

Failure of noninvasive ventilation during hypercapnic exacerbation of chronic obstructive pulmonary disease: the role of chronic kidney diseases

To the Editor We read with great interest the paper by Nicolini et al.¹ In the article, the authors clearly showed that patients with fewer comorbidities, less severe illness, and improvement in arterial blood gas parameters within 1 hour, were more likely to have a successful outcome.

These data are very interesting; however, among the most frequent comorbidities in patients with chronic obstructive pulmonary disease (COPD), we would like to emphasize the role of chronic kidney diseases as an important factor related to noninvasive ventilation (NIV) failure. In a recent study, Miller et al.² demonstrated, in a similar population, that patients who had lower urea levels at baseline showed an improvement in pH within 1 hour and were more likely to have a good outcome when undergoing NIV for a hypercapnic exacerbation of COPD.² The latter data confirm our previous results obtained in a study performed on a population of COPD patients admitted to undergo NIV for acute exacerbation.³ In particular, our study demonstrated that the failure of NIV in the acute exacerbation of COPD might be also related to the presence of chronic kidney disease, independently of the arterial blood gas parameters.

Taken these data together, we encourage the authors to carefully evaluate renal function and the urinary system before starting NIV during acute exacerbation of COPD. The presence of chronic kidney disease might indeed represent a crucial risk factor predicting the poor outcome, or even failure, of NIV.

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REFERENCES

- 1 Nicolini A, Ferrera L, Santo M, et al. Noninvasive ventilation for hypercapnic exacerbation of chronic obstructive pulmonary disease: factors related to noninvasive ventilation failure. *Pol Arch Med Wewn.* 2014; 124: 525-531.
- 2 Miller D, Fraser K, Murray I, et al. Predicting survival following non-invasive ventilation for hypercapnic exacerbations of chronic obstructive pulmonary disease. *Int J Clin Pract.* 2012; 66: 434-437.
- 3 Carratù P, Bonfitto P, Dragonieri S, et al. Early and late failure of noninvasive ventilation in chronic obstructive pulmonary disease with acute exacerbation. *Eur J Clin Invest.* 2005; 35: 404-409.

Authors' reply We appreciate your insightful comments regarding our study. We are aware that, in clinical practice, chronic kidney disease could be an important factor related to the failure of noninvasive ventilation (NIV) as demonstrated by Miller et al.¹ and Carratù et al.² Recently, Pacilli et al.³ investigated the effect of comorbidities on the outcome of patients with chronic obstructive pulmonary disease admitted to a respiratory intensive care unit. They did not observe any statistical difference between the outcomes of patients with moderate or severe renal failure or those without renal failure.

The debate continues because few studies investigated the impact of any single comorbidity in this clinical setting.³ Unfortunately, in our study, we assessed only the presence or absence of comorbidities, without investigating their type or number in individual patients and their role in determining NIV failure. This was acknowledged as a limitation of the study.⁴ In our opinion, as based on the results of some previous studies^{5,6}, the expertise of a team is of key importance to appropriately establish the timing of NIV, risk factors, and also potential treatment modes.⁷ The presence of chronic kidney disease is likely

to represent an important parameter to be considered and evaluated by clinicians before starting NIV, but it should not be a contraindication to NIV or a well-established predictor of its failure.

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REFERENCES

- 1 Miller D, Fraser K, Murray I, et al. Predicting survival following non-invasive ventilation for hypercapnic exacerbations of chronic obstructive pulmonary disease. *Int J Clin Pract.* 2012; 66: 434-437.
- 2 Carratù P, Bonfitto P, Dragonieri S, et al. Early and late failure of noninvasive ventilation in chronic obstructive pulmonary disease with acute exacerbation. *Eur J Clin Invest.* 2005; 35: 404-409.
- 3 Pacilli AM, Valentini I, Carbonara P, et al. Determinants of noninvasive ventilation outcomes during an episode of acute hypercapnic respiratory failure in chronic obstructive pulmonary disease: the effects of comorbidities and causes of respiratory failure. *Biomed Res Int.* 2014; 2014: 976783.
- 4 Nicolini A, Ferrera L, Santo M, et al. Noninvasive ventilation for hypercapnic exacerbation of chronic obstructive pulmonary disease: factors related to noninvasive ventilation failure. *Pol Arch Med Wewn.* 2014; 124: 525-531.
- 5 Carlucci A, Dalmastro M, Rubini F, et al. Changes in practice of noninvasive ventilation in treating COPD patients over 8 years. *Intensive Care Med.* 2003; 29: 419-425.
- 6 Contou D, Fragnoli C, Córdoba-Izquierdo A, et al. Noninvasive ventilation for acute hypercapnic respiratory failure: intubation rate in an experienced unit. *Resp Care.* 2013; 58: 2045-2052.
- 7 Ozyilmaz E, Ozsancak U, Nava S. Timing of noninvasive ventilation failure: causes, risk factors, and potential remedies. *BMC Pulm Med.* 2014; 14: 19.