

Noninvasive Ventilation: Do Not Tolerate Intolerance

Noninvasive ventilation (NIV) has been used to treat acute respiratory failure in various settings for more than 2 decades. There is now strong evidence that NIV saves lives.¹ The most clearly established indications for NIV are acute-on-chronic respiratory failure resulting from exacerbations of COPD² and acute cardiogenic pulmonary edema.³ In these indications, NIV decreases the risk of intubation and mortality.^{2,3} In contrast, the benefit of NIV as first-line treatment of hypoxemic acute respiratory failure (ie, de novo acute respiratory failure) has not been clearly demonstrated, since the NIV failure rate is higher in hypoxemic acute respiratory failure than in any other indication of NIV. NIV failure is also associated with higher mortality in these patients.^{4,5}

In view of the growing use of NIV throughout the world,⁶⁻⁸ it must be kept in mind that NIV is a double-edged sword, since, although NIV is clearly a lifesaving treatment, NIV failure may have major adverse consequences.⁴ For this reason, it is crucial to improve our knowledge of the risk factors for NIV failure. Several risk factors of NIV failure have been reported, such as very severe disease on admission, a high breathing frequency severe hypoxemia, or impaired level of consciousness.^{4,5} One of the identified risk factors for NIV failure is patient intolerance of NIV.⁹⁻¹² However, few data are available concerning the prevalence of NIV intolerance. One possible explanation could be the lack of a clear definition of poor tolerance of NIV. From a practical point of view, NIV intolerance could be defined as the need to discontinue NIV because the patient is no longer able to tolerate NIV. This definition was used in this original study from Liu et al,¹³ who prospectively enrolled 961 subjects receiving NIV as first-line treatment of acute respiratory failure, mostly related to an exacerbation of COPD or pneumonia. The main finding of their study was the low level of NIV intolerance (5.2%). However, subjects who experienced

NIV intolerance had a higher risk of NIV failure and subsequent intubation. Moreover, NIV failure occurred sooner (2.4 h) in these subjects.

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In this prospective and observational study, NIV was applied via an oronasal mask connected to a heated humidifier. NIV was initially delivered until acute respiratory failure was relieved and was then used intermittently. The proportion of subjects experiencing NIV intolerance was surprisingly low in this study compared with previous studies, which have reported failure rates ranging from 11 to 15%.^{9,11} The main explanation for this finding may be the mild severity in these subjects compared with subjects in previous studies. Because decreased severity is associated with better tolerance, the low severity of symptoms in the subjects included by Liu et al¹³ could explain the low prevalence of poor tolerance in their study. As expected, the authors reported a poorer outcome in subjects with intolerance, since subjects experiencing NIV intolerance were more frequently intubated (44% vs 26%, $P = .008$) and presented a trend toward higher mortality (34% vs 22%, $P = .08$). It is noteworthy that Liu et al¹³ asked subjects to describe any complaints in relation to NIV. Although many types of complaints were observed, three complaints were most frequently reported: (1) NIV worsened subjects' distress (46%), (2) NIV resulted in dyspnea (26%), and (3) the flow or pressure of NIV was too strong to bear (16%).

The study by Liu et al¹³ has a number of limitations. First of all, the authors did not look for the presence of patient-ventilator asynchrony. This is an important point, since patient-ventilator asynchrony has been reported to be associated with NIV failure and intolerance^{12,14} and, more recently, with increased ICU mortality.¹⁵ The second limitation concerns the team's experience in relation to NIV. According to the old adage that practice makes perfect,⁸ the team's experience with NIV (including nurses and physicians) must be specified, although it may be difficult to evaluate.¹⁶ Third, since dyspnea and consequently intolerance are frequently related to inadequate ventilator settings and may be dramatically reduced by improving ventilator settings,¹⁷ it would have been interesting to evaluate

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Correspondence: Alexandre Demoule MD PhD, Service de Pneumologie et Réanimation Médicale, Groupe Hospitalier Pitié-Salpêtrière, 47-83 boulevard de l'Hôpital, 75651 Paris Cedex 13, France. E-mail: alexandre.demoule@aphp.fr.

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the impact of changes in ventilator settings on intolerance and outcome.

Overall, the authors should be commended for their important work, since they have reported the characteristics and outcomes of a large cohort of NIV subjects and highlighted the fact that, in the ICU as in other settings, NIV intolerance is a challenging issue.

Martin Dres MD

Sorbonne Universités, UPMC Univ Paris 06
INSERM, UMRS1158, Neurophysiologie respiratoire
expérimentale et clinique
AP-HP, Groupe Hospitalier Pitié-Salpêtrière Charles
Foix
Service de Pneumologie et Réanimation Médicale
(Département "R3S")
Paris, France

Alexandre Demoule MD PhD

Sorbonne Universités, UPMC Univ Paris 06
INSERM, UMRS1158, Neurophysiologie respiratoire
expérimentale et clinique
AP-HP, Groupe Hospitalier Pitié-Salpêtrière Charles
Foix
Service de Pneumologie et Réanimation Médicale
(Département "R3S")
Paris, France

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