



BOUSSIGNAC SYSTEM (CPAP)



Escambia County, Florida - ALS/BLS Medical Protocol

Continuous Positive Airway Pressure has been shown to rapidly improve vital signs, gas exchange, the 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 and acute cardiogenic pulmonary edema. CPAP is also shown to improve dyspnea associated with pneumonia, chronic obstructive pulmonary disease (asthma, bronchitis, emphysema). In patients with CHF, CPAP improves hemodynamics by reducing preload and after load.



Indications

Dyspnea / Hypoxemia secondary to congestive heart failure, acute cardiogenic pulmonary edema, pneumonia, chronic obstructive pulmonary disease (asthma, bronchitis, emphysema) and:

- A. Any patient who is complaining of shortness of breath for reasons other than pneumothorax.



Approved: 10/01/2011
Version: 3.1

Page 1 of 9

Approved by:


Charles Neal, D.O. Medical Director



BOUSSIGNAC SYSTEM (CPAP)



Escambia County, Florida - ALS/BLS Medical Protocol

- B. Is awake and oriented.
- C. Has the ability to maintain an open airway (GCS>10).
- D. Has a respiratory rate greater than 25 breaths per minute.
- E. Has a systolic blood pressure above 90 mmHg.
- F. Uses accessory muscles during respirations.

Contraindications

1. Pneumothorax
2. Respiratory arrest
3. Agonal respirations
4. Unconscious
5. Shock associated with cardiac insufficiency.
6. Penetrating chest trauma.
7. Persistent nausea/vomiting.
8. Facial anomalies / stroke obtundation / facial trauma /burns.
9. Has active upper GI bleeding or history of recent gastric surgery.
10. Less than 12 years old.

Procedure

1. Make sure the patient does not have a pneumothorax!



Approved: 10/01/2011
Version: 3.1

Page 2 of 9

Approved by:


Charles Neal, D.O. Medical Director



BOUSSIGNAC SYSTEM (CPAP)



Escambia County, Florida - ALS/BLS Medical Protocol

2. Place patient in a sitting position.
3. Assess vital signs and SpO₂ q5 min.
4. Attach heart monitor and pulse oximeter.
5. If BP <90 systolic contact Medical Control prior to beginning CPAP.
6. Use 5cmH₂O - 10cmH₂O CPAP.

Begin @ 5cmH₂O and if tolerated slowly increase to 10cmH₂O.

Flow meter rates are titrateable to PEEP settings and are generally as follows whatever mask setup is used:

- (a) 10 L's = 2.5-3.0 cmH₂O (nebulizer setting).
 - (b) 15 L's = 4.5-5.0 cmH₂O (initial CPAP Setting).
 - (c) 20 L's = 7.0-8.0 cmH₂O (Max for COPD)
 - (d) 25 L's = 8.0-10.0 cmH₂O (Max for CHF).
7. Explain the procedure to the patient:
 - i. Patient requires "verbal sedation" to be used effectively.
 - a. Example: "You are going to feel some pressure from the mask but this will help you breath easier."
 - ii. Place delivery device over mouth and nose.
 - iii. Instruct patient to breath in through their nose slowly and exhale through their mouth as long as possible (count slowly and aloud to four then instruct to inhale slowly).
 8. Check for air leaks.



Approved: 10/01/2011
Version: 3.1

Page 3 of 9

Approved by:


Charles Neal, D.O. Medical Director



BOUSSIGNAC SYSTEM (CPAP)



Escambia County, Florida - ALS/BLS Medical Protocol

9. Treatment should be given continuously throughout transport to ED.
10. Continue to coach patient to keep mask in place and readjust as needed.
11. If respiratory status / level of consciousness deteriorate, remove device and consider bag valve mask ventilation and/or endotracheal intubation.
(FOLLOW SMART AIRWAY (RSI) intubation protocol)
12. Documentation on the patient care record should include:
 - a. CPAP level (10cmH2O)
 - b. FiO2 (100%)
 - c. SpO2 q5 minutes
 - d. Vital Sign q5 minutes
 - e. Response to treatment
 - f. Any adverse reactions

Procedure (Albuterol Nebulizer Use)

- (A) Use of Albuterol with the Nebulizer/Acorn is allowed.
- (B) All other elements of the procedures should be followed with this application of the CPAP system. With the acorn in use the initial setting should be the 10 L's or 2.5-3.0cmH2O setting giving approximately 30% more medication delivered.



