CORRESPONDENCE

Are we ready to harness AI and digital modelling for precision in PEEP settings?

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We read with interest the letter by Briassoulis et al. [1] in response to our article [2]. We agree with the Authors that the relationship between recruitability and positive end-expiratory pressure (PEEP) setting is complex and requires further consideration and understanding.

Given that the systematic use of physiology at the bedside is becoming rarer and large clinical trials have often led to inconclusive and discordant results, it is imperative to explore other options. Some of these options may include automated multi-parametric monitoring and modelling, which can predict response to treatment, such as the use of computational models ("digital twins") [3] to estimate non-measurable parameters in clinical trials and provide a physiological interpretation of their findings.

Algorithms based on artificial intelligence (AI), can further interpret intervention and response, informing on the best way to provide ventilation while minimizing possible harms. This approach takes us several steps into the future, as selecting mechanical power (and its various components) based on recruitability and physiological changes over time is much more complex and unlikely to admit just one possible solution.

Indeed, one issue is the input variables, namely the consistent and reliable monitoring tools to calculate lung volumes, strain, and total stress. Another challenge is understanding how changes in PEEP will affect the lungs, hemodynamics, or other organ functions such as the kidneys, brain, etc. The idea that the optimal PEEP is simply the one that is best for the lungs is simplistic; PEEP should be seen as a variable with more systemic consequences. Depending on the goal—which may vary over time—the target may change. For example, in patients with a large amount of diffuse inflammatory oedema and single organ failure, the value of PEEP may differ from that of the same patient with acute kidney injury, right heart failure, or suffering from brain injury.

As always, technology can provide the monitoring capability and potential solutions, but the goals of care remain—fortunately still a prerogative of the clinician in partnership with the patient and their families.

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Declarations

Conflicts of interest
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