Medical Procedures **Date: 07/01/2023**

Non-Invasive Positive Pressure Ventilation (NIPPV) **Policy #7040**

I. Purpose:

A. The purpose of this policy is to define the indication and procedures required for the use of Non-Invasive Positive Pressure Ventilation (NIPPV), including Continuous and/or Bi-Level Positive Airway Pressure (CPAP or BiPAP) by EMTs, AEMTs, and Paramedics.

II. Authority:

A. Health and Safety Code, Section 1797.220, 1798. Title 22, Section 100170.

III. Policy:

A. Use of NIPPV is authorized under the following conditions:
   1. Patients 14 years of age or older, **or** larger than pediatric measurement tape device
   2. Awake, alert and able to follow commands
   3. Able to maintain their own airway
   4. Exhibit two or more of the following:
      a. Respiratory rate > 20
      b. Pulse Oximetry < 94%
      c. Use of accessory muscles during respiration
         i. Increased work of breathing

B. Conditions in which NIPPV may be helpful include:
   1. Congestive Heart Failure (CHF) with acute pulmonary edema
   2. Acute exacerbation of COPD or asthma
   3. Near drowning/submersion
   4. Other causes of severe respiratory distress, excluding trauma

C. Indications:
   1. The purpose of NIPPV is to improve ventilation and oxygenation to avoid intubation in patients who present with severe respiratory distress, and have significant issues with oxygenation, ventilation or both. Often congestive heart failure (CHF) with acute pulmonary edema, COPD, pneumonia, or interstitial lung disease are common causes of severe respiratory distress.

D. Contraindications:
   1. Absolute Contraindications:
      a. Respiratory or cardiac arrest
      b. Agonal/failing respirations

c. Inability to maintain airway
d. Altered mental status or inability to cooperate
e. Systolic blood pressure <100 mmHg
f. Signs and symptoms of pneumothorax
g. Major facial, head or chest trauma
h. Facial abnormalities or inability to obtain a mask seal
i. Tracheostomy
j. Unconsciousness
k. Vomiting or copious secretions
l. Suspected or known pneumothorax

2. Relative Contraindications:
   a. Claustrophobia or inability to tolerate mask

E. Continuous Capnography:
1. Continuous capnography will be used for all airway, respiratory and ventilatory procedures in Imperial County. The target range will be between 35-45 mmHg, in patients with a pulse, while providing adequate ventilation
2. Continuous capnography should be applied to the patient prior to NIPPV and optimally as soon as respiratory distress is identified

F. Equipment:
1. NIPPV pressure generator and circuit set with ability to deliver 5.0 cm to 10 cm of H_20 pressure
2. Appropriately sized face mask and straps
3. In-line nebulizer if required for bronchodilator administration
4. Sufficient oxygen supply

G. Procedure:
1. Place patient in a seated position
2. Monitor ECG, vital signs (BP, HR, RR, SpO2, EtCO2)
3. Monitor vital signs every five minutes; SpO2 AND EtCO2 must be used continuously to monitor patient's oxygen saturation
   a. Vital signs prior to application of NIPPV must be documented.

4. Set up the NIPPV system (per manufacturer's recommendation) with pressure set at 5-10 cm H_20
    a. Only approved Imperial County EMS devices (Pulmodyne® O2-RESQ™, Boussignac and WhisperFlow)
5. Explain to the patient what you will be doing
6. Verify that oxygen is flowing to the mask. Apply mask while reassuring patient – encourage patient to breathe normally (may tend to become anxious or panic – reassure and coach)
7. Settings:
    a. Continuous positive airway pressure (CPAP):
        i. For COPD/Asthma, or sepsis due to pneumonia, it is recommended to start at 3-5 cm H20 is often effective; the risk of increasing PEEP and increased thoracic pressure (and "auto peep") in these patients should be considered
        ii. 5 – 15 cm H20 for respiratory distress, especially pulmonary edema or CHF, COPD, asthma, drowning, possible aspiration, or pneumonia
    b. Bi-level positive airway pressure device (BiPAP):
        i. Inspiratory PAP (positive airway pressure) 10 – 15 cm over Expiratory PAP 5 – 7 cm H2O for pulmonary edema, CHF, COPD, asthma, drowning, possible aspiration, or pneumonia
        ii. During titration keep IPAP to EPAP at least a difference of 5 cm H2O. 15 cm H20 is maximum pressure that should be utilized with NIPPV
        iii. Increasing positive pressure can cause hypotension. Use caution or remove and re-evaluate with systolic blood pressures consistently < 90 mmHg, and unresponsive to interventions, or patient appears to clinically worsen
8. Reevaluate the patient – normally the patient will improve in the first 5 minutes with NIPPV as evidenced by:
    a. Decreased heart rate
    b. Decreased respiratory rate
    c. Decreased blood pressure
    d. Increased SpO_2

9. If the patient does not improve or becomes worse with NIPPV, remove the NIPPV device and assist ventilations with BVM as needed
10. Notify the receiving facility of the type of NIPPV device that is being used

H. Required documentation includes:
   1. Indication for use of NIPPV
   2. Pre procedure vital signs
   3. Intra and post (if applicable) procedure vital signs
   4. Complications
   5. Response to treatment

I. Risks:
   1. NIPPV is not without risk. These risks include:
      a. Development or worsening a pneumothorax
         i. If a patient suddenly has increased work of breathing or unilateral lung sounds, provide treatment for pneumothorax, and removal of NIPPV
      b. Decreased blood pressure
         i. Consider IV fluids early during NIPPV if a patient's blood pressure appears to be affected. Also consider removal of nitropaste if applied
      c. Airway obstruction with secretions or the patient's tongue
         i. This is a sign the patient is not conscious enough for NIPPV. Consider intubation, supraglottic airway, or BVM administration as clinically appropriate

APPROVED:
Signature on File
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