Authors have nothing to disclose with regard to commercial support.

slight infiltration. In several clinical investigations^{2,3} including the current study of Miura and colleagues,¹ RAS of at least 2 was used as a cutoff point for atelectasis. If this is the case, the proportion of patients with RAS of 1 or less at intensive care unit discharge would be comparable (0/18 vs 2/16; $P = .214$ by Fisher exact test). Third, in the recruitment group, patients received recruitment maneuver during the noninvasive ventilation session with positive end-expiratory pressure (PEEP) of 15 cm H₂O for 2 minutes, 20 cm H₂O for 2 minutes, and then returning to 8 cm H₂O for the remainder. Air leakage is unavoidable during the noninvasive ventilation process, which may lead to a lower PEEP than the set level. More importantly, appropriate PEEP to maintaining lung inflation is a key point during recruitment maneuver. Miura and colleagues¹ should describe how the PEEP of 8 cm H₂O was selected in this trial, such as the lower inflection point in the pressure-volume curve strategy.⁴

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RECRUITMENT MANEUVER MIGHT BE AN OPTION FOR PATIENTS WITH HYPOXEMIA AND ATELECTASIS

Reply to the Editor:

We thank Mr Jiang and colleagues for their interest in our study and we will try to respond to the raised issues.

We acknowledge that the intensive care unit (ICU) team might not be blind to the allocation, although patients from

both groups were submitted to noninvasive ventilation (NIV), because the ventilator parameters needed to be modified during the application of recruitment maneuver, and, as we stated, sometimes it was necessary to hold the mask on patient's face to prevent air leakage. This was stated as a limitation in the report.¹ However, we think it is very unlikely that this could have influenced the evaluation of oxygen arterial pressure (PaO₂), because the researchers did not choose the timing of the PaO₂ assessment. Although the ICU team might not be blind to the patient allocation, PaO₂ is an objective parameter. Besides, the arterial blood gas sample was collected as part of the ICU routine by the laboratory staff. The schedule of blood samples was standardized and was not chosen either by the researchers, or by the ICU staff.

In our study, initial PaO₂ was the first arterial blood sample collected after extubation and the final PaO₂ was the last before ICU discharge. It is important to emphasize that both groups used NIV, besides the time factor, meaning that patients were expected to improve oxygenation. However, we could observe an increase of $12.6 \pm 6.8\%$ of PaO₂ in the control group and $23.3 \pm 8.5\%$ in the recruitment group ($P < .001$). As stated in the study, we used a difference higher than 10% between groups in PaO₂ improvement in the sample size calculation.

Regarding the same subject, the use of oxygen therapy followed the ICU standards, and it was on the basis of arterial blood gas and on the patient's oxygen saturation. Although arterial blood gas evaluates PaO₂ in a specific time, peripheral oxygen saturation is evaluated continuously in the ICU and during the day, it is the parameter that the ICU team uses to indicate the use of oxygen therapy. In our ICU, oxygen is administered by the ICU staff to all of the patients who present peripheral oxygen saturation lower than 92%. Despite small in absolute values, the difference in PaO₂ might be enough for peripheral oxygen saturation that would or would not indicate the use of oxygen therapy during the clinical course of the patients, especially in specific conditions such as acidosis. Additionally, the difference in the length of supplementary oxygen use was found also after ICU discharge, during the ward stay. The ward team, including medical, nursing, and physiotherapy, was not aware of the participation of the patient in the study, therefore, was not aware of the allocation group of the patients. The care team based administration of oxygen on clinical criteria and the researchers were not involved in this decision.

In the matter of the difference in radiologic atelectasis score (RAS), we used a cutoff point of RAS ≥ 2 because we did not think that it would be reasonable to use a recruitment maneuver² in patients with a lower score; however, it does not mean that it is not clinically significant. The fact that we found difference in the time of oxygen use indicate lower levels of atelectasis is related to better oxygenation.

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We can consider a reduction in health care costs by using less oxygen. Although the study has not been designed for this purpose, an internal analysis showed that for the 19 patients who presented $RAS = 0$, mean PaO_2 was 72.3 ± 7.9 mm Hg, and for the 13 patients who presented $RAS = 1$, mean PaO_2 was 65.4 ± 7.1 mm Hg ($P = .017$).

About the possibility of lower levels of positive end-expiratory pressure during the recruitment maneuver, we do acknowledge this possibility; in fact, we did state this as a limitation. This issue exists in clinical practice, even if no recruitment maneuver is applied. We cannot be 100% sure of the exact pressure reached in the respiratory system during NIV. As reported in the article, we used the strategy of holding the mask against the patient's face to reduce the chance of air leakage, when NIV therapy was performed with a presence of a physiotherapist as routine of the ICU.

The positive end-expiratory pressure (PEEP) value was not calculated according to patient's respiratory system mechanics, because patients were submitted to the intervention after extubation, so they were awake and spontaneously breathing. Thus, we could not perform a pressure-volume curve strategy to titrate PEEP.³ The level of 8 cm H_2O was chosen because this is the level routinely used in our service. To avoid the bias of one more variable, we choose to maintain the PEEP level that would be used for patients in the control group. There was already an institutional protocol to use 30 minutes of NIV in hypoxemic patients with a ratio of arterial oxygen partial pressure to fraction of inspired oxygen <300 , so in our study we only added the recruitment maneuver in steps until 20 cm H_2O to verify whether there would be an improvement in the oxygenation and radiological image compared with the control group.

Finally, one of the outcomes of our study was hemodynamic instability because we were interested in safety. For obvious reasons, we did not include patients who already were unstable. Among the patients who were included in the study, hemodynamic instability was not observed in any of them, as stated in the Results.

We agree with Mr Jiang and colleagues that PEEP should be individualized in clinical practice; however, because this study aimed to compare exactly the use of higher levels of PEEP, it needed to be previously defined and be uniform. We do not intend to state that all coronary artery bypass grafting should be submitted to a recruitment maneuver during NIV, but this was a clinical trial, therefore, the intervention group received the recruitment maneuver. To our knowledge, this was the first study of this nature, and we

agree that further knowledge will help in the definition of the benefits of this intervention (ie, we agree that the benefit of the recruitment maneuver during NIV must still be studied, as it is with most subjects). However, our results showed that the recruitment maneuver during NIV might be a strategy for coronary artery bypass grafting patients who are hypoxemic and present atelectasis. Although our study was not designed for follow-up after hospital discharge we believe that the postoperative cardiac patients can benefit from an earlier lung resolution, when pulmonary impairment is described recurrent even months after surgery.⁴

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