Preoxygenation With High-Flow Nasal Cannula: Benefits of Its Extended Use During the Process of Intubation

To the Editor:

We applaud Simon et al¹ for the study published in *RESPIRATORY CARE* comparing high-flow nasal cannula (HFNC) and bag-valve-mask ventilation. However, we would like to emphasize several points.

First, a significant increase in S_{pO_2} after preoxygenation with HFNC was seen only in the subgroup of subjects previously receiving low-flow oxygen and not in subjects previously receiving noninvasive ventilation or HFNC. The absence of improved S_{pO_2} with HFNC preoxygenation may lead to the wrong conclusion that HFNC preoxygenation is effective only in a certain type of patients. As the authors have briefly discussed, patients previously treated with HFNC and noninvasive ventilation have already had improved lung recruitment related to increased PEEP, and simply the absence of significant desaturation during the apnea phase of intubation already proves a beneficial role of HFNC as a preoxygenation method.

Second, the lack of more significant impact of HFNC in preoxygenation was explained by the lack of ability of subjects to keep the mouth closed during the delivery of high-flow oxygen. This observation led to the conclusion that HFNC may not be adequate for severely hypoxemic patients requiring intubation. The fact is that the authors did not evaluate this “open-mouth factor” and reduction in the level of positive pressure with any objective measurement, so it is impossible to know the relevance of this factor.²

Last, the authors report that there was no significant desaturation during apnea phase before intubation in the HFNC group, as opposed to the bag-valve-mask group. This finding suggests HFNC as a favorable method for preoxygenation. Analyzing the relevance of this finding, it is important to note that subjects in the HFNC group were maintained on HFNC oxygen support after

the preoxygenation period and throughout endotracheal intubation. HFNC offers several benefits in management of respiratory failure during preoxygenation and also throughout the process of endotracheal intubation itself. HFNC offers continuous delivery of high F_{IO_2} , which can help gas exchange and promote apneic oxygenation but also provides a low PEEP effect on alveolar recruitment and upper-airway splinting.³ Given the utility of HFNC for treatment of hypoxemic respiratory failure with benefits in prevention of the intubation rate in certain patients⁴ and for prevention of failure of extubation,⁵ it is already evident that HFNC has become a well-recognized part of the preoxygenation strategy in acute respiratory failure requiring transition to mechanical ventilation. As opposed to other oxygen-delivery methods strictly limited to the preoxygenation process but not maintainable throughout the process of intubation itself (non-rebreathing mask, face mask noninvasive ventilation, bag-valve-mask), HFNC use can be extended through the whole process and all stages of endotracheal intubation. Based on the concept applied in the study of Simon et al,¹ we propose here that future studies focus on HFNC not only as a *preoxygenation method* but rather as *complete preintubation oxygenation support* that encompasses continuous usage of HFNC before and throughout endotracheal intubation. We have previously explored such a concept in a small case series where we tested HFNC⁶ or nasal noninvasive ventilation⁷ as preoxygenation and during-intubation support; both techniques have shown promising results.

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