LETTER TO THE EDITOR

Author Reply: Lung Ultrasound Score—Does It Really Predict Extubation Failure?

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Dear Editor,

We appreciate the readers' keen interest in our article titled "Prediction of successful spontaneous breathing trial and extubation of trachea by lung ultrasound in mechanically ventilated patients in intensive care unit (ICU)".[1] We thank them for their thoughtful comments and would like to address their queries and concerns.

Firstly, the readers rightly point out that extubation failure and reintubation are associated with poor outcomes in the ICU.[2] We agree that the use of lung ultrasound as an adjunctive tool for weaning and extubation readiness assessment holds great promise. Our study aimed to highlight the role of ultrasound in this context.

Regarding the distinction between the spontaneous breathing trial (SBT) and the extubation readiness trial (ERT), we appreciate the clarification. Extubation readiness trial is a structured assessment of spontaneous breathing designed to determine whether the patient is prepared to have the endotracheal tube removed and/or withdraw ventilatory support.[3] In our study, we primarily used SBT as a component of ERT, understanding that successful SBT alone does not necessarily guarantee extubation readiness, as underlying pathologies may persist. One significant limitation in the study, which impacts the accuracy of the outcome regarding the success of spontaneous breathing trials, is the omission of factors like pleural effusion, cardiac involvement, pericardial effusion, volume overload, and diaphragm dysfunction. These factors indeed play crucial roles in weaning and extubation outcomes. These aspects were not taken into account during the study as we focused on specific lung-related parameters rather than incorporating broader factors like those mentioned above. Future studies may benefit from a more comprehensive ultrasound evaluation encompassing these aspects.

Furthermore, the readers bring up the issue of COPD and upper airway obstruction. We acknowledge that lung aeration alone may not provide a complete picture, and the inclusion of these factors in the ultrasound evaluation could enhance its predictive value. We appreciate these insights and recognize their importance.

As for the timing of ultrasound assessments, we opted for the 30-minute mark during SBT to assess early changes in lung aeration. According to the 2001 collective task force recommendations, a spontaneous breathing trial (SBT) should ideally last between 30 to 120 minutes.[4] The evaluation of the SBT's success or failure should only be conducted after the initial 30 minutes have passed. There is evidence indicating the potential harm of early respiratory muscle fatigue during SBTs that are not successful.[5] When transitioning from mechanical ventilation to a SBT, there is a shift from positive intrathoracic pressure to negative intrathoracic pressure. This shift elevates venous return and the afterload on the left ventricle. Furthermore, immediately after commencing the SBT, there can be an increase in extravascular lung water. This increase has the potential to contribute to the failure of the weaning process.[6]

Hence, it is of paramount importance to closely monitor the patient during the initial minutes following the commencement of the spontaneous breathing trial. If at any point the patient exhibits signs of SBT failure, the trial should be immediately terminated.

Based on this evidences, we made the decision to conduct lung ultrasound assessments at the beginning of the SBT at 30 minutes duration rather than waiting until the end. This approach allowed us to identify cases that experienced SBT failure early on, ensuring their inclusion in the study. However, we agree that a longer interval, such as at 2 hours, might provide a more accurate assessment of extubation readiness. The observed increase in lung ultrasound score within 30 minutes is indeed intriguing and warrants further investigation to understand its clinical significance.

In conclusion, we appreciate the readers' insightful comments and suggestions, which highlight areas for further exploration and refinement in the use of lung ultrasound for predicting extubation outcomes. We hope that our study contributes to the ongoing efforts to improve patient care in the ICU.

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