

Non-invasive ventilation for non-COPD-related respiratory failure

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Although treatment of respiratory failure due to COPD exacerbations is the best established clinical indication for noninvasive ventilation, there are many other potential applications in the acute care settings. Other applications that are supported by multiple randomized controlled trials include the use of noninvasive ventilation (NIV) (i.e. pressure support plus positive end expiratory pressure (PEEP)) and continuous positive airway pressure (CPAP) for acute cardiogenic pulmonary edema (ACPE) and acute respiratory failure in the face of immunocompromised states. For ACPE, NIV and CPAP appear to be equally efficacious in avoiding intubation and mortality, but NIV may offer some early physiologic advantages. A recent study raised questions about the efficacy of these modalities compared to standard oxygen therapy, but the intubation rate was only 3% in the control group, too low to permit a fair evaluation of intubation as an end point.

Other obstructive diseases besides COPD may respond favorably to NIV. For acute severe asthma, only one randomized controlled trial has demonstrated a favorable effect, mainly on airflow. But several uncontrolled trials suggest a benefit on gas exchange and lowering of intubation rate. Cystic Fibrosis may also respond favorably to NIV, especially as a bridge to transplantation. However, aggressive measures must also be directed at alleviating secretion retention. Upper airway obstruction may also respond well to NIV, again based on anecdotal evidence, especially in patients with temporary inspiratory stridor following extubation. Nonetheless, caution may be exercised in patients who are at risk for occlusion such as those with airway tumors.

Hypoxemic respiratory failure constitutes a broad range of etiologies giving rise to severe hypoxemia and respiratory distress. Some entities that are lumped into the category such as ACPE respond quite well to NIV. However, severe pneumonias and ARDS have not responded as well to NIV as obstructive processes. A randomized controlled trial on patients with severe community acquired pneumonia found that only those with underlying COPD responded well to NIV and there was no apparent benefit of NIV for those without underlying COPD. One study suggested that ARDS patients who were otherwise stable and had no more than two organ failures have a reasonable chance of succeeding with NIV if oxygenation improves substantially within the first hour.

NIV may be useful for acute deteriorations in patients with restrictive thoracic processes caused by chest wall deformities or neuromuscular disease. Despite the success of NIV for support of such patients in the home, these constitute a relatively small portion of patients admitted with acute respiratory failure to acute care hospitals. These admissions are often precipitated by respiratory infections associated with increased secretion retention and temporary intubation may be necessary to control the situation.

NIV has a role in non-COPD patients who have failed standard extubation, have do-not-intubate statuses or in the post operative setting, but such patients should be carefully selected and monitored. As technology advances and we learn how best to apply NIV, we can expect further expansion and refinement of the role of NIV for non-COPD patients in the acute care setting.