

Is Noninvasive Ventilation Still Underused by Physicians?

Noninvasive ventilation (NIV) refers to the provision of ventilatory support through the patient's upper airways, using a mask or similar device.¹ With this technique the upper airways are not bypassed with a tracheal tube, laryngeal mask, or tracheostomy. Consequently, by avoiding tracheal intubation, NIV presents several potential advantages, such as reduction in pulmonary infections, barotrauma, and need for sedation.² Although NIV is not suitable for all patients with acute respiratory failure, it has been shown to decrease the intubation rate and improve survival in patients with exacerbation of chronic obstructive pulmonary disease (COPD) and acute congestive heart failure (CHF).³⁻⁵ The possible benefits of NIV in other clinical conditions, such as severe acute asthma, pneumonia, and respiratory failure after extubation, are still unclear.⁶⁻⁸ Due to ease of application, less intensive monitoring, more equipment availability, shortage of intensive care beds, and clinical benefits, NIV is more frequently used outside the intensive care unit, in high-dependent units, respiratory wards, and emergency departments (EDs).^{1,8-10} It has been suggested that each hospital should have a specific designated area with experienced staff, where patients requiring NIV can be transferred with the minimum delay.¹

An international report of NIV from 1998 to 2004 showed an increase in use from 4% to 11%,¹¹ while in the same time period an observational French survey conducted in intensive care reported an increase in use from 16% to 24% in patients requiring ventilatory support for acute respiratory failure.^{12,13} However, only one small survey of NIV was conducted in acute-care hospitals in the United States, which showed an overall utilization rate of 20%.¹⁴ Conversely, until now there have been no data concerning the use of NIV in American EDs.

In this issue of *RESPIRATORY CARE*, 2 national American surveys reporting the use of NIV, in Veterans Affairs hospitals¹⁵ and in EDs,¹⁶ are respectively presented. In the first one, Bierer et al conducted a survey in 63 of 128 veterans hospitals, including physicians and respiratory therapists (RTs), to describe the current use of NIV.¹⁵ The Veterans Affairs Department operates with 163 hospitals, and over 125,000 patients yearly are discharged with a diagnosis of COPD. The majority of respondents were RTs, compared to physician (77% vs 22%). Far more physicians reported no specific NIV training, compared to RTs (51% vs 13%). The NIV was used in at least one patient per month in all the respondents, and between 0–4

patients per month in 45% of respondents. In small hospitals the NIV was more frequently used, compared to large hospitals. Equally, 40% of respondents reported the use of NIV on the wards or restricted to specific intensive care areas, with the possibility to start over the entire day. Initiation of NIV occurred in less than 30 min in 62% and in less than 60 min in 90% of the cases. Acute exacerbations of COPD and CHF were the most frequent indications for NIV, which was delivered in 50% of the cases, using a non-critical-care ventilator equipped with a face mask. However, when NIV was indicated, a high number of RTs declared that NIV was utilized less than 50% of the time.

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In the second one, Hess et al conducted a survey in 132 academic EDs in the United States.¹⁶ It was found that 64% of physicians and 99% of RTs were very familiar with NIV. The RTs were primarily responsible for initiation of NIV in 96% of cases, and NIV was used one or more times per week in 92% of EDs. NIV was more commonly used for exacerbation of COPD and CHF, compared to asthma conditions. The majority of respondents reported the perception that the use of NIV was about right for each of the diagnoses. NIV equipment was available in 76% of EDs, and it was initiated in less than 20 min in the majority of them. Bi-level ventilators and oronasal mask were more frequently used.

Despite the difference in the survey questionnaires, these 2 surveys taken together show that physicians are less trained and familiar with NIV, compared to RTs. NIV is initiated more frequently in the EDs, compared to hospitals, for exacerbations of COPD and CHF, and it is usually delivered via non-critical-care ventilator through an oronasal face mask.

In a hospital survey conducted at all 82 acute-care hospitals in Massachusetts and Rhode Island, NIV was utilized in 20% of the patients with acute respiratory failure.¹⁴ Similarly, a prospective survey of 70 French intensive care units in 2006 found that NIV was used as first-line ventilatory treatment in 23%.¹² Conversely to hospital use, 2 European surveys reported a higher NIV use in the EDs, ranging from 49% to 67%.^{17,18} This higher NIV rate in the EDs could be simply due to the lesser severity of the condition of these patients, compared to the more critically patients admitted to intensive care, who required invasive

mechanical ventilation. In the survey by Hess et al,¹⁶ the authors found a higher rate of NIV use, compared to the 2 previous studies. Possible reasons were the more common availability of NIV equipment in the hospital and the presence of RTs in up to 90% of the cases, compared to European EDs, in which emergency physicians were responsible for the NIV in the majority of cases.^{17,18} Thus, the RTs, having better training and experience, could have started NIV more frequently, compared to physicians.

In contrast to the good clinical evidence regarding the use of NIV in COPD and in CHF patients,³⁻⁵ data to support NIV in other clinical conditions are still lacking.⁶⁻⁸ The results of the present surveys agree well with available data, because more than 60% of respondents reported use of NIV as the first-line option only in these 2 categories of patients, and acknowledged that NIV was a reasonable therapy. However many respondents believed that NIV was employed less often than was clinically indicated. NIV also requires more time than conventional therapy for interface fitting and ventilatory setting.² In addition, great disparities existed among the centers regarding the clinical indications and management of NIV.^{14-17,19} Thus, several patients could have been treated with NIV erroneously, increasing the risk of failure and requiring invasive mechanical ventilation.

In the majority of settings a non-critical-care ventilator equipped with an oronasal face mask was the initial equipment for NIV. Non-critical-care ventilators are the preferred ventilators due to the lower cost and ease of use, compared to critical-care ventilators. The use of an oronasal face mask seem a logical solution to maximize the NIV efficacy, because dyspneic patients are mouth-breathers, thus predisposing to a lower leakage, compared to nasal mask.²⁰ However during long-term use the face mask can be poorly tolerated, thus causing a premature NIV interruption.¹³

Although NIV is increasingly being used, especially in EDs, for exacerbation of COPD and CHF, great variations in clinical practice are still present; thus, clear guidelines associated with education and training programs will be welcome.

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