.6 Signs and symptoms of pneumothorax
- 3.1.7 Inability to maintain a patent airway
- 3.1.8 Major trauma, especially head injury (possible increased ICP) or significant chest trauma (possible pneumothorax)
- 3.1.9 Facial abnormalities or trauma (e.g. burns, fractures preventing a good mask seal)
- 3.1.10 Vomiting
  
- 3.2 Relative Contraindications (USE CAUTIOUSLY)
  - 3.2.1 History of Asthma or COPD
  - 3.2.2 History of pulmonary fibrosis
  - 3.2.3 History of pneumothorax
  - 3.2.4 Decreased LOC that may interfere with patient cooperation
  - 3.2.5 Claustrophobia or inability to tolerate the mask (after first 1-2 minutes)
  
- 4 Equipment
  - 4.1 San Mateo County approved CPAP device
  - 4.2 Appropriate size mask
  - 4.3 Oxygen tank with flow rate regulator
  
- 5 Procedure
  - 5.1 Setting up the system
    - 5.1.1 Follow the manufacturer's recommendations for connecting the system to your oxygen source
    - 5.1.2 Start the patient on a flow rate of 10 cm of H<sub>2</sub>O and titrate down to 7.5, or 5 cm of H<sub>2</sub>O on the CPAP device to help patient compliance
  - 5.2 Patient Preparation
    - 5.2.1 Place patient in a seated position with legs initially dependent if possible
    - 5.2.2 Monitor EKG, vital signs (BP, HR, RR, SpO<sub>2</sub>)
    - 5.2.3 While one member of the team is setting up the CPAP equipment, a second team member should treat the patient according to established treatment protocols
    - 5.2.4 The patient must be reassessed frequently (every 5 minutes)
      - 5.2.4.1 Blood pressure
      - 5.2.4.2 Heart rate
      - 5.2.4.3 Respiratory rate
      - 5.2.4.4 Pulse Oximetry – O<sub>2</sub> saturation
  - 5.3 Patient Evaluation
    - 5.3.1 Normally, the patient should improve in the first 5 minutes with CPAP, as evidenced by;
      - 5.3.1.1 Decreased heart rate
      - 5.3.1.2 Decreased respiratory rate

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- 5.3.1.3 Decreased blood pressure
      - 5.3.1.4 Increased O2 saturation
    - 5.3.2 Pulse oximetry must be used to continuously monitor patient's oxygen saturation
  - 5.4 Failure to Improve
    - 5.4.1 Should the patient fail to show improvement with CPAP, remove the CPAP device, assist ventilations with BVM as needed and refer to advanced airway management. Failure to improve can be marked by one or more of the following:
      - 5.4.1.1 Sustained or increased heart rate
      - 5.4.1.2 Sustained or increased respiratory rate
      - 5.4.1.3 Sustained or decreasing pulse oximetry readings
      - 5.4.1.4 Decrease in level of consciousness,
- 6 Special information / Complications
- 6.1 Hypotension
  - 6.2 Pneumothorax /tension pneumothorax
  - 6.3 Corneal drying
- 7 Documentation
- 7.1 The use of CPAP must be documented on the PCR
  - 7.2 Vital signs (BP, HR, RR, SpO2) must be documented every 5 minutes
  - 7.3 In the narrative section of the PCR, document the patient's response to CPAP
- 8 Transport Considerations
- 8.1 Notify the hospital early if the patient is being transported on CPAP so respiratory therapy can be alerted and prepared to assume care of the patient
  - 8.2 Transport to a Basic Emergency Department
  - 8.3 Continue CPAP en route to the hospital if the patient is improving and tolerates the procedure