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).[1] The authors raise four issues concerning the management of our patients.[2]

First is the concern that we did not achieve the transpulmonary pressure (Ptp) goal according to the protocol proposed by Talmor *et al*.[3] Currently, the appropriate level of Ptp positive end expiratory pressure (PEEP) and its association with FiO_2 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.[3] This is highlighted by the fact that a different protocol has been adopted by the same authors in the EPVENT2 trial.[4] 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 H_2O. 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.[5] 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 H_2O, respectively, similar to patient 1.[6] In addition, while ventilating patient 1, there was an inappropriate reduction in the lung compliance on increasing PEEP levels beyond 13 cm H_2O, this was another important reason why we chose not to increase PEEP beyond 13 cm H_2O.

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 H_2O, 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 H_2O (32 cm H_2O at 48 h); however, safety was ensured by keeping the Ptp plat <25 cm H_2O and a Ptp peep above 0 cm H_2O.[1] A Ptp plat and Ptp PEEP <25 cm H_2O and 0–10 cm H_2O ensure the prevention of volutrauma and atelectrauma, respectively. By this analogy, in extrapulmonary ARDS, the Ptp plat may exceed 30 cm H_2O due to an increase in chest wall compliance, but the Ptp plat would still be <25 cm H_2O. 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.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

Inderpaul Singh Sehgal, Sahajal Dhooria, Digambar Behera, Ritesh Agarwal

Department of Pulmonary Medicine, Postgraduate Institute of Medical Education and Research, Chandigarh, India

Correspondence:
Dr. Inderpaul Singh Sehgal, Department of Pulmonary Medicine, Postgraduate Institute of Medical Education and Research, Chandigarh - 160 012, India.
E-mail: inderpgi@outlook.com

References

1. Sehgal IS, Dhooria S, Behera D, Agarwal R. Acute respiratory distress syndrome: Pulmonary and extrapulmonary not so similar. Indian J Crit Care Med 2016;20:194-7.
2. Ray A, Gupta A. Esophageal pressure-guided positive end-expiratory pressure in acute respiratory distress syndrome: The jury is still out! Indian J Crit Care Med 2016;20:377-8.
3. Talmor D, Sarge T, Malhotra A, O'Donnell CR, Ritz R, Lisbon A, *et al.* Mechanical ventilation guided by esophageal pressure in acute lung injury. N Engl J Med 2008;359:2095-104.
4. Fish E, Novack V, Banner-Goodspeed VM, Sarge T, Loring S, Talmor D. The esophageal pressure-guided ventilation 2 (EPVent2) trial protocol: A multicentre, randomised clinical trial of mechanical ventilation guided by transpulmonary pressure. BMJ Open 2014;4:e006356.
5. Santa Cruz R, Rojas JI, Nervi R, Heredia R, Ciapponi A. High versus low positive end-expiratory pressure (PEEP) levels for mechanically ventilated adult patients with acute lung injury and acute respiratory distress syndrome. Cochrane Database Syst Rev 2013;(6)Cd009098.
6. Brower RG, Lanken PN, MacIntyre N, Matthay MA, Morris A, Ancukiewicz M, *et al.* Higher versus lower positive end-expiratory pressures in patients with the acute respiratory distress syndrome. N Engl J Med 2004;351:327-36.

Access this article online	
Quick Response Code:	Website: www.ijccm.org
	DOI: 10.4103/0972-5229.188211

How to cite this article: Sehgal IS, Dhooria S, Behera D, Agarwal R. Esophageal pressure-guided mechanical ventilation: Strong physiological basis, just needs more evidence. Indian J Crit Care Med 2016;20:490-1.