In the previous issue of *Critical Care*, Fuller and colleagues [1] report the results of a systematic review on the use of lung protective (low tidal volume) mechanical ventilation in patients without acute respiratory distress syndrome (ARDS) at the onset of mechanical ventilation.

Introduction of positive pressure ventilation during a polio epidemic in 1952 resulted in a large reduction of mortality in patients with respiratory failure (87% to less than 15%) and marked the birth of modern intensive care medicine [2].

Better understanding of the effects of positive pressure ventilation on respiratory physiology and mechanics has led to an appreciation of potential side effects of positive pressure ventilation, in particular ventilator-associated lung injury [3]. The key determinants of ventilator-associated lung injury are cyclic alveolar distension (volutrauma) and recruitment/derecruitment (atelectrauma), the size of available lung (‘baby lung’), with an additional contribution from preexisting sepsis, vascular pressures, respiratory rate and inspiratory flow [3]. Avoiding high tidal volume ventilation is the only intervention with convincing survival benefit in patients with ARDS [4]. More recently, observational studies and a randomized clinical trial suggested a benefit of avoiding conventional high tidal volume ventilation in all critically ill patients [5,6].

The systematic review by Fuller and colleagues [1] highlights the importance of the low tidal volume ventilation strategy in patients without ARDS at the onset of mechanical ventilation. The results from 8 out of 13 studies included in the final analysis of this systematic review show that lower tidal volumes at initiation of mechanical ventilation reduce progression to ARDS. Similar findings were reported in another recent systematic review that combined observational studies and clinical trials in both ICUs and perioperative settings [7]. Neither of these systematic reviews raised concerns about the safety of low tidal volume ventilation in patients without ARDS.

Given the difficulty of identifying patients with ARDS in a timely fashion and both the safety and potential benefit of low tidal volume ventilation in patients without ARDS, lung-protective mechanical ventilation is recommended as an initial approach to mechanical ventilation in both perioperative and critical care settings.
end-expiratory pressure, recruitment maneuvers, and the avoidance of a high fraction of inspired \( O_2 \) (FiO\(_2\)) as safer and more effective ways to prevent atelectasis than high tidal volume [11,12].

The second concern with regards to low tidal volume ventilation is the increase of the carbon dioxide partial pressure (PCO\(_2\)), but acidosis is usually easily corrected by increasing respiratory rate except in patients with severe ARDS, where permissive hypercapnia may actually be desirable [13]. Another concern regarding low tidal volume ventilation is the potential increase in the need for sedation [14]. However, there is little evidence to
support this claim, particularly in patients without ARDS [15]. Although limited, the current evidence, including the current report by Fuller and colleagues [1], suggests that the risk/benefit ratio of low tidal volume ventilation in patients with or without ARDS is on the side of benefit. In Figure 1 we provide a pragmatic approach to lung protective mechanical ventilation in patients with and without ARDS.

Abbreviations
ARDS, acute respiratory distress syndrome.

Competing interests
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