

Noninvasive Ventilation Options for Use in the Non-Intensive Care Setting



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KEYWORDS

• Noninvasive ventilation • Acute respiratory failure • Non-ICU

HOSPITAL MEDICINE CLINICS CHECKLIST

1. Noninvasive ventilation (NIV) is the delivery of oxygen/augmentation of ventilation for the patient with acute hypoxemic or hypercapneic respiratory failure without bypass of the upper airways.
2. NIV is divided into two general categories: positive-pressure and negative-pressure modes. Negative-pressure mode is rarely used in current practice.
3. Positive-pressure NIV has pulmonary and circulatory physiologic effects.
4. Patients generally considered appropriate for NIV to manage acute respiratory failure include those with increased work of breathing/dyspnea/hypercapnia/hypoxemia caused by a potentially reversible/responsive cause of respiratory failure amenable to treatment.
5. NIV is safe and effective for non-ICU management of acute respiratory failure in carefully selected patients.
6. Commonly used modalities (NIV) in the inpatient non-ICU setting include high-flow nasal cannula, continuous positive airway pressure, and bilevel positive airway pressure.
7. After surgery, patients remain at risk for hypoxemia and/or acute respiratory failure, where use of anesthesia, postoperative pain, associated atelectasis, and diaphragm dysfunction may play a contributing factor.

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8. The application of NIV in the postoperative period attempts to decrease the risk of acute respiratory failure and reintubation by improving gas exchange, decreasing atelectasis, and decreasing the patient's work of breathing.
9. Applications for NIV are broadening, with increasing use for management of respiratory failure caused by a widening spectrum of respiratory diseases.

INTRODUCTION

Management of acute respiratory failure in the non-intensive care unit (ICU) setting is a commonly encountered challenge in the management of hospitalized patients. Options for management of respiratory failure outside the ICU setting, beyond basic supportive care, have historically been limited but are expanding. Newer management strategies for patients with acute respiratory failure requiring more than supplemental oxygen and basic supportive care are being developed with the goal of avoiding invasive ventilation (INV). Noninvasive ventilation (NIV) techniques are being developed to bridge the gap, intended to provide respiratory support for patients needing more than basic care with the hope of avoiding complications associated with INV. Commonly used options include high-flow nasal cannula oxygen delivery, continuous positive airway pressure (CPAP), and bilevel positive airway pressure (BiPAP), each of which has been demonstrated to be safe and effective in carefully selected patients. Although most frequently used for management of acute chronic obstructive pulmonary disease (COPD) and heart failure exacerbation, applications for NIV are broadening, with increasing use for management of respiratory failure caused by a widening spectrum of respiratory diseases as reviewed here. The decision to use NIV must be based on patient characteristics, institutional resources (equipment availability, monitoring ability, staff experience), and patient-specific goals of care. Basic concepts regarding NIV, patient selection criteria, and key management principles are reviewed.

What is the definition and basic premise of noninvasive ventilation?

The essential premise of NIV is the delivery of oxygen/augmentation of ventilation for the patient with acute hypoxemic respiratory failure without bypass of the upper airway. The goal is to avoid complications commonly associated with INV (intubation), such as increased risk for infection and airway trauma. A secondary goal is to improve patient comfort and tolerance.

Potential advantages of NIV that have promoted its use include reduced need for INV (endotracheal intubation), shorter ICU care periods, reduced cost of care, and decreased mortality related to complications from INV.

In some instances, NIV is used for long-term (outpatient) respiratory support, but the focus of this article is on uses of NIV for common inpatient scenarios, such as acute respiratory failure and weaning from INV support.

What are the basic forms of noninvasive ventilation?

NIV is divided into two general categories: positive-pressure and negative-pressure modes. Negative-pressure mode is rarely used in current practice. This involves encasing the thorax (or whole body) with application of a vacuum to lower pressure

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