

EDITORIAL



# Acute respiratory failure and mechanical ventilation in the context of the COVID-19 pandemic: why a special issue in ICM?

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Acute respiratory failure is the most common, life-threatening condition in critically ill patients, and is associated with a high morbidity and mortality. As such, respiratory support including standard supplemental oxygen therapy, high flow oxygen therapy (HFOT), non-invasive ventilation (NIV) (with either face mask or helmet), and invasive mechanical ventilation (IMV) for patients with acute respiratory failure are the most frequently used organ supports in the ICU. Indeed, the widespread use of mechanical ventilation during the polio epidemic is credited with the birth of the intensive care unit. Mechanical ventilation is certainly lifesaving, but as we have learned over the past few decades, it can be associated with several major complications which in turn can be life-threatening.

Given the importance of mechanical ventilation to ICU care, it is not surprising that over the years, Intensive Care Medicine (ICM) has published many important articles related to acute respiratory failure, acute respiratory distress syndrome (ARDS), and mechanical ventilation. This is also the case during the current coronavirus disease 2019 (COVID-19) pandemic in which ICM has published several notable papers, related to the pathogenesis, pathophysiology, and outcomes of COVID-19 patients. In this special issue of ICM, we invited world leaders in the field of acute respiratory failure and mechanical ventilation to update readers with respect to the most recent advances in the physiopathology, epidemiology and

treatment of ICU diseases/illnesses/syndromes which impact respiratory function.

The ICM editorial board had been planning this issue of the Journal well before the onset of the COVID-19 pandemic. However, given that SARS-CoV-2 has such an important impact on the lung, with development of pneumonia, ARDS, and respiratory failure, we expanded the range of topics to address several COVID-19 specific issues. There is no question that the ICU world—and of course, the entire world—will be changed after this crisis. Although, we do not know exactly (or even approximately) when the pandemic will end, this special issue is published in the midst of the crisis with the goal of reporting the most recent knowledge in this evolving field. Although COVID-19 will likely be with us for a number of years in one form or another, COVID-19 patients will represent the minority of ICU patients, other than for defined (hopefully very short) periods of time, and thus most of the articles deal with non-COVID-19 acute respiratory failure.

Respiratory support can be considered to be both “symptomatic” and/or an “etiologic” therapy. Recent improvements in our understanding of the pathophysiology of several critical diseases, especially those associated with lung organ failure, should challenge clinicians to regularly review and revise applicable guidelines or recommendations to treat acute respiratory failure. The ongoing progress of science and the conflicting results reported from some recent large randomized controlled trials of therapies related to acute respiratory failure and mechanical ventilation require clinicians to update their knowledge base on a regular basis. We are grateful to the experts who have contributed to this issue of the Journal to help with this update, and for having effectively

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adapted their manuscripts to cover the ongoing COVID-19 reality.

In this special issue, you will read both short and long pieces. The goal of the short pieces is to briefly summarize key messages in relation to important topics. The long pieces are more extensive and summarize recent advances related to different ICU syndromes in a much more thorough manner. In addition, there are selected hot topics, original articles, conference reports and expert panel papers, position papers, and all manner of manuscripts on acute respiratory failure and mechanical ventilation. We strongly urged the authors to include informative figures and summary tables in their manuscripts, when appropriate.

There are several challenges that must be met to improve the management of acute respiratory failure including how to personalize therapy for a given patient taking into account their genetic background, their environmental exposure, their host response, their underlying physiology, at a specific time in their clinical course. The principle of *primum non nocere* (first, do no harm) should be applied at all times to our patients, but it plays a particularly important role in the field of mechanical ventilation, given our increased understanding of the iatrogenic consequences of the ventilatory process including the complications associated with endotracheal intubation, the endotracheal tube, sedation/paralysis, heart lung interactions, and ventilator-induced lung injury (including the systemic effects on organ dysfunction). We were not able to address every relevant topic, but we tried to address the most important advances which have impact in the daily practice of clinicians.

Specifically, you will find key articles on the pathophysiology and optimal care of patients with ARDS, including the most up to date approach to ventilatory strategies, future pharmacological agents, muscle relaxants, sedation and analgesia, prone position, hemodynamic management, and rescue therapies such as extracorporeal lung support (ECLS) for refractory hypoxemia.

Ventilatory management strategies for selected high-risk patients such as immunocompromised, obese, chronic obstructive pulmonary disease (COPD), trauma brain injury (TBI) patients and others are provided. The most recent advances in airway management from endotracheal intubation to tracheal extubation are addressed. Prevention of major complications related to IMV is updated such as infections/super-infections in ARDS patients and prevention of lung–diaphragm dysfunction. The most recent advances on the potential benefit of delivering non-invasive respiratory support to reduce the risk of endotracheal intubation in patients with acute respiratory failure are detailed, including HFOT and NIV using either a face mask or helmet interface in different populations of ICU patients.

We hope that this special issue will benefit clinicians, but of course the key goal is to improve the outcomes of the critically ill patient with respiratory failure. We hope you the readers of these article enjoy this special issue. And of course, stay safe during this crazy time.

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#### Compliance with ethical standards

#### Conflicts of interest

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