Esophageal pressure-guided mechanical ventilation: Strong physiological basis, just needs more evidence

Sir,

We thank Ray and Gupta for ardently reading and commenting on our report of extrapulmonary and pulmonary acute respiratory distress syndrome (ARDS). The authors raise four issues concerning the management of our patients.

First is the concern that we did not achieve the transpulmonary pressure (Ptp) goal according to the protocol proposed by Talmor et al. Currently, the appropriate level of Ptp positive end expiratory pressure (PEEP) and its association with FiO₂ remains unknown, and the esophageal pressure protocol in ARDS is in the process of development. Talmor et al. suggested a convenient protocol; however, this protocol per se has not been validated. This is highlighted by the fact that a different protocol has been adopted by the same authors in the EPVENT2 trial. One important point in ARDS management strategy is that the recruited airways should be prevented from collapsing at end expiration to avoid atelectrauma; this is achieved by maintaining Ptp PEEP levels above 0 cm H₂O. While we agree that the PEEP could have been increased in case 1, the presence of hypotension requiring two vasopressors precluded this strategy. Whether a higher PEEP would have changed the outcome in case 1 is speculative. In a meta-analysis of studies comparing high versus low PEEP strategy, the former did not result in an improved survival or reduced hospital length of stay. Further, the mean (standard deviation) PEEP in the high and low PEEP groups of the ALVEOLI trial was 13.2 (3.5) and 8.3 (3.2) cm H₂O, respectively, similar to patient 1. In addition, while ventilating patient 1, there was an inappropriate reduction in the lung compliance on increasing PEEP levels beyond 13 cm H₂O, this was another important reason why we chose not to increase PEEP beyond 13 cm H₂O.

Regarding the second point, esophageal pressure-guided mechanical ventilation would help us in properly titrating PEEP in both pulmonary and extrapulmonary ARDS. For instance, the strategy of high and low PEEP in the ALVEOLI trial always maintained a plateau pressure (Ptp plat) of <30 cm of H₂O, using the low tidal volume strategy. In case 1, we maintained a low tidal volume strategy but breached the magic figure of Ptp plat of 30 cm H₂O (32 cm H₂O at 48 h); however, safety was ensured by keeping the Ptp plat <25 cm H₂O and a Ptp peep above 0 cm H₂O. A Ptp plat and Ptp PEEP <25 cm H₂O and 0–10 cm H₂O ensure the prevention of volutrauma and atelectrauma, respectively. By this analogy, in extrapulmonary ARDS, the Ptp plat may exceed 30 cm H₂O due to an increase in chest wall compliance, but the Ptp plat would still be <25 cm H₂O. Here, one can confidently apply higher tidal volumes and PEEP while ventilating these patients.

Third, Ray and Gupta suggest that extrapulmonary ARDS is not a homogeneous group and the esophageal pressure strategy will not be uniform in extrapulmonary ARDS. However, the only other causes for reduced chest wall compliance are marked obesity and pleural effusion apart from conditions causing increased intra-abdominal
pressure (sepsis, ascites, intestinal obstruction, and others). In any case, all these conditions would benefit from higher PEEP as highlighted in case 2.[1]

Finally, we agree with Ray and Gupta that more clinical evidence is required before adopting this strategy in routine practice. Hopefully, the results of the EPVENT2 trial will solve this dilemma.

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Conflicts of interest

There are no conflicts of interest.

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