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CORRESPONDENCE

Discussion on "Opening pressures and atelectrauma in acute respiratory distress syndrome"

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Initial correspondence from Dr. Dong et al.

Dear Editor,

Recently, we read the article in your journal by Cressoni et al. [1] which found that the prerequisites of the open lung strategy are not satisfied and higher pressures are needed. We congratulate them on their results and good writing. However, we feel some points merit a precise discussion. First, the lung recruitment has many benefits, but it also has complications such as hypotension, arrhythmias, desaturation, and barotrauma. Research shows that volutrauma is associated with a higher risk for ventilator-induced lung injury (VILI) and furthermore higher lung inflammation than atelectrauma [2]; and Tonetti et al. [3], on re-analyzing the data [2], suggested that compared to the atelectrauma group, the volutrauma was ventilated with double the mechanical power (same tidal volume, respiratory rate, and driving pressure, but different PEEP). PEEP may prevent VILI by reducing the dynamic stress/strain. However, in the absence of consistent lung recruitability, PEEP may solely increase the end-inspiratory stress/strain with no benefit. Those increased stress/strains may be above the VILI threshold. Hence, we think it [1] may mislead the reader in clinical work.

Another problem is why choose extracorporeal membrane oxygenation (ECMO) patients? Many studies suggested resting the lung during ECMO by limiting plateau pressure to less than 30 cmH_2O, and using a moderate/high PEEP (10–14 cmH_2O). Although there are no large randomized studies focused on mechanical ventilator settings during ECMO in severe ARDS, we think it is reasonable, at this time, to perform an ultra-protective ventilation strategy which limits tidal volume to less than 4 ml/kg PBW, targets a very low plateau pressure (less than 25 cmH_2O), and provides PEEP for lung recruitment. So we believe the choice of higher pressure in ECMO patients is still debatable.

Reply from Dr. Cressoni et al.

We thank Drs. Dong, Zhou, and Kang for their comments on our paper. This gives us the opportunity to clear up some misunderstandings.

It was not our intention to promote the open lung approach. We just wanted to underline that, even when the ventilation is maximized to the widely accepted clinical limits (Pplat 30 cmH_2O, PEEP 15 cmH_2O), patients with moderate/severe ARDS are far from experiencing "fully open" lung conditions. To keep the lung open, after applying sufficient opening pressure, the PEEP has to be set at values close to 25 cmH_2O or higher [4]. We do believe (not "we do know") that such conditions (volutrauma) are likely more dangerous than some degree of alveolar opening and closing. We would like to reassure Dr. Dong and coworkers that our data were not collected during a clinical treatment, but derived from short-lasting physiological trials, where we did not observe harmful hemodynamic consequences. Our intention was to understand the mechanism, not to promote the therapy.

We did not choose the ECMO patients for lung recruitment, we just tested it in this severe category. By the way, we were likely the first ones to introduce the concept of the lung rest to promote lung healing and to avoid the

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pulmonary and extrapulmonary complications of high volume/pressure ventilation [5].

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Compliance with ethical standards

Conflicts of interest
All authors have no conflict of interest.

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