The authors reply

Audrey de Jong, Samir Jaber

The authors reply:

We thank Pieri et al (1) for their interest in our article (2) recently published in *Critical Care Medicine*.

Pieri et al (1) present a new device called the "Janus mask" able to improve oxygenation by noninvasive ventilation (NIV) during the whole intubation procedure. They underline that it might improve the safety of ICU intubation procedures and, ultimately, improve patients' prognosis. As reported in our study (2), three modifiable risk factors were found to be related to intubation-related cardiac arrest: hypoxemia prior to intubation, hemodynamic failure prior to intubation, and absence of preoxygenation. Several interventions, aiming to reduce the occurrence of these risk factors, may modify the likelihood of intubation-related cardiac arrest. One of the first is to optimize preoxygenation. In a previous study (3), NIV for preoxygenation of patients with severe hypoxemic acute respiratory failure was associated with less hypoxemia than preoxygenation with oxygen facial mask during intubation procedures (3). Associating pressure support with positive end-expiratory pressure (PEEP) limits alveolar collapse and atelectasis formation, responsible for hypoventilation and low perfusion ventilation ratio. Preoxygenation using NIV was included in the Montpellier intubation protocol (4) and combined with hemodynamic optimization. The application of this protocol allowed to reduce intubation-related complications in a beforeafter study (4). However, although NIV can be safely applied for preoxygenation before the intubation procedure, NIV facial mask has to be removed after preoxygenation in order to allow the passage of the orotracheal tube through the mouth. High-flow nasal cannula (HFNC) oxygen, which delivers high-flow heated and humidified oxygen and air, can be continued during the passage of orotracheal tube through the mouth. HFNC can allow apneic oxygenation, continuing blood oxygenation during the apnea period of intubation, especially when the bag-valve mask or NIV facial mask is removed. The technique of preoxygenation associating NIV and HFNC (the OPTINIV method [5]), respectively combining the concepts of prevention of alveolar derecruitment and of apneic oxygenation, was more effective at reducing oxygen desaturation in comparison with the reference method using NIV alone in a recent study (5).

In this context, we totally agree with the authors that Janus mask could be attractive to perform intubation. By providing PEEP and ventilatory support before and during the intubation procedure, the risk and degree of hypoxia, and to a lesser extent the related hemodynamic adverse events, might be reduced. Janus mask could be included in a standardized protocol for difficult intubation (6). In particular, Janus mask could be used to combine NIV and HFNC preoxygenation in the OPTINIV method (5).

Further studies are needed to assess if the use of Janus mask in ICU intubation procedures could help to reduce intubationrelated complications, the greatest among the many threats being the cardiac arrest related to intubation.

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