

A. Introduction

Continuous Positive Airway Pressure (CPAP) is a method of positive pressure ventilation used with patients who are breathing spontaneously. CPAP is applied to keep the alveoli open at the end of exhalation and thus increase oxygenation and reduce the work of breathing. 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. Patients who suffer dyspnea from congestive heart failure, acute cardiogenic pulmonary edema, COPD, and asthma may be a candidate for CPAP.

B. Indications

For this trial patients presenting with dyspnea/hypoxemia secondary to congestive heart failure, acute cardiogenic pulmonary edema and:

- a. Is awake and oriented (GCS ≥ 14)
- b. Has the ability to maintain an open airway
- c. Has a respiratory rate > 24
- d. $SP_{O_2} \geq 90$ mmHg
- e. Has a systolic blood pressure ≥ 110 mmHg
- f. There is no age limitation as long as there is a good mask seal

C. Contraindications

- a. Suspected pneumothorax
- b. Respiratory arrest
- c. Agonal respirations
- d. Unconscious
- e. Systolic blood pressure < 110
- f. Shock associated with cardiac insufficiency
- g. Penetrating chest trauma
- h. Persistent nausea/vomiting
- i. Facial anomalies i.e. facial trauma
- j. History of upper GI bleeding or history of recent gastric surgery

D. Special Considerations

- a. CPAP therapy should not be discontinued unless the patient cannot tolerate the mask or experiences continued or worsening respiratory failure.
- b. Monitor for gastric distension. D/C CPAP if abdomen becomes severely distended.
- c. Frequent assessment of vital signs (q5 minutes) is paramount with patients receiving CPAP.
- d. Documentation should include the response to treatment and any adverse reactions.

E. CHF/Pulmonary Edema:

EMR/BLS

1. Initial Assessment/Care [Procedure 01](#)
2. Position patient sitting upright to improve effort of breathing.
3. Suction as necessary.
4. The patient's respiratory status should be continuously monitored.

ALS

5. Administer **Nitroglycerin spray, 0.4 mg SL.**
6. Apply CPAP (See procedure).
7. Apply 1" (1 GM) NTG paste. (Systolic B/P must be ≥ 100).
8. Start and IV of NS KVO.

F. Procedure

FLOWSAFE Ilez

1. Place patient in sitting position.
2. Explain procedure to patient.
3. Set oxygen flow to deliver CPAP in cm H₂O pressure. Begin by turning the flow control device to 8 lpm and once the mask is applied over the mouth and nose and gradually adjusting flow while observing the manometer to achieve the desired level of CPAP.
 - a) 8 liters per minute yields approximately 5 cm H₂O
 - b) 10 liters per minutes yields approximately 7.5 cm H₂O
 - c) 14 liters per minute yields approximately 10 cm H₂O

The optimal CPAP (PEEP) for CHF patients is 10 cm H₂O. Titrate to effect starting at 5 cm H₂O.

4. Place delivery device over mouth and nose.
5. Secure the mask with the provided straps.
6. Adjust the mask off the nose by squeezing the tabs on the forehead support.
7. Instruct patient to breathe in through their nose slowly and exhale through their mouth as long as possible.

8. Check for air leaks.
9. Monitor and document the patient's respiratory response to the treatment.
10. Continue to coach patient to keep mask in place and readjust as necessary.
11. If respiratory status deteriorates, remove device and provide BVM and/or endotracheal intubation.
12. All patients on CPAP should have continuous SpO₂ monitoring.

PULMODYNE O2-MAX

OPERATING THE SYSTEM:

1. Connect directly to a 50 psi oxygen source.
2. Prior to use, be sure the device is free of obstructions and verify proper valve function.
3. Gradually place mask over patients face. Utilize the head strap to secure the mask firmly in place.

MONITORING THE PATIENT:

The optimal CPAP (PEEP) for CHF patients is 10 cm H₂O. Titrate to effect starting at 5 cm H₂O.

During operation, be sure to check the following on a regular basis:

4. Ensure that there are no leaks at the patient connection.
5. Ensure that there is flow from the O₂-CPAP valve during inspiration (which means that the generator is supplying adequate flow to meet patient demand).
6. Monitor the patient's arterial blood oxygen saturation (SpO₂).
7. Monitor the patient for signs of dehydration and discomfort in the upper airways.

On even days unit will use the FLOWSAFE Ilez
On odd days units will use the PULMODYNE O2-MAX

Only one type of system will be kept in the airway bag, switch system each morning.
The unit OIC will be required to submit an evaluation form located in the EMS portal on MDRnet after every use of either system.