Noninvasive ventilation reduced duration of mechanical ventilation and ICU stay more than conventional weaning

Ferrer M, Esquinas A, Arancibia F, et al. **Noninvasive ventilation during persistent weaning failure: a randomized controlled trial.** Am J Respir Crit Care Med. 2003;168:70-6.

QUESTION

In patients on mechanical ventilation with persistent weaning failure, does noninvasive ventilation (NIV) reduce the duration of mechanical ventilation and its associated complications?

DESIGN

Randomized {allocation concealed*}†, {unblinded}†,* controlled trial with 90-day follow-up.

SETTING

Intensive care units (ICUs) of 2 centers in Spain.

PATIENTS

43 patients (mean age 71 y, 70% men) in whom a spontaneous breathing trial failed for 3 consecutive days. Exclusion criteria were facial or cranial trauma or surgery, recent gastric or esophageal surgery, tracheotomy, upper gastrointestinal bleeding, excessive respiratory secretions, or lack of cooperation. Follow-up was complete.

INTERVENTION

Patients were allocated to extubation and NIV treatment (n = 21) or continued mechanical ventilation with once-daily weaning attempts (conventional weaning) (n = 22). NIV (BiPAP Vision, Respironics Inc, Murrysville, Pennsylvania, USA) was given continuously for ≥ 24 hours after extubation and was gradually withdrawn until patients could sustain spontaneous breathing.

MAIN OUTCOME MEASURES

Duration of invasive ventilation. Secondary outcomes were total period of ventilation, lengths of stay in the ICU and hospital, complications, and survival.

MAIN RESULTS

Patients in the NIV group had a shorter duration of invasive ventilation than did patients in the conventional-weaning group (Table). NIV-group patients also had shorter periods of ventilatory support, ICU stay, and hospital stay (Table). The incidence of serious complications was lower in the NIV group than in the conventional-weaning group (5 [24%] vs 16 [73%], P = 0.004), particularly for nosocomial pneumonia (5 [24%] vs 13 [59%], P = 0.042). ICU survival was higher in the NIV group (P = 0.045), as was 90-day cumulative survival (P = 0.044).

CONCLUSION

In patients on mechanical ventilation with persistent weaning failure, early extubation and noninvasive ventilation reduced the period of mechanical ventilation and complications and increased survival more than a conventional weaning approach.

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For correspondence: Dr. M. Ferrer, Institut Clinic de Pneumologia I Cirurgia Toracica, Barcelona, Spain. E-mail miferrer@clinic.ub.es. ■

*See Glossary.

†Information provided by author.

Noninvasive ventilation (NIV) vs conventional weaning for patients on mechanical ventilation with persistent weaning failure‡

Outcomes	NIV	Conventional weaning	Difference (95% CI)
Duration of invasive ventilation (d)	9.5	20.1	10.6 (3.8 to 17.4)
Total duration of ventilatory support (d)	11.4	20.1	8.7 (2.0 to 15.4)
Duration of ICU stay (d)	14.1	25.0	10.9 (4.1 to 17.7)
Duration of hospital stay (d)	27.8	40.8	13.0 (1.7 to 24.3)

‡Values are means. All differences favor NIV. CI defined in Glossary and calculated from data in article.

COMMENTARY

The study by Ferrer and colleagues highlights the exciting potential for noninvasive weaning to reduce patient morbidity, improve survival, and conserve ICU resources. These benefits have been previously reported (1–3), so this study brings to 4 the number of trials that have consistently reported lower mortality with NIV and have shown, on balance, reductions in nosocomial pneumonia, tracheotomy, duration of mechanical support, and ICU stay.

This study represents a major contribution to this emerging literature. Not only does it increase the randomized evidence base to 150 patients, it has expanded the population to include 10 patients without chronic pulmonary disease. Moreover, the investigators sought to address some of the limitations of these trials in which patients and caregivers were necessarily unblinded. First, to facilitate weaning among control-group patients, they conducted daily spontaneous breathing trials. Second, to reduce subjectivity in the measurement of important study outcomes, they applied predefined criteria for tracheotomy, reintubation, and the diagnosis of nosocomial pneumonia. Future trials will benefit further by implementation of sedation protocols and blinding of other members of the investigative team, such as judicial outcome assessors and data analysts.

For now, cautious skepticism may limit integration of noninvasive weaning into routine clinical care. Because current trials have not uniformly reported on weaning failures, reintubation, and other adverse events, clinicians may be reticent to remove a secure airway from patients with limited respiratory reserve. Therefore, we look forward to further research in noninvasive weaning to build upon this auspicious foundation.

Karen E. Burns, MD
Maureen O. Meade, MD
McMaster University
Hamilton, Ontario, Canada

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