

Mechanical Power and the use of Mechanical Ventilation in Pediatric Acute Respiratory Distress Syndrome

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Children undergoing mechanical ventilation (MV) due to acute respiratory distress syndrome (ARDS) has been a challenge in the pediatric ICU, and although many advances have been done, there is still a high mortality (18% to 27%) [1]. Many guidelines and consensus have been published in recent years [1,2]; however, there is a lot of research to be done in this field to clarify the best practices, since the evidences in pediatric ARDS are still weak.

The guidelines focus on the protective ventilation, suggesting low tidal volumes (VT), set according to ideal body weight (IBW) of the patient to avoid barotrauma, volutrauma and ventilator-induced lung injury (VILI) [1,2]. However, all these recommendations are extrapolations from adult studies [3] and recent studies have shown that ARDS patients who are ventilated according to these guidelines may still be exposed to forces that can induce or aggravate lung injury [4,5].

Amato, *et al.* published a study in NEJM demonstrating that the driving pressure (ΔP) was associated with survival in adult patients with ARDS [6]. He concluded that “decreases in ΔP owing to changes in ventilator settings were strongly associated with increased survival”. That was another step in the knowledge on how to ventilate patients with ARDS, and although there are no similar studies in children, we are again extrapolating data from this study, and using them to ventilate pediatric patients with ARDS. However, we should remember that the pediatric patient is not a “mini-adult” and has its particularities. Many treatments that are well-established for adults are useless or harmful to children. Therefore, we need clinical trials to validate these data in children.

More recently, the concept of mechanical power has been raised as a more accurate formula to predict VILI [7], since the current strategy to minimize VILI has been to avoid high VT or ΔP ; however, the role of “power” (work applied to the lung per unit time) is uncertain. Hence, other variables are taken into account, besides the VT and the ΔP . Then the mechanical power equation may help estimate the contribution of the different ventilator-related causes of lung injury and of their variations.

Although these data are from adult patients, the general idea is quite intuitive and should be translated to the pediatric patients, while awaiting the clinical trials.

Competing Interests

The authors declare that they have no competing interests.

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