

	POLICY Number: 7311-60-024 Title: APPLICATION OF NON INVASIVE VENTILATION FOR ACUTE RESPIRATORY FAILURE
Authorization <input type="checkbox"/> President and CEO <input checked="" type="checkbox"/> Vice President, Finance and Corporate Services	Source: Director, Acute Medicine and Complex Care Cross Index: 7311-60-004 Date Approved: June 23, 2009 Date Revised: November 28, 2012 Date Effective: November 30, 2012 Date Reaffirmed: September 2012 Scope: SHR

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Overview

The following policy applies only to the use of NIV for adult patients with acute respiratory failure (see Appendix A). It does not apply to the treatment of sleep disordered breathing, chronic, stable respiratory failure, dyspnea in palliative care patients and pediatric patients.

DEFINITIONS

Non-Invasive Ventilation (NIV) is the provision of ventilatory support through the patient's upper airway using a mask or similar device. For the purposes of this policy, both continuous positive airway pressure (CPAP) and bi-level positive airway pressure (BiPAP) will be generically referred to as non invasive ventilation (NIV).

1. PURPOSE

The purpose of this policy is to establish safe and uniform standard of practice for the application of non-invasive ventilation in adult patients with acute respiratory failure.

2. PRINCIPLES

2.1 NIV is most beneficial when applied early in the treatment course and should not be considered as merely a substitute for intubation. Consultative advice is encouraged when the attending service is unsure whether NIV will benefit a particular patient.

- 2.2** Clinical Goals of NIV
- Optimize minute and tidal volume
 - Decrease respiratory rate
 - Decrease work of breathing
 - Improve patient comfort
 - Improve respiratory acidosis
 - Improve oxygenation

3. POLICY

- 3.1** On the written or verbal order of a physician (see SHR Policy *Ordering of Medications*), a respiratory therapist will apply NIV as part of the management of acute respiratory failure.
- 3.1.1 An order for NIV must include values for IPAP, EPAP and oxygen flow (usually written as “supplemental oxygen to keep SpO₂ within 90 – 92%”). IPAP and EPAP values may be left up to the discretion of the RRT, however, upon determining initial pressure settings, the RRT must obtain a physician’s order for these settings.
- 3.1.2 An order to initiate NIV requires a mandatory consultation to either Respiriology or ICU. Consults are placed by the attending medical or surgical service. ICU is considered the default consultant and can be contacted by either nursing or respiratory therapy. Respiriology or ICU may consult each other directly, according to clinical circumstances.
- 3.1.3 A consultation with Respiriology/ICU is not required to start NIV in the Emergency Department however; a referral to Respiriology/ICU is required prior to admission.
- 3.1.4 NIV shall be applied in a fully monitored setting (Emergency Department, Coronary Care Unit, Intensive Care Unit, Progressive Care Unit) or a ward observation unit with continuous pulse oximetry as the minimal acceptable level of monitoring.
- 3.2** The personnel permitted to perform NIV is limited to the Registered or graduate respiratory therapist and student respiratory therapists under supervision of a registered respiratory therapist.
- 3.3** The physician determines when to initiate and discontinue NIV (see Appendix A).

4. ROLES AND RESPONSIBILITIES

4.1 Physicians

- 4.1.1 Determine need and appropriateness of NIV.
- 4.1.2 Prescribes NIV and consults either ICU or Respiriology.
- 4.1.3 Monitors the effectiveness of NIV.
- 4.1.4 Works with respiratory therapy and nursing in the management, weaning and discontinuation of NIV.

4.2 Respiratory Therapists (see also SHR Respiratory Therapy Procedure: Non Invasive Ventilation for Acute Respiratory Failure)

- 4.2.1 Initiate NIV, including choosing appropriate mask size and type for the patient.
- 4.2.2 Perform initial assessment and follow-up assessment and perform any changes to NIV as prescribed by the physician.
- 4.2.3 Works in conjunction with nursing and the attending physician in the management and weaning of the patient from NIV.
- 4.2.4 Discontinues NIV on the direction of the physician.

