

# Predicting survival after acute exacerbation chronic obstructive pulmonary disease (ACOPD): is long-term application of noninvasive ventilation the last life guard?

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## Dear editor

Patients with acute chronic obstructive pulmonary disease (ACOPD) admitted to an intensive care unit (ICU) still show substantial high hospital mortality (24%).<sup>1</sup> After ICU discharge, long-term application noninvasive ventilation (NIV) may be a reasonable and effective indication.<sup>2</sup> However, hospital mortality shows higher mortality rates for patients with COPD surviving their first episode after 2 and 5 years.<sup>2,3</sup>

Some patients with ventilatory failure at hospital discharge have increased arterial carbon dioxide tension (PaCO<sub>2</sub>), dyspnea, and reduced inspiratory muscle strength, compared with those of a normal patient. This is especially interesting for severe stable hypercapnic COPD, which can benefit substantially from using NIV, particularly showing improvements in gas change, dyspnea, and sleep quality.

Currently, describing long-term survival in COPD patients receiving long-term NIV is a difficult issue. Titlestad et al analyzed the long-term survival rate in COPD patients receiving NIV for acute respiratory failure.<sup>3</sup> We have read with interest this original and important epidemiological study that reports a 5-year mortality rate of 23.7%, and highlights the effects of NIV, with a trend toward more female mortality than male.

However, we consider that it could be useful to add some aspects that are currently lacking, which could be analyzed and remarked on separately to understand this high mortality.

First, there is a lack of relevant information on initial hospital admission that may influence higher mortality and could be interesting to take into account, such as: (a) rate of development of non-respiratory organ system dysfunction;<sup>1</sup> (b) if there are some correlations with inspiratory pressure levels and adherence with NIV that have shown strength implications for long-term survival;<sup>4</sup> (c) previous history of mechanical ventilation (MV); and (d) nutritional status and body mass index.<sup>5</sup>

Secondly, after hospital discharge, some aspects could be relevant to take into account. One study suggests that home NIV allows a lasting physiological stabilization in selected COPD patients, particularly those with an advanced disease, by reducing hypercapnia and improving inspiratory capacity.<sup>9</sup> Further, in Titlestad et al's article parameters of efficacy of home non invasive mechanical ventilation in non-survivors of COPD are unknown

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and may explain higher mortality;<sup>3</sup> it could be interesting to know if there were some subgroups of COPD patients who remained at a hypercapnic high level after hospital discharge. In addition, for previous studies, prior domiciliary oxygen was a key predictor of 5-year mortality.<sup>5</sup>

Thirdly, it is very important to know the rate of readmission during this time, as after a severe ACOPD exacerbation, health conditions rapidly deteriorate.<sup>10</sup>

In this scenario of higher mortality, we need more solid scores after ACOPD to predict mortality and assess the protective role of long-term NIV application. Further large international surveys should be encouraged in order to consolidate new mortality prediction models, and discover whether the long-term application of NIV is the last life guard.

## Disclosure

The authors report no conflicts of interest in this communication.

## References

1. Seneff MG, Wagner DP, Wagner RP, Zimmerman JE, Knaus WA. Hospital and 1-year survival of patients admitted to intensive care units with acute exacerbation of chronic obstructive pulmonary disease. *JAMA*. 1995;274(23):1852–1857.
2. Oscroft NS, Quinell TG, Shneerson JM, Smith IE. Long-term non-invasive ventilation to manage persistent ventilatory failure after COPD exacerbation. *Respirology*. 2010;15(5):818–822.
3. Titlestad IL, Lassen AT, Vestbo J. Long-term survival for COPD patients receiving noninvasive ventilation for acute respiratory failure. *Int J Chron Obstruct Pulmon Dis*. 2013;8:215–219.
4. Budweiser S, Hitzl AP, Jörres RA, et al. Impact of noninvasive home ventilation on long-term survival in chronic hypercapnic COPD: a prospective observational study. *Int J Clin Pract*. 2007;61(9):1516–1522.
5. Chung LP, Winship P, Phung S, Lake F, Waterer G. Five-year outcome in COPD patients after their first episode of acute exacerbation treated with non-invasive ventilation. *Respirology*. 2010;15(7):1084–1091.
6. Ai-Ping C, Lee KH, Lim TK. In-hospital and 5-year mortality of patients treated in the ICU for acute exacerbation of COPD: a retrospective study. *Chest*. 2005;128(2):518–524.
7. Funk GC, Breyer MK, Burghuber OC, et al. Long-term non-invasive ventilation in COPD after acute-on-chronic respiratory failure. *Respir Med*. 2011;105(3):427–434.
8. Lamia B, Cuvelier A, Benichou J, Muir JF. [A multi-centre randomized controlled trial of domiciliary non-invasive ventilation vs long-term oxygen therapy in survivors of acute hypercapnic respiratory failure due to COPD. Non-invasive ventilation in obstructive lung disease (NIVOLD) study.] *Rev Mal Respir*. 2012;29(9):1141–1148. French [with English abstract].
9. Thibout Y, Philit F, Freymond N, Petitjean T, Nesme P, Guerin C. [Outcome in COPD patients treated with at-home, long-term, non-invasive ventilation.] *Rev Mal Respir*. 2006;23(5 Pt 1):438–444. French [with English abstract].
10. Suissa S, Dell'Aniello S, Ernst P. Long-term natural history of chronic obstructive pulmonary disease: severe exacerbations and mortality. *Thorax*. 2012;67(11):957–963.

## Authors' reply

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## Dear editor

We thank Dr Esquinas and his colleagues for their interest and comments on our article on “Long-term survival for COPD patients receiving noninvasive ventilation for acute respiratory failure” where we report a 23.7% 5-year survival.

The patients included in this study were primarily COPD patients treated in a non-ICU setting. The study was a retrospective study, with data obtained from patient records, and the primary drawback of the study the lack of systematic data on reported patient values and blood analyses.

To address the first question about data on non-respiratory organ failure: patients with multi-organ failure were primarily

admitted to the ICU unless there was an order of “not-to-intubate” and/or it was considered that the patient would not benefit from the intensified treatment. Patients admitted to the ICU directly were not included in this study. Unfortunately, we have no data on inspiratory positive airway pressure levels (IPAP) and adherence, nor on previous mechanical ventilation.

At the time period of our study, home treatment with NIV was not an option. There is presently an ongoing study in Denmark on home treatment in selected patients.<sup>1</sup> Many of our COPD patients had chronic hypercapnia when discharged from the hospital and long-term oxygen therapy was prescribed if the patients fulfilled the standard criteria with chronic hypoxemia ( $pO_2 < 7.3$  kPa or  $pO_2 < 8.0$  kPa with present cor pulmonale) according to guidelines.

We fully agree that we need more solid scores after ACOPD to predict mortality and we await the results from the Danish study on long-term application of NIV as well as other studies in this area.

## Disclosure

The authors report no conflicts of interest in this communication.

## Reference

1. University Hospital, Gentofte, Copenhagen. Home Non Invasive Ventilation (NIV) Treatment for COPD-patients After a NIV-treated Exacerbation. Available from: <http://clinicaltrials.gov/ct2/show/NCT01513655>. NLM identifier: NCT01513655. Accessed July 1, 2013.

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