

Continuous Positive Airway Pressure (CPAP)

Nor-Cal EMS

Learning Objectives

- 1) Understand the applications/indications for CPAP
- 2) Understand the physical mechanics of how a CPA works
- 3) Understand the contraindications for CPAP
- 4) Understand and know next steps depending of patient response.

What is CPAP

- Continuous Positive Airway Pressure (CPAP)
- A non-invasive alternative to intubation
- Does not require any sedation
- It provides comfort to the patient with acute respiratory distress by reducing work of breathing
- CPAP has been successfully demonstrated as an effective adjunct in the management of a variety of respiratory distress states. CPAP may prove to be a viable alternative in many patients previously requiring endotracheal intubation by prehospital personnel

How CPAP works

- Helps to keep the airways open, preventing collapse of alveoli
- Uses continuous oxygen flow with pressure to improve diffusion of oxygen into the blood
- increases the airway pressures allowing for better gas diffusion & for re-expansion of collapsed alveoli
- CPAP allows the refilling of collapsed, airless alveoli
- CPAP expands the surface area of the collapsed alveoli allowing more surface area to be in contact with capillaries for gas exchange
- provides increased continuous gas pressures at the level of the *lower* airway structures, improving gas exchange in the alveol
- Helps decrease the work of breathing

- CPAP
 - Non-invasive
 - Easily discontinued
 - Easily adjusted
 - Use by EMT
 - Does not require sedation
 - Comfortable

- Intubation
 - Invasive
 - Usually don't extubate in field
 - Potential for infection
 - Requires highly trained personnel
 - Requires Sedation
 - Traumatic

Indications:

- Respiratory distress /
- hypoxemia secondary to CHF
- acute pulmonary edema
- pneumonia
- asthma and/or COPD *without ventilatory failure*

Contraindications:

- unconscious
- respiratory arrest
- agonal respirations
- pneumothorax
- hypovolemic shock
- acute MI with hypotension
- chest trauma
- persistent nausea/vomiting
- active upper GI bleeding or recent history of gastric surgery
- facial anomalies/stroke/facial trauma
- Decreased cardiac output and gastric distention
- Hypotension secondary to Hypovolemia

Possible risks:

- Gastric distention, vomiting, aspiration
- Drying of secretions, mucus plugging
- Hypotension
- Pneumothorax
- Corneal drying

Treatment with CPAP

Components of a CPAP system

*All are different.

Control Units:



Breathing Circuit and Positive Pressure Face Mask



Procedure

- Apply CPAP mask and ensure snug fit without air leak
 - Adjust air flow to achieve PEEP of 5 cm H₂O (may increase to 7.5 cm H₂O if patient's condition does not improve in 15 minutes).
 - Discontinue CPAP and consider BVM ventilation or intubation:
 - If mental status declines significantly
 - For significant drop in blood pressure (to a systolic BP <90 mmHg). For worsening hypoxia or severe respiratory fatigue
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- **Patient improvement indicated by:**
 - Improvement in dyspnea
 - Decreased respiratory rate
 - Improved pulse oximetry
 - Improved patient comfort

Setting up the mask:

Setting up the O2-RESQ System (example)

Step 1 - Connect Generator directly to a 50psi Oxygen source on a Flow Meter or to a DISS fitting on an O2 tank regulator

Step 2



Remove the mask from Inner bag and attach the circuit to the mask. Turn on oxygen. Hand mask to patient for them to place on their face to get used to the flow. Then proceed to put the Head on.

Step 3



For all mask styles, Flip Head Strap forward and place mask on the patient's face. If using the BiTrac ED Mask, pinch the OmniClip, *slide it up or down* to find the best position.

Step 4



For all mask styles, Flip Head Strap back over the patient's head, bring tabs forward on the top Head Strap and adjust equally to proper fit. Fold straps back to attach. Next attach the bottom 2 clips and repeat.

Step 5



Finally if using the BiTrac ED Mask, adjust the OmniClip *in and out* on Head Strap and Mask for best fit: Do Not Over Tighten the Head Strap. Monitor the Patient.

Removal

- CPAP needs to be continuous and should not be removed unless the patient cannot tolerate the mask or experiences respiratory arrest and/or begins to vomit
- Intermittent positive pressure ventilation (IPPV) with a BVM should be considered if CPAP is removed
- A Laryngo Tracheal Device (King Airway, Combitube, etc.) should be used with a bag valve device if the patient is in respiratory arrest

Special Considerations

- Do not remove CPAP until hospital therapy is ready
- Watch for gastric distention which can cause vomiting
- CPAP may be used with patients who have POLST forms or DNR orders