Acute respiratory distress syndrome (ARDS) is still a clinical condition of concern for the intensivists 50 years after its first description (1). Indeed, ARDS accounts for 10% of all ICU admissions and supports mortality as high as 40% according to the most recent epidemiological data (2). Furthermore, the above mentioned study showed that in the real daily practice: (I) only 40% of ARDS patients received the minimal monitoring method, which is the measurement of the plateau pressure (2); (II) the tidal volume is set well above the 6 mL/kg predicted body weight recommended tidal volume (on average 7.5 mL/kg), and, more importantly, has the same size regardless the ARDS severity. With the ARDS severity the loss of lung aeration increases (3) and hence the baby lung (4) goes down, which should result in lowering tidal volume; (III) positive end expiratory pressure (PEEP) was set to 10 cmH_2O in the most severe forms of ARDS, whilst levels of 15 cmH_2O or more are required from pathophysiological basis.

Mechanical ventilation is the primary method of management and treatment of ARDS patients. This, together with the fact that no pharmacological treatment, except for neuromuscular blocking agent, has been associated with better outcome, explain why this special issue on ARDS will concentrate on mechanical ventilation.

We know that the primary goal to of mechanical ventilation is to prevent ventilator-induced lung injury (VILI) and the main method for this is to lower tidal volume (5). Other methods, like prone position (6) and neuromuscular blockade (7) have been shown to improve patient outcome and their beneficial effect is likely the result of VILI prevention. However, in the daily practice these interventions are still underused (2).

There is a continuous improvement in knowledge of pathophysiology of ARDS that has potential impact on many aspects of the management of ARDS. The respiratory monitoring becomes more relevant and refined with the measurement of trans-pulmonary pressure (8) and other respiratory mechanics variables (stress index, driving pressure) and the assessment of regional lung ventilation with methods available at the bedside. Right ventricle function assessment must be closely performed because its failure occurs in 20–25% of the cases. There are also a lot of recent outstanding studies that shed light onto the complex pathophysiology of ARDS. The lung computed tomography has been used for many years to establish important concepts based on the recognition of intrinsic characteristics of the ARDS lung like the baby lung (9), the potential of recruitment, i.e., the amount of recruited lung mass in response to a range of airway pressure (10), including the range that occurs during tidal breath, the critical opening and closing pressures. The recent new hypothesis of the role of mechanical power as a new mechanism of VILI, beyond barotrauma, volutrauma and atelectrauma, suggests that other ventilator settings than PEEP and tidal volume, i.e., inspiratory flow and respiratory rate, should be taken into account to protect the lung during mechanical ventilation. Allowing spontaneous breathing is highly desirable in any patient receiving invasive mechanical ventilation, sedation and paralysis. However, once spontaneous breathing happens, the risk of VILI may be increased and this risk is underestimated by the clinicians. Avoiding intubation is also a method to minimize VILI and a recent trial suggested strong benefit from using high flow oxygen cannula (11). Finally, extracorporeal techniques regained interest and large trials are almost completed or planned in this field.

In this special issue, experts in the various components of pathophysiology and management of ARDS have made a great effort to clearly summarize the current concepts and the future trends related to this fascinating situation. I am sure that the readership will found in this issue a source for a better understanding of what ARDS is and for a judicious management of ARDS patients.

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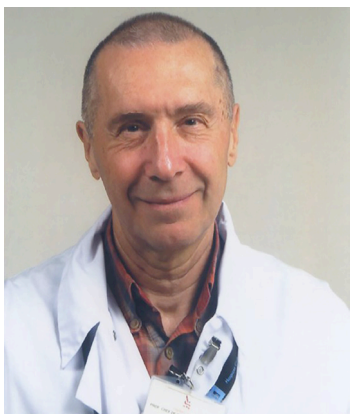

Claude Guérin

Claude Guérin[1,2,3]

[1]*Medical ICU, Croix Rousse Hospital, Lyon, France;* [2]*University of Lyon, Lyon, France;* [3]*INSERM 955, Créteil, France.*

(Email: claude.guerin@chu-lyon.fr)

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