

# COPD exacerbations admitted to intensive care unit. Organization, mortality, and noninvasive or invasive mechanical ventilation strategies: are they sufficiently well known?

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## Dear editor

We read with interest the survival analysis of chronic obstructive pulmonary disease (COPD) patients who are admitted to critical care units with exacerbation, conducted in Saudi Arabia by Alaithan et al.<sup>1</sup> This study makes an important contribution on the real practice of intensive care units (ICUs). The authors, in the overall results, provided some great information similar in some aspects to previous epidemiologic surveys where a low level of consciousness on admission, need for endotracheal intubation (ETI), being a current smoker, cardiopulmonary arrest, tracheostomy, and development of acute renal failure are associated with higher ICU and hospital mortality. Although, study design showed some limitations with respect to interpretation predictors of mortality, there are aspects that differ compared to previous studies in this area that could be taken into account for clinical and practical implications.

First, there are no references regarding protocols of noninvasive mechanical (NIV) or invasive mechanical ventilation (IMV) implementation to ICU admissions, for example, where and how these mechanical ventilation options were performed at first line in the emergency departments. Additionally, there were not clearly defined criteria of applications, places or severity of exacerbation of COPD among participating ICUs. After endotracheal intubation (ETI) and IMV, the rate of successful weaning, prolonged mechanical ventilation, or tracheostomy practices are lacking. These are well known predictive factors associated with COPD in ICU and hospital mortality.<sup>2,3</sup> Interestingly, Alaithan et al did not consider COPD as a comorbidity associated with other indications of NIV or IMV.<sup>4,5</sup>

Second, a relevant aspect that could influence hospital practices and COPD outcomes in this study<sup>1</sup> was that only 55% of COPD exacerbations received NIV as initial first line treatment and assumed that the remaining patients received oxygen therapy alone. These data may have health care implications for ICUs, because it could be reflecting three potential scenarios: (1) delayed NIV applications, (2) staff training and skills, or (3) limited access to the NIV therapy (the availability of beds in ICU ward). These factors are related to COPD exacerbation and mortality and escape NIV international recommendations during exacerbations of COPD, an important epidemiological factor in this study.<sup>6</sup>

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Third, the low rate of COPD hospital mortality (11%) and ICU mortality (6%) is lower than other studies and may be influenced by these aforementioned factors. However, there are other factors with recognized influence that were not analyzed, such as body mass index (BMI),<sup>7</sup> lower health status, nutritional status, or nonrespiratory organ system dysfunction.<sup>2,3,8</sup> Alaithan et al<sup>1</sup> considered that ICU mortality was associated with a longer duration of mechanical ventilation and lower Acute Physiology and Chronic Health Evaluation II (APACHE II)<sup>2,3</sup> score, but this is a controversial aspect by other epidemiological published studies.<sup>2,3</sup> Additionally, COPD readmissions,<sup>7,8</sup> existence of do not-ETI orders, and NIV palliative in severe exacerbation of COPD, were not taken into account.<sup>9</sup>

The study highlights the complexity of the epidemiological aspects that may affect attendance, prognosis, and mortality in different health systems.<sup>8,9</sup> Revealing the diversity of factors that affect NIV and IMV possibilities. Further studies are required to determine sensitive factors that could be modifiable that influence ICU admission criteria, prognosis, and mortality.

## Disclosure

The author reports no conflicts of interest in this communication.

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## Author's reply

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## Dear editor

Thank you for the opportunity to answer the letter of Dr Esquinas on our article.<sup>1</sup>

First of all we would like to thank Dr Esquinas for his interest in our paper. We believe that some of the comments raised in the letter are valuable and thought-provoking in various aspects. Likewise some of the comments made may be arising from misunderstanding of the information presented in our paper. Dr Esquinas has raised some major concerns and our responses to these concerns are as follows.

- First, regarding the lack of any reported protocol for noninvasive positive pressure ventilation (NIPPV) or invasive mechanical ventilation (IMV) at our hospital. There was no specific protocol in place to assist clinicians in deciding on the mode of ventilation; nevertheless, all intensivists working at the study hospital used clinical judgment in addition to well-established criteria

while deciding on the mode of ventilation in a particular patient.<sup>2</sup>

- Another concern raised was of not including chronic obstructive pulmonary disease (COPD) as comorbidity in our study. We believe that this comment is simply based on some misunderstanding as the actual study was about the COPD patients, and as such all patients have COPD to start with.
- The third concern raised by Dr Esquinas was regarding the relatively high number of patients offered oxygen as a treatment option, and who might have stayed a long time outside ICU before they received the appropriate treatment. It is important to note that the majority of patients (96%) were admitted from the emergency department immediately to the intensive care unit, and presented in severe respiratory distress. Moreover, 88% of our patients were offered either IMV or NIPPV as the first treatment option.
- The last major concern raised by the Dr Esquinas was non-inclusion of various factors that would have been played a role on the outcome of our patients such as: BMI; socioeconomic status, and nutritional status, to mention a few. Unfortunately our study did not address such modifiers and we do agree with Dr Esquinas that such factors may have been important variables in affecting study outcomes.

## Disclosure

The author reports no conflicts of interest in this communication.

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