4.2.5 Consults ICU if attending physician service is unavailable to consult either ICU or Respiriology.

4.3 Nursing

4.3.1 Monitors and assesses patient for changes in respiratory status.

4.3.2 Assists in applying, adjusting, repositioning and removing the mask interface as required.

4.3.3 Works with respiratory therapy and the attending physician service in weaning the patient from NIV.

4.3.4 Consults ICU when attending physician service is unavailable to consult either ICU or Respiriology.

4.4 ICU and Respiriology Staff

4.4.1 Assists in determining the appropriateness and effectiveness of NIV.

4.4.2 Reassesses the patient and assists in the management of NIV as needed as long as the patient requires NIV.

5. POLICY MANAGEMENT

The management of this policy including policy education, monitoring, implementation and amendment is the responsibility of the Director, Acute Medicine and Complex Care.

6. NON-COMPLIANCE/BREACH

Non-compliance of this policy will result in a review of each patient situation lead by the Director, Acute Medicine and Complex Care.

7. REFERENCES

Wood KE, Flaten AL, Backes WJ. Inspissated secretions: a life threatening complication of prolonged noninvasive ventilation. *Respir Care* 2000;45(5):491-493.

Majid A, Hill N. Noninvasive ventilation for acute respiratory failure. *Curr Opin Crit Care* 2005;11:77-81.

Sinuff T, Keenan SP. Clinical practice guideline for the use of noninvasive positive pressure ventilation in COPD patients with acute respiratory failure. *J Crit Care* 2004;19(2):82-91.

Martins de Araujo MT, Vieira SB, Vasquez EC, Fleury B. Heated humidification or face mask to prevent upper airway dryness during continuous positive airway pressure therapy. *Chest* 2000;117(1):142-147.

Indications for NIV Use - Patient Selection

Strongly consider NIV in the following circumstances:

- Acute Exacerbation of COPD, with dyspnea and pH < 7.35, PaCO₂ >45
- Cardiogenic Pulmonary Edema (CPAP or BiPAP)
- Immunocompromised Patient with diffuse pulmonary infiltrates
- Facilitate extubation in patients with COPD

NIV can be cautiously tried in the following circumstances:

- Post-extubation failure in patients with COPD or pulmonary edema
- Non-specific Hypoxemic respiratory failure (particularly if hypercapneic or underlying COPD)
- Asthma
- Cystic Fibrosis
- Prevention of Post operative respiratory failure in thoracic surgery

NOTE: NIV is contraindicated after upper airway or esophageal surgery. While NIV has shown benefit in patients post-op from major abdominal surgery, it may be problematic in upper GI surgery that has disrupted bowel wall integrity, particularly if an ileus develops.

- Patients with “do not intubate” directive

Absolute Contraindications:

- Need for immediate intubation
- Cardio respiratory Arrest
- Hemodynamic Instability or unstable arrhythmias
- Unable to protect airway
- Post-op upper airway surgery
- Facial trauma.

Relative Contraindications:

- Decreased Level of Consciousness (GCS < 11)
*(CO₂ narcosis in COPD is the only exception)
- Excessive Secretions
- Post operative gastrointestinal surgery
- Aspiration risk, nausea or vomiting
- Uncooperative patient.
- Poor mask fit

Predictors of NIV Success

- Younger age
- Lower acuity of illness
- Neurologically intact and cooperative
- Synchronous breathing with machine
- Good mask seal
- Moderate Hypercapneic respiratory failure at baseline
*(PaCO₂ 45 mmHg – 90 mmHg and pH 7.25 – 7.35)
- Improvement within two hours, as measured by respiratory rate and ABG

Predictors of NIV Failure

- More severely ill
- RR > 34 breaths per minute
- Copious secretions
- Diagnosis other than COPD exacerbation
- Impaired consciousness (GCS < 11)
- pH < 7.30 after 2 hours of NIV

General Limitation of NIV

Failure to show improvement in dyspnea, respiratory rate and ABG within the first two hours is predictive of eventual failure and need for intubation. More than 25% of patients will ultimately require intubation.

Reducing Risk of Aspiration

The patient will be NPO for the first 24 hours of NIV. Medications that must be given orally can be maintained, but all others should be temporarily held or switched to IV route. After 24 hours, decisions regarding nutrition and oral intake will be made according to patient stability and likelihood of intubation.