

Seriously, Should We Be Treating Severe ARDS With High-Flow Nasal Cannula Oxygen?

To the Editor:

We have read with interest the RESPIRATORY CARE article entitled "Use of high-flow nasal cannula oxygen therapy in subjects with ARDS: a 1-year observational study".¹ We are surprised that, compared with an overall mortality of 29%, the mortality in the group treated with high-flow nasal cannula (HFNC) oxygen therapy and subsequently needing intubation was 50%. This is close to the value determined by Antonelli et al² in 2007: 56% mortality in subjects treated with noninvasive ventilation (NIV) and finally intubated due to NIV failure. Because there was a possible delay in the intubation of these subjects the result was a higher mortality rate. In addition, mortality could have been prevented if, instead of being treated with NIV, patients with ARDS were initially intubated and treated with the open-lung strategy with high PEEP.³

The current mortality due to ARDS varies between 20 and 60% depending on many factors, but there is a clear relationship that has been established between the level of PEEP, the P_{aO_2}/F_{IO_2} that is reached with this PEEP, and mortality.⁴ Thus, in patients intubated and ventilated with a PEEP of > 10 cm H_2O , if the P_{aO_2}/F_{IO_2} is < 150 , the mortality rate is 60.3%, which is very similar to the rate found by Antonelli et al² in subjects with delayed intubation.

In ARDS, the ventilation strategy is aimed at reducing the intrapulmonary shunt with the use of continuous distending pressure. Due to the high rate of associated failure and secondary mortality, there are some physicians who advise against the continuation of NIV in patients with ARDS if, after 1 h of treatment, oxygenation has not improved to a P_{aO_2}/F_{IO_2} of > 175 ² (the intrapulmonary shunt when $P_{aO_2}/F_{IO_2} > 175$ is $\sim 35\%$).⁵ In recent clinical trials involving hypoxemic respiratory failure in the pediatric population, HFNC was not shown to have better results than standard low-flow oxygen therapy,⁶ and both therapies had a higher mortality rate than CPAP therapy.⁷

In mild hypoxemic situations, although NIV produces better oxygenation, HFNC is subjectively better tolerated, and it can be considered as a reasonable alternative ther-

apy.⁸ However, we disagree with the use of HFNC in moderate or severe ARDS (P_{aO_2}/F_{IO_2} of < 200). ARDS is a clinical condition with high mortality. If the decision to use NIV is made, it should be started with CPAP or bi-level positive airway pressure. However, if an improvement in oxygenation (P_{aO_2}/F_{IO_2} of > 175) is not obtained after 1 h of NIV, the patient should be intubated to improve the level of recruitment and to minimize the intrapulmonary shunt.

So the question now is, are we sure that using HFNC initially, instead of conventional mechanical ventilation in patients with severe ARDS, does not increase mortality? In our opinion, the answer is no. If, as patients, we happened to have severe ARDS, we would definitely choose conventional mechanical ventilation from the very beginning.

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Seriously, Should We Be Treating Severe ARDS With High-Flow Nasal Cannula Oxygen?—Reply

In Reply:

We thank Drs Medina-Villanueva and Modesto i Alapont for their interest in our work.¹ They question the use of high-flow nasal cannula (HFNC) oxygen for the management of ARDS. The crucial point missed by Drs Medina-Villanueva and Modesto i Alapont is the basic philosophy of acute respiratory failure management.

We know that not all patients who are ultimately diagnosed with ARDS immediately fulfill all ARDS criteria. In addition, not all patients with ARDS arrive already intubated in the ICU, and not all of them present with immediate intubation criteria. This means that a significant proportion of patients arrive in the ICU with severe acute respiratory failure, still breathing spontaneously, usually with supplemental oxygen administered via a face mask. Hence, until recently, clinicians could choose from 3 options: immediately intubate (even in the absence of intubation criteria as suggested by Drs Medina-Villanueva and Modesto i Alapont), initiate noninvasive ventilation (NIV), or continue conventional oxygenation.

We contend that there is now a fourth option, which is the use of HFNC. There is ample evidence that HFNC performs better than a conventional face mask in these subjects.²⁻⁴ There are now convincing data demonstrating that HFNC performs better than NIV⁵ and that a certain degree of ventilator-induced lung injury may occur with NIV.⁶ Thus, the initial management of ARDS in the ICU, before intubation, should preferably be done with HFNC.

Drs Medina-Villanueva and Modesto i Alapont further imply that our mortality rate is high and cite the study by Amato et al⁷ and the so-called benefit of their open-lung strategy. A more serious interpretation of the study by Amato et al is that their observed difference in mortality was the result of an excessive mortality in the control group and not a reduction obtained with the open-lung strategy.⁸

The risk of unduly delaying intubation and increasing mortality in patients subsequently intubated as observed with NIV in de novo acute respiratory failure is a legitimate concern.⁹ However, a more serious analysis of our study and a better knowledge of the literature indicate that this situation may not have been encountered in our study. Mean durations of NIV associated with excess mortality due to delayed intubation exceeded 75 h!¹⁰ In one study,¹⁰ NIV duration in subjects who ultimately required intubation was considerably longer in subjects who died than in those who survived (78 vs 32 h). Our figures are totally opposite: not only was our median duration of HFNC in the case of failure much shorter (20 h) than reported with NIV, but importantly, it was shorter in subjects who failed than in those who succeeded with HFNC (20 vs 32 h). Finally, HFNC duration in subjects who required intubation was identical in those who ultimately died and those who survived. Thus, we contend that our subjects were intubated in a timely fashion when intubation criteria were met.

An additional benefit of HFNC is the use of a single device to manage patients in acute respiratory failure, from ICU admission up to intubation, where recent data suggest that pre-oxygenation is improved with HFNC.¹¹ Cogent analysis and interpretation

of medical literature are difficult skills and a serious matter.

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