Respiratory Care Services
John Dempsey Hospital
Policy and Procedure Manual

Subject: **BiPAP Ventilatory Support System**

Rationale: The BiPAP name is derived from Bi-Level Positive Airway Pressure. BiPAP is a low pressure, electrically driven unit with electronic pressure control. The unit provides air at suitable pressure and flow rates for patient ventilation assistance. BiPAP is intended to augment patient breathing in those patients with spontaneous respirations. It is not to be used as a life support ventilator. It is not intended to provide total ventilatory requirements of the patient.

Equipment Needed:

1. Stethoscope
2. BiPAP unit with power cord
3. BiPAP Single Use Disposable Circuit
4. Mainstream Bacterial Filter
5. Patient Interface
   - Nasal Mask
6. Head Gear
7. BiPAP disposable humidifier tubing (optional)
8. Humidifier (optional)
9. Manometer (optional)

Indications:

Acute and chronic pulmonary disorders causing hypercapneic respiratory failure, increased work of breathing (WOB), upper airway obstruction, COPD spectrum, disorders of oxygenation where positive pressure ventilation with CPAP pressure and alveolar recruitment is necessary.

Contraindications:

Severe air trapping
Suspected barotraumas
Pneumothorax
Severe Hypotension
Severe Cardiac Arrhythmia
Coronary Artery disease
Diminished consciousness with inability to protect airway
Sinus or middle ear infection
Hypotension induced by PPV
Allergic reaction to mask
Vomiting
Nausea

Procedure:

1. Identify potential candidate for BiPAP
   a. Spontaneously breathing patient
   b. Patient demonstrates clinical evidence of acute and/or chronic pulmonary disorder resulting in hypercapneic respiratory failure, increased WOB, SOB, upper airway obstruction, COPD spectrum. disorders of oxygenation where positive pressure ventilation with CPAP pressures and alveolar recruitment are evident

Special Note: Those patients exhibiting any of the following criteria will be excluded from BiPAP and an Alternate Therapy must be chosen:

- Respiratory Arrest
- Uncontrolled Arrhythmias
- Airway Obstruction
- Unable to Clear Secretions
- Uncooperative
- Facial Trauma
- Systolic BP < 90 mmHg

2. Obtain baseline parameters

3. Obtain and assemble equipment
   - Properly fit nasal mask interface
   - Put manometer in line to confirm delivered pressures
   - Provide appropriate FIO2 as needed

Remember a mask which is improperly fitted to the patient, causes anxiety, or results in discomfort will only impede the effective management of the patient.

4. Obtain initial orders/settings for BiPAP and verify patient's orders sheet for specific instructions. Verify patient's name, DOB, and bed location. Proceed to patient's bed, introduce yourself, and explain what you are about to do. Check the patient's name and DOB verbally and by the patient's wristband. Offer reassurance.

Example:
For BiPAP

- S/T Mode
- IPAP/EPAP 10 / 4
- Respiratory Rate 8
- If available, Rise Time = Adjust of patient comfort

4. Set available alarms to appropriate levels

5. Continue to monitor patient's respiratory parameters and perform clinical assessments:
   a. Assess patient's level of dyspnea, accessory muscle usage, paradoxical chest wall movement, respiratory rate, heart rate, systemic pressures, skin color, perfusion status, temperatire
   b. Assess patients mental status (patient awake, alert, and demonstrates an ability to follow and perform simple commands when instruction is provide)
   c. Chest auscultation: assess breath sounds and air movement
   d. Assess for effectiveness of cough effort in promoting airway clearance
   e. Assess secretions (frequency, amount , color, and texture)
   f. Optimize medical management of patient
   g. Monitor patient comfort
   h. Obtain ABG's and Chest X-Rays as needed

6. Monitor & Assess Ventilation Assistive Device System and Interface.
   a. Adjust Ventilation Assistive Device settings to patient ventilatory and oxygenation needs.
   b. Adjust alarms and verify alarm settings accordingly.

For patient ventilatory needs:

- Gradually Adjust IPAP and Optimize patient ventilator synchrony
  - optimize V_T and/or PCO_2
  - minimize accessory muscle usage/WOB
  - alleviate dyspnea/SOB
  -decrease respiratory rate

For patient oxygenation needs:

- Gradually Adjust EPAP(and IPAP) and Adjust FIO_2 or O_2 lpm
  - $SpO_2 > 90\%$

7. Monitor Therapy Goals
   - Does patient demonstrate significant improvement in ABG's and respiratory symptoms?
   - Is patient stabilized?
     -Transfer stabilized patient to Unit /Floor
   - If patient shows no improvement after 1 hour elapsed, advise physician that patient's current respiratory status may warrant the physician considering intubation and placement of the patient on mechanical ventilation

Mode Selection:

BiPAP can operate in the following four (4) modes, to be determined jointly by the physician and respiratory therapist based on the appropriate patient testing and monitoring

1. Spontaneous Mode (S): Patient is in command of the frequency and depth of his breathing patten.

2. Spontaneous/Timed Mode (S/T): If the patient fails to initiate an inspiration, the unit will cycle IPAP based on a preset interval determined by the synchronized rate (BPM) control.

3. Timed Mode (T): The unit cycles between IPAP and EPAP levels based on the timing intervals as determined by the rate (BPM) and inspiratory time.(%IPAP) respirations.

4. Continuous Positive Airway Pressure (CPAP): The pressure set on the corresponding dial will be delivered continuously.

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