The authors reply.

Audrey de Jong, Samir Jaber

The authors reply:

We wish to thank Bloomstone et al (1) for their comments in response to our article (2), recently published in *Critical Care Medicine*.

In our multicenter study (2), a total of 1,918 intubation procedures were reported in 64 ICUs from January 2001 to January 2016. After exclusion of cardiac arrests as a reason for admission and/or intubation, 1,847 intubations were included, and 1,550 intubations were performed in observational studies. Among them, 49 intubation-related cardiac arrests were recorded (2.7%; 95% CI [2.0–3.4]). This relative high rate of intubation-related cardiac arrest reflects the real life and practices. As discussed in the article (2) and reported in other studies, effect of delayed intubation (3) in patients under noninvasive ventilation (NIV), high-flow nasal cannula (HFNC), or standard oxygen could be a risk factor for cardiac arrest during intubation procedure. We absolutely agree that early identification and implementation of mechanical ventilation could reduce the risk of intubation-associated cardiac arrest. Indeed, delayed intubation must be avoided, to limit complications associated with intubation and decrease ICU mortality.

We disagree with Bloomstone et al (1) when they state that intubation-related cardiac arrests are not challenging to prevent. As all procedures in ICU, intubation procedure is challenging and associated with high rate of life-threatening complications (4, 5). As accurately stated by Bloomstone et al (1) and in the Discussion section of the article (2), administration of appropriate vasopressors to mitigate the predictable effects of hypnotics is crucial when managing high-risk patients. Optimizing preoxygenation using HFNC oxygenation, ideally associated with NIV as shown in a recent randomized controlled trial (6), also allows to further reduce severe desaturation events during intubation procedure and therefore could reduce intubation-related cardiac arrest.

As underlined by Bloomstone et al (1), 69% of the patients were cared for by anesthesiologists. In the ICUs participating to the study, the presence of a senior physician is mandatory 24 hours a day, each day of the week. One physician trained to the intubation procedure, and the use of a fiber optic tool was available all the time.

Finally, Bloomstone et al (1) concluded that standardized difficult airway alerts, written communication of a patient's prior difficult airway, and airway management algorithms could improve patient safety. We totally agree as this could help to prevent the main modifiable risk factors for intubation-related cardiac arrest found in our study (2): low systolic blood pressure prior to intubation, hypoxemia prior to intubation, and absence of preoxygenation before intubation procedure. An intubation algorithm aiming to improve hemodynamic status and minimize hypoxemia might prevent intubation-related cardiac arrest and thereby decrease 28-day mortality of ICU patients with invasive mechanical ventilation.

The authors have disclosed that they do not have any potential conflicts of interest.

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