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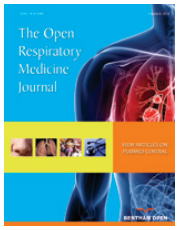

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EDITORIAL

Hypoxemia and Respiratory Failure: Clinical Conditions and Patho-physiological Approaches

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INTRODUCTION TO SPECIAL ISSUE: HYPOXEMIA AND RESPIRATORY FAILURE: CLINICAL CONDITIONS AND PATHOPHYSIOLOGICAL APPROACHES.

Respiratory failure (RF) is a clinical condition characterized by the inability of the respiratory system to maintain adequate arterial O_2 and CO_2 levels according to the demands of cellular metabolism. The RF can be classified based on blood gases abnormalities into type 1 and type 2.

Type 1 (hypoxemic) RF has a PaO_2 < 60 mmHg with normal or subnormal $PaCO_2$. In this type, the gas exchange is impaired at the level of the aveolo-capillary membrane. Examples of type I RF are carcinogenic or non-cardiogenic pulmonary edema and severe pneumonia. Type 2 (hypercapnic) RF has a $PaCO_2$ > 50 mmHg. Hypoxemia is common, and it is due to respiratory pump failure. Also, respiratory failure is classified according to its onset, course, and duration into acute and chronic; acute (ARF) on top of chronic respiratory failure (CRF) [1].

The prognosis of RF varies according to underlying causes and other factors like the age of the patients and the associated comorbidities. Furthermore, according to the mechanism of the RF type, it is the therapeutic approach that can be established in the patient. For this reason, multidisciplinary and pathophysiological focus in RF is necessary for the management of these patients.

The application of non-invasive mechanical ventilation (NIMV) has acquired major relevance in the last few years forthe management of ARF in patients with hypoxemic, hypercapnic failure, and diaphragmatic dysfunction. The main advantage of NIMV compared to invasive mechanical ventilation is that it can be used earlier outside ICU. The evidence strongly supports its use in patients with chronic obstructive pulmonary disease (COPD) exacerbation and those with acute cardiogenic pulmonary edema [2]. In the case of HFNC, few large randomized clinical trials have been performed, and it has been gaining attention as alternative respiratory support for critically ill patients [3].

This issue is focused on the clinical and pathophysiological conditions associated with chronic and acute hypoxemic RF, such as COPD, diaphragmatic dysfunction, or severe acute respiratory syndrome–related coronavirus type 2 (SARS-CoV-2) [4].

In the retrospective research of High Flow Nasal Cannula as a Support in Immunocompromised Patients *Giugliano-Jaramillo et al.*, described in detail the behavior of immunocompromised patients with ARF supported with HFNC. The conclusions are that the use of HFNC for immunosuppressed patients with acute respiratory failure decreases HR and RR, in-hospital mortality was 28% even though respiratory support was used.

In the prospective research of Romero-Dapueto *et al.*, it was describes the relationship between pulmonary rehabilitation of COPD patients, and oxidative stress markers, such as antioxidant potential in plasma and lipid peroxidation. Also, how a pulmonary rehabilitation modulates the physiological response against oxidative injury in plasma.

Finally, in the reviews of Castillo RL and Lux S *et al.*, We include clinical concepts and pathophysiological aspects of pulmonary infection by COVID-19 in obese patients and diaphragmatic dysfunction . This in order to optimize drug management and rehabilitation.

I hope that you will find this special issue helpful and interesting for clinician and pathophysiologist that work in pulmonary medicine.

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