Author Reply "Comment on Prediction of Successful Spontaneous Breathing Trial and Extubation of Trachea by Lung Ultrasound in Mechanically Ventilated Patients in Intensive Care"

Lalit Kumar Rajbanshi

Dear Editor,

I am writing in response to the questions raised by your readers regarding our recently published study on the use of lung ultrasound in the determinants of successful spontaneous breathing trials in mechanically ventilated patients.[1] We appreciate the opportunity to address these important inquiries and provide further insights into our research methodology and results.

The lack of significance for B profiles in determining successful spontaneous breathing trials in our study population is an intriguing observation. It is important to emphasize that our research aimed to explore multiple factors that could influence the outcome of spontaneous breathing trials comprehensively.

In the case of B profiles, while they are valuable predictors in some previous studies, our findings may differ due to various reasons. These could include the heterogeneity of the study population, variations in clinical characteristics, or limitations in the sample size. Similar to our study finding, the inadequate sample size in Antonio ACP's study led to suboptimal B-predominance accuracy when attempting to predict weaning success and the likelihood of reintubation within 48 hours.[2] We conducted a quantification of lung profiles in 12 different thoracic zones, based on the predominance of the A, B, or C profiles. However, in our study, we overlooked the significance of differentiating between B lines, which can vary in their characteristics. Some B lines may indicate moderate loss of lung aeration, while others may suggest severe loss of lung tissue due to their profuse coalescence.[2] Taking this differentiation into account could potentially yield more definitive insights into the outcomes of spontaneous breathing trials, leading to a more robust understanding of success or failure in such cases.

Next, the choice to employ multiple logistic regressions instead of univariate analysis was carefully considered based on the objectives and complexity of our study. Univariate analysis could be useful in examining the relationship between individual variables and the outcome, providing a simple understanding of their associations. However, it has limitations, such as not accounting for potential confounding factors that may influence the results. On the other hand, multiple logistic regression allowed us to examine the impact of multiple independent variables on the dependent variable (the outcome) while adjusting for confounding variables. By considering several factors simultaneously, we can better identify

Department of Anesthesiology and Critical Care, Birat Medical College and Teaching Hospital, Biratnagar, Kathmandu, Nepal
Corresponding Author: Lalit Kumar Rajbanshi, Department of Anesthesiology and Critical Care, Birat Medical College and Teaching Hospital, Biratnagar, Kathmandu, Nepal, Phone: +977 9852030496, e-mail: lalitrajbanshi@gmail.com

which variables independently contribute to the outcome and assess their relative strengths.

In our study, we were interested in exploring the combined effects of various factors that might influence the success of spontaneous breathing trials. The utilization of multiple logistic regression allowed us to analyze these factors simultaneously, providing a more comprehensive and robust understanding of their significance in determining the outcome.

One significant limitation in the study, which impacts the accuracy of the outcome regarding the success of spontaneous breathing trials, is the omission of the patient's fluid balance from consideration. This aspect was not taken into account during the study as we focused on specific lung-related parameters rather than incorporating broader factors like fluid balance. Moreover, some of the previous research or established literature did not indicate a strong correlation between fluid balance and spontaneous breathing trial outcomes.[3,4] Thus, we did not deem it essential to include fluid balance in their study. We accept that it represented a crucial factor that could influence the overall results and we genuinely acknowledge this limitation when interpreting the study's findings and considering the potential impact of unmeasured factors on the results.

We hope that our responses have clarified some of the concerns raised by your readers. We would like to express our gratitude for their interest in our research and for encouraging a continued

dialogue on this important topic. Should further questions arise, we remain eager to engage with the scientific community to advance our understanding of successful spontaneous breathing trials and related statistical analyses.

ORCID

Lalit Kumar Rajbanshi ⓘ https://orcid.org/0000-0001-7531-634X

REFERENCES

1. Rajbanshi LK, Bajracharya A, Devkota D. Prediction of successful spontaneous breathing trial and extubation of trachea by lung ultrasound in mechanically ventilated patients in intensive care unit. Indian J Crit Care Med 2023;27(7):482–487. DOI: 10.5005/jp-journals-10071-24487.
2. Antonio ACP, Teixeira C, Castro PS, Savi A, Maccari JG, Oliveira RP, et al. Behavior of lung ultrasound findings during spontaneous breathing trial. Rev Bras Ter Intensiva 2017;29(3):279–286. DOI: 10.5935/0103-507X.20170038.
3. Liu W, Guo H, Wang J, Ding F. Effect of spontaneous breathing trial on extubation in patients with acute exacerbation of chronic obstructive pulmonary disease under mechanical ventilation. BMC Emerg Med 2022;22(1):112. DOI: https://doi.org/10.1186/s12873-022-00672-y.
4. Antonio AC, Teixeira C, Castro PS, Savi A, Oliveira RP, Gazzana MB, et al. 48-hour fluid balance does not predict a successful spontaneous breathing trial. Respir Care 2015;60(8):1091–1096. DOI: 10.4187/respcare.03172.