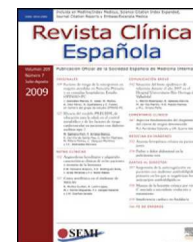


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EDITORIAL

Optimizing both noninvasive ventilation and antimicrobial approach in hematological patients with acute respiratory failure



Optimización de la ventilación no invasiva y el abordaje antimicrobiano en pacientes hematológicos con insuficiencia respiratoria aguda

Over the last 15 years several advances have been made in the early diagnosis and management of patients with various types of malignancies, resulting in a decrease in overall mortality. As underlined by I. Prieto del Portillo, et al. in their review published in the present issue of *Rev Clin Esp*,¹ recent studies suggest that early admission to the intensive care unit (ICU) of oncohematology patients is associated with reduced hospital mortality.^{2,3} Acute respiratory failure (ARF) in immunocompromised patients is a recognized indication of non-invasive ventilation (NIV), and according to international recommendations (of level I), NIV should be used whenever possible in this indication to reduce the risk of nosocomial pneumonia.⁴ Above all, NIV makes it possible to reduce the endotracheal intubation rate and subsequent mortality of oncohematology patients with ARF.⁵ Indeed, despite advances in mechanical ventilation and respiratory support, the hospital mortality in these recipients remains high. In their literature review, Soubani et al. showed clearly that the lower the percentage of patients receiving mechanical ventilation, the higher the survival rate.⁶ In a very recent trial on 199 patients, the multivariate analysis revealed that ≥ 2 organ failures (OR 5.62; 95% CI 2.30–13.70) and mechanical ventilation (OR 3.03; 95% CI 1.33–6.90) were independently associated with in-hospital mortality.⁷ Thus, avoiding intubation remains a major objective in oncohematology patients and one could believe that a trial of ICU support, with treatment of ARF with NIV, should be offered.

The present review deals with the new perspectives in management of cancer patients in ICU.¹ New perspectives clearly include the optimization of both the selection of patients in whom NIV should be performed, and the equipment and techniques used. In an observational trial, NIV proved to be feasible for the treatment of respiratory failure in hematological patients who were at high risk of

intubation-related complications.⁸ Nevertheless, in hematological patients NIV is more indicated at an earlier stage of ARF when the $\text{PaO}_2/\text{FiO}_2$ ratio is below 200 or when oxygen saturation does not reach 90% despite high flow oxygen therapy.⁵ A case-control study on 34 patients was performed to evaluate the effectiveness of early administration of continuous positive airway pressure (CPAP) through a helmet in hematological malignancy patients with ARF.⁹ Each patient was treated by CPAP outside an ICU, directly in the hematological ward. The authors described a success rate as high as possible in patients ventilated with the helmet, while eight NIV failures were registered in the group ventilated with a facemask because of intolerance of this interface. And even, a recent study suggests that early use of CPAP on the hematological ward in patients with early changes in respiratory variables prevents evolution to acute lung injury requiring mechanical ventilation and ICU admission.¹⁰ Managing the patients in a very early stage of ARF (with $\text{PaO}_2/\text{FiO}_2$ levels between 200 and 300 instead of below 200) outside the ICU offers an interesting perspective that could be tested in a large randomized controlled trial.

Undoubtedly, ARF in hematological patients belongs to the indications for NIV which requires experience and good mastery of the technique. The time suitable to appreciate improvement or, contrarily, NIV failure may depend on many factors. Patients in whom ARF does not resolve at 1–2 h are most in need of efforts to try improving their adaptation to NIV and the outcome. Thus, it is important to consider if it could be possible to ameliorate several factors to improve adaptation of the patient to NIV and the outcome of the technique. Many factors must be considered when pressure support and PEEP are used, and particular attention should be given to the leaks responsible of ineffective efforts during persistent insufflations; several adjustments can eliminate prolonged inspiration by reducing either the leaks or the

ventilator insufflation time.¹¹ We believe the first hours of delivering NIV, with careful attention to mask fit, patient comfort and patient-ventilator synchrony, represent a critical opportunity to improve outcome.

The new perspectives in management of cancer patients in ICU include also optimization of the antimicrobial approach. The risk of death is higher when the cause of ARF remains unknown in cancer patients, and the cause of ARF must be identified.^{5,12} Over the past few years, lung computed tomography has become one of the most important diagnostic tools for aspergillosis in patients with hematological malignancy.¹³ Noninvasive tests on sputum, induced sputum, nasopharyngeal aspirates, serum, and urine are now performed routinely. Serologic testing techniques based on the detection of circulating fungal cell wall components, such as galactomannan or β -D-glucan, and detection of circulating fungal DNA by PCR techniques hold promise. However, fiberoptic bronchoscopy and bronchoalveolar lavage (FOB-BAL) is the cornerstone of the etiologic diagnosis; in addition, a multicenter randomized controlled trial demonstrated that FOB-BAL performed in the ICU did not significantly increase intubation requirements in critically ill cancer patients with ARF.¹²

In a randomized study the effect on outcomes of the presence and the absence of a final diagnosis of the cause of pneumonitis with ARF was studied.⁵ In the NIV group, the patients with a final diagnosis had significantly lower rates of intubation ($p=0.03$), and death in the ICU ($p=0.04$) or in the hospital ($p=0.006$). Thus, a positive diagnosis and a well-adapted treatment could be the main determinants of improved outcome of immunosuppressed patients managed with NIV. In a recent prospective randomized trial on 26 patients, NIV was shown superior to conventional oxygen supplementation in preventing gas exchange deterioration and provided better hemodynamic tolerance during FOB-BAL.¹⁴ However, this procedure remains uncomfortable, and the patient's agitation may lead to desaturation and compromise the performance of BAL. Sedation could prevent desaturation and improve the success rate of the procedure.¹⁵

The early involvement of intensivists in hematological patients' care, the better definitions of patients who require ICU admission, and optimizing both NIV and antimicrobial will probably play a major role in the future.

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