Approved: 10/01/2011
Version: 3.1

Page 4 of 9

Approved by:


Charles Neal, D.O. Medical Director



BOUSSIGNAC SYSTEM (CPAP)



Escambia County, Florida - ALS/BLS Medical Protocol



- (c) To utilize the nebulizer it requires placing the T-piece from a nebulizer setup inline with the mask and the valve as shown on the previous page. The 20 L's flow rate should be utilized with the PEEP of 7.5 cmH₂O. The acorn does require an O₂ source connection in order not to “percolate” the Albuterol out of the oxygen connection port. Medication efficacy or delivery is supposed to be improved approximately 30% with this delivery method verses the normal configuration.

Special Notes

1. CPAP should not be used in children under 12 years of age.
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. Monitor patient for gastric distension which may lead to vomiting.
5. Use nitroglycerine tablets to avoid nitroglycerine spray from being dispersed on patient/EMS crew.
6. CPAP may be considered for non-cardiogenic pulmonary edema use as well, i.e. drowning and near drowning.



Approved: 10/01/2011
Version: 3.1

Page 5 of 9

Approved by:


Charles Neal, D.O. Medical Director



BOUSSIGNAC SYSTEM (CPAP)



Escambia County, Florida - ALS/BLS Medical Protocol

MINUTES OF OXYGEN BY CYLINDER SIZE USING DIFFERENT FLOW RATES WITH THE BOUSSIGNAC SYSTEM (BASED ON A FULL CYLINDER WITH 2200 PSI)

Cylinder

<i>FLOW</i>	<i>“D”</i>	<i>“E”</i>	<i>“M”</i>
<i>5</i>	<i>70</i>	<i>123</i>	<i>703</i>
<i>6</i>	<i>58</i>	<i>102</i>	<i>598</i>
<i>8</i>	<i>44</i>	<i>77</i>	<i>498</i>
<i>10</i>	<i>35</i>	<i>61</i>	<i>374</i>
<i>12</i>	<i>29</i>	<i>51</i>	<i>299</i>
<i>15</i>	<i>23</i>	<i>41</i>	<i>199</i>
<i>20</i>	<i>16</i>	<i>29</i>	<i>175</i>
<i>25</i>	<i>14</i>	<i>23</i>	<i>140</i>



Approved: 10/01/2011
Version: 3.1

Page 6 of 9

Approved by:


