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ARDS: rest the lungs or the ventilator?

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Dear Editor,

We congratulate Tonelli et al. [1] for comprehensively summarising the effects of interventions in acute respiratory distress syndrome (ARDS). The authors identify heterogeneity of the disease and the study population and lack of standardisation of outcome measures as key shortcomings of the ARDS trials over the last few decades. The accompanying editorial [2] highlights that the three positive trials thus far, which are yet to be validated in a confirmatory trial, are based on a strong pathophysiologic rationale (i.e. prevention of ventilator-induced lung injury, VILI).

The strong association between VILI and adverse outcomes [3] prompts us to reflect on the current respiratory support strategies. While a degree of VILI is probably inevitable with positive pressure ventilation, it is unclear to what extent this is "permissible" in ARDS. Although mechanical ventilation remains an indispensable tool, achieving optimal gas exchange whilst avoiding VILI in patients with ARDS is a difficult balancing act. Our conventional approach of providing advanced ventilatory support with invasive mechanical ventilation for severe ARDS may itself be misplaced. Low tidal volume ventilation strategy has resulted in improved outcomes over the last decade; however, this benefit is relative to our previous ventilation practices notwithstanding refinements in many other aspects of intensive care.

Rendering patients with severe ARDS bedbound, on high doses of sedatives and neuromuscular blockers in order to facilitate a particular protective ventilation strategy certainly needs more scrutiny. Patients often develop right ventricular dysfunction and shock requiring hemodynamic support, and aggressive diuresis to minimise extra vascular lung water may risk acute kidney injury [4]. Despite this, protective ventilation with or without adjuncts may still not fully negate VILI and multi-organ dysfunction often ensues. For a lack of viable alternatives, there appears to be a degree of over-reliance on conventional airway-based gas exchange techniques.

Although controversial, a paradigm shift is required in our approach aimed at achieving optimal gas exchange in patients with moderate to severe ARDS. Alternate means of gas exchange, such as extracorporeal respiratory support, merit further exploration as these techniques do have a strong pathophysiologic rationale. Both extracorporeal membrane oxygenation (ECMO) and extracorporeal carbon dioxide removal (ECCOR) have the potential to better address the heterogeneity in lung injury, which is central to VILI and adverse outcomes. Equally these techniques are invasive, not widely available and have their own complications [5]. But with refinements in technology and clinical application, it would not be surprising if these risks eventually outweigh the benefits of persisting with potentially injurious ventilation. A substantial amount of resources may have to be spent in understanding pathophysiology of these extracorporeal support techniques and to refine them further. Future clinical trials should rigorously test a standardised conventional ventilation technique against ECMO by not allowing cross over to ECMO in the conventional ventilation arm.

Even though the report card for 25 years of ARDS research is disappointing, the three positive trials and a host of negative trials have given us more clarity then we have ever had when managing this difficult disease process. In the final battle against severe ARDS, the ventilator may have to be rested.

Conflicts of interest None.

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