Intraoperative Mechanical Power: Comment

Sichuan University, Chengdu, China (X.L.).
xuemeilin__scu@163.com

DOI: 10.1097/ALN.0000000000005129

To the Editor:

We read with great interest the article by Elefterion *et al.*[1] titled "Intraoperative Mechanical Power and Postoperative Pulmonary Complications in Noncardiothoracic Elective Surgery Patients: A 10-Year Retrospective Cohort Study" published in the March 2024 issue of Anesthesiology. The study found that lower tidal volume of predicted body weight, decreased dynamic respiratory system compliance, and increased mechanical power, as well as decreased pulse oxygen saturation, are independently associated with postoperative pulmonary complications. We appreciate the authors' great work. However, we also have a question, and we would like to raise it with the investigators for discussion.

The article collected the fractional inspired oxygen tension as one of ventilation parameters in the section of "Exposures." However, the study did not indicate whether the difference in intraoperative fraction of inspired oxygen (F_{IO_2}) between the two groups was statistically significant or considered F_{IO_2} as a confounding factor for adjustment by using a logistic regression in statistical analysis. There have been so many studies suggesting that high F_{IO_2} was associated with the increasing rate of absorption atelectasis and damaging pulmonary gas exchange, which may cause postoperative pulmonary adverse events, and we did not think it should be omitted if it could be available.[2–4]

However, because some studies failed to find the positive effects of low F_{IO_2} to high, the relationship between F_{IO_2} and postoperative pulmonary complications remains controversial.[5] We believe that if the F_{IO_2} was also standardized in the study design as one of the ventilator parameters, the results of this study could have been more informative and conclusive.

Competing Interests

The authors declare no competing interests.

Xiao Deng, M.M., Hao Li, M.D., Xuemei Lin, M.D.

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The article processing charge was funded by the authors.

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(Accepted for publication June 6, 2024.)

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In Reply:

We thank Deng *et al.* for their interest[1] in our recently published article, "Intraoperative Mechanical Power and Postoperative Pulmonary Complications in Noncardiothoracic Elective Surgery Patients: A 10-Year Retrospective Cohort Study."[2] Indeed, the fraction of inspired oxygen (F_{IO_2}) was recorded but not extracted nor analyzed. Our statistical analysis plan did not include

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the study of F_{IO_2} because we chose to use oxygen saturation measured by pulse oximetry (S_{pO_2}) instead. In our center, the systematic intraoperative use of high F_{IO_2} (greater than 0.8) has never been implemented. F_{IO_2} at 0.5 has been the usual practice until recently, when lower values, titrated to maintain S_{pO_2} greater than 95%, have been in use. We therefore believed that F_{IO_2} information constrained in most cases to a very limited range around 0.5 would not be informative. In contrast, several studies have demonstrated the importance of intraoperative S_{pO_2} in the occurrence of postoperative pulmonary complications. In the study by Hino *et al.*, the pulmonary Apgar score (which includes intraoperative S_{pO_2}) was able to predict pulmonary complications.[3] More recently, Song *et al.* showed, in a geriatric patient population, that the occurrence of hypoxemia (indicated by low S_{pO_2}) was predictive of postoperative hypoxemia.[4] Therefore, we decided to use episodes of desaturation with S_{pO_2} less than 96% as a more informative variable for assessing intraoperative pulmonary complications and potential confounding factors for postoperative pulmonary complications.

Competing Interests

Dr. Cirenei received fees from Grunenthal France (Puteaux, France) for speaking. Dr. Kipnis received fees from Shionigi SAS France (Puteaux, France), MSD France (Puteaux, France), and Pfizer France (Paris, France). He also received consultancy fees from Takeda (Tokyo, Japan). These conflicts of interest are not related to the theme and writing of this study. Dr. Tavernier declares no competing interests.

Cédric Cirenei, M.D., Benoit Tavernier, M.D., Ph.D., Eric Kipnis, M.D., Ph.D.
Lille University Hospital, Lille University, Lille, France (C.C.).
cedric.cirenei@chu-lille.fr

DOI: 10.1097/ALN.0000000000005130

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(Accepted for publication June 6, 2024.)

Lung Strain during Laparoscopies in Children: Comment

To the Editor:

The prospective cohort study by Acosta *et al.*, focusing on the effects of capnoperitoneum on lung strain and stress in children aged 3 to 7 yr, is particularly notable.[1] The significance of atelectasis in healthy children following general anesthesia and mechanical ventilation has attracted considerable interest.[2] This study employs individualized lung recruitment and tailored positive end-expiratory pressure (PEEP) strategies to mitigate atelectasis, demonstrating that lung-protective ventilation can reduce lung strain, albeit with a slight increase in lung stress during laparoscopic surgery.

There is a notable gap in the literature concerning the mechanisms of ventilator-induced lung injury in healthy, anesthetized children. Addressing this, the study utilizes a comprehensive methodology, incorporating ultrasonography, the air-test, and end-expiratory transpulmonary pressure measurements. These noninvasive, reliable techniques allow for the early detection of atelectasis in pediatric surgical patients, enabling timely interventions.[3] Additionally, the study's statistical analysis, especially the use of linear mixed models that include longitudinal patient data, offers improved data interpretation and insights.

However, several areas within this trial necessitate further consideration and improvement. First, the study's relatively small sample size of only 20 children limits the generalizability of its findings. Second, its design as a before-and-after self-controlled observational cohort study may restrict the clinical applicability of the results, highlighting the necessity for a randomized controlled trial. Third, the study's focus on intraoperative data to assess sustained lung function changes leaves questions regarding the impact of individualized lung protective ventilation on postoperative lung function and clinical outcomes. Fourth, the exclusive use of inhaled sevoflurane for anesthesia induction, which can increase patient apprehension and decrease comfort levels, suggests that using propofol for induction in patients who can tolerate

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