Noninvasive ventilation decreased mortality and the need for endotracheal intubation for COPD exacerbation


Objective
To compare noninvasive ventilation, administered through a face mask, with standard treatment in patients with chronic obstructive pulmonary disease (COPD) in the intensive care unit.

Design
Randomized controlled trial.

Setting
5 intensive care units in Europe.

Patients
85 patients (mean age 70 y) who had COPD and exacerbation of dyspnea lasting < 2 weeks and at least 2 of respiratory rate > 30 breaths/min, partial pressure of oxygen < 45 mm Hg, or an arterial pH < 7.35 after breathing room air for ≥ 10 minutes. Exclusion criteria included respiratory rate < 12 breaths/min or need for immediate intubation, receipt of sedative drugs within the previous 12 hours, central nervous system disorder, kyphoscoliosis, upper airway obstruction or asthma, or clear cause of decompensation requiring specific treatment. Follow-up was complete.

Intervention
Patients were allocated to standard treatment (oxygen, maximal flow rate 5 L/min plus subcutaneous heparin, antibiotics, and bronchodilators) (n = 42) or to standard treatment plus periods of noninvasive pressure-support ventilation with a face mask ≥ 6 hours/day (n = 43). Any patient who met 1 of 5 objective criteria (respiratory arrest, respiratory pauses with loss of consciousness or gasping for air, psychomotor agitation, heart rate < 50 beats/min, or hemodynamic instability) received endotracheal intubation.

Main Outcome Measures
Need for endotracheal intubation and mechanical ventilation. Secondary outcomes were length of hospital stay, duration of ventilatory assistance, and mortality.

Main Results
Noninvasive ventilation led to fewer requirements for endotracheal intubation than did standard treatment (26% vs 74%, P < 0.001). This absolute risk reduction (ARR) of 48% means that 2 patients would need to be treated (NNT) to prevent 1 intubation, 95% CI 2 to 4; the relative risk reduction (RRR) was 65%, CI 43% to 80%.* Patients who received noninvasive ventilation had a shorter time in the hospital (23 [SD 17] vs 35 d [SD 33]) (CI for the 12-day difference 0.17 to 23.3, P = 0.02). Noninvasive ventilation led to fewer deaths than did standard treatment (9% vs 29%, P = 0.02) (ARR 20%, NNT 5, CI 3 to 36; RRR 67%, CI 13% to 88%).*

Conclusion
The addition of noninvasive pressure-support ventilation, administered through a face mask, to standard treatment was more effective than standard treatment alone for patients with chronic obstructive pulmonary disease in the intensive care unit.

Source of funding: Not stated.

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*Evid Based Med* 1996 1: 90
doi: 10.1136/ebm.1996.1.90

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