Charles Neal, D.O. Medical Director

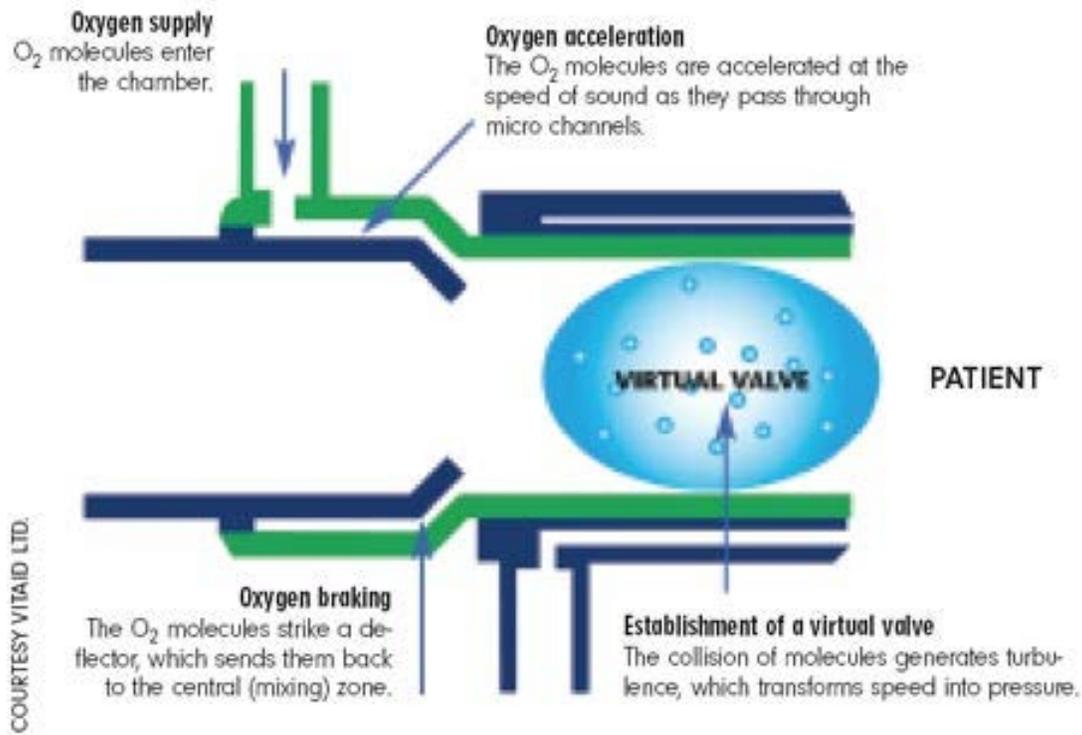


BOUSSIGNAC SYSTEM (CPAP)



Escambia County, Florida - ALS/BLS Medical Protocol

Boussignac CPAP works the same way as the turbines of a jet engine



Approved: 10/01/2011
Version: 3.1

Page 7 of 9

Approved by:


Charles Neal, D.O. Medical Director



BOUSSIGNAC SYSTEM (CPAP)



Escambia County, Florida - ALS/BLS Medical Protocol

*DURATION OF O2 CYLINDERS WITH SPECIFIC
LITER FLOW CALCULATIONS*

**MAXIMUM GAUGE/FILL PRESSURES ARE 2,000 TO 2,200 IN ALL
CYLINDERS REGARDLESS OF SIZE**

**ALL CYLINDERS NEED TO HAVE A SAFE RESIDUAL PRESSURE
OF A MINIMUM OF 200 PSI REMAINING IN THE CYLINDER TO
PRODUCE THE APPROXIMATE 50PSI OF WALL PRESSURE
TO DELIVER THE OXYGEN AT THE PROPER FLOW RATES**

**CYLINDER CONSTANTS (AS FOLLOWS) ARE NEEDED TO
CALCULATE THE TIME A CYLINDER OF A SPECIFIC SIZE IS ABLE TO
LAST WITH A SINGLE FLOW METER OR MULTIPLE FLOW METERS.**

THE CONSTANTS ARE AS FOLLOWS:

**D CYLINDER = 0.16
E CYLINDER = 0.28
CYLINDER = 1.56
H CYLINDER = 3.14
K CYLINDER = 3.14**

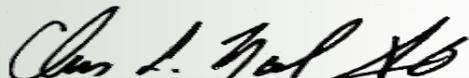
**ECEMS USUALLY HAS
D, M, AND OR H M
CYLINDERS**



Approved: 10/01/2011
Version: 3.1

Page 8 of 9

Approved by:


Charles Neal, D.O. Medical Director



BOUSSIGNAC SYSTEM (CPAP)



Escambia County, Florida - ALS/BLS Medical Protocol

**TO DETERMINE CYLINDER TIME FOR AN H CYLINDER WITH
2000 PSI INDICATED YOU WOULD:**

(2000PSI-200PSI{SAFE RESIDUAL}) X 3.14(H factor)

15 liters(example)

1800 x 3.14 = 5652 divided by 15 = 377 mins or 6 hrs 28 mins

**MULTIPLE FLOW METER/MANIFOLD DEVICES MAY DELIVER MUCH
HIGHER LITER FLOW RATES BUT THE TOTAL LITERS PER MINUTE
WOULD BE USED AS THE 15 L'S LITERS WAS ABOVE DIVIDING IT INTO
THE TOTAL**



Approved: 10/01/2011
Version: 3.1

Page 9 of 9

Approved by:


Charles Neal, D.O. Medical Director