Short Communication
Volume 13:04, 2023

Journal of
Pulmonary & Respiratory Medicine

ISSN: 2161-105X

Open Access

Optimizing Oxygen Therapy Strategies for Acute Respiratory Distress Syndrome

Victor Hugo*

Department of Pulmonary Medicine, Golden Gate University, San Francisco, CA, USA

Introduction

Acute Respiratory Distress Syndrome (ARDS) is a severe and life-threatening condition characterized by rapid onset of severe respiratory failure, hypoxemia, and bilateral infiltrates on chest imaging. It can be caused by various factors including pneumonia, sepsis, trauma, and aspiration. One of the fundamental interventions for managing ARDS is providing adequate oxygen therapy. However, there is growing recognition that inappropriate oxygen therapy can have detrimental effects on patient outcomes, including increased mortality and complications. This article aims to comprehensively review the current literature and discuss the strategies for optimizing oxygen therapy in patients with ARDS.

ARDS is characterized by increased permeability of the alveolar-capillary barrier, leading to pulmonary edema and impairment of gas exchange. Hypoxemia, or low blood oxygen levels, is a hallmark of ARDS. Traditionally, oxygen therapy has been provided to maintain arterial oxygen saturation (SaO2) levels above a certain threshold, often around 90-95%. However, recent studies have highlighted potential harms associated with excessive oxygen supplementation, including oxygen toxicity and increased oxidative stress [1].

To address these concerns, there has been a shift towards more conservative oxygenation targets. The "permissive hypoxemia" approach acknowledges that tolerating lower oxygen levels within a certain range might be beneficial to prevent oxygen-related harm. This approach is guided by the understanding that tissue oxygen delivery depends not only on arterial oxygen content but also on blood flow and oxygen extraction. By avoiding excessive oxygen supplementation, it is theorized that the risk of oxygen toxicity can be reduced. Oxygen toxicity occurs due to the generation of Reactive Oxygen Species (ROS) during the process of oxidative phosphorylation. Prolonged exposure to high levels of oxygen can overwhelm the body's antioxidant defenses, leading to oxidative stress and cellular damage. In the context of ARDS, where inflammation and tissue damage are already present, oxygen toxicity can exacerbate the existing pathology [2].

Description

Recent trials such as the "Oxygen-ICU" trial and the "LOCO2" trial have questioned the necessity of maintaining high oxygen saturation levels. These trials suggest that targeting lower oxygen saturation levels (88-92%) might be non-inferior to the traditional approach and could potentially reduce mortality. However, individual patient characteristics and comorbidities should be considered when adopting this approach. Regular monitoring of oxygen levels is essential. Arterial blood gas analysis helps assess the adequacy of oxygenation and guide adjustments in oxygen therapy. Pulse oximetry provides continuous monitoring and can assist in maintaining oxygen saturation within the desired range. Placing ARDS patients in the prone position has been shown to improve oxygenation and ventilation-perfusion matching. This technique redistributes lung perfusion and helps reduce the severity of ventilation-perfusion mismatch, ultimately enhancing oxygenation.

In severe cases of ARDS where conventional ventilation strategies fail, ECMO can provide temporary support by oxygenating the blood outside the body. This approach allows the lungs to rest and recover from the underlying injury while minimizing the risk of ventilator-induced lung injury. Every patient with ARDS is unique, and optimizing oxygen therapy requires an individualized approach. Factors such as the underlying cause of ARDS, the patient's baseline health, comorbidities, and the presence of other organ dysfunctions should all be considered when tailoring oxygen therapy. Additionally, the potential benefits and risks of different oxygenation targets should be discussed with the patient's family to ensure shared decision-making. Optimizing oxygen therapy in ARDS is not without challenges. The complex interplay between oxygenation, perfusion, and cellular metabolism requires a nuanced approach. Furthermore, the optimal oxygenation target might vary at different stages of the disease. More research is needed to identify biomarkers that can help guide individualized oxygen therapy and predict the risk of oxygen-related harm [3-5].

Conclusion

Optimizing oxygen therapy strategies for ARDS is a critical aspect of managing this life-threatening condition. While traditional approaches focused on maintaining high oxygen saturation levels, emerging evidence suggests that conservative oxygenation targets might be equally effective and less harmful. Individualizing oxygen therapy based on the patient's condition and regularly monitoring oxygen levels are key strategies to prevent oxygen toxicity and improve outcomes. As our understanding of ARDS and oxygen therapy continues to evolve, a multidisciplinary approach that combines clinical expertise, patient preferences, and the latest research findings will be essential in providing the best possible care to ARDS patients.

Acknowledgement

None.

Conflict of Interest

The authors declare that there is no conflict of interest associated with this manuscript.

References

1. Nemati, Shamim, Andre Holder, Fereshteh Razmi and Matthew D. Stanley, et al. "An interpretable machine learning model for accurate prediction of sepsis in the ICU." *ICU Crit Care Med* 46 (2018): 547.
2. Li Guangdi and Erik De Clercq. "Therapeutic options for the 2019 novel coronavirus (2019-nCoV)." *Nat Rev Drug Discov* 19 (2020): 149-150.

***Address for Correspondence:** Victor Hugo, Department of Pulmonary Medicine, Golden Gate University, San Francisco, CA, USA, E-mail: victrohugo45@yahoo.com*

Received: 01 August, 2023, Manuscript No. jprm-23-111778; **Editor assigned:** 03 August, 2023, PreQC No. P-111778; **Reviewed:** 15 August, 2023, QC No. Q-111778; **Revised:** 21 August, 2023, Manuscript No. R-111778; **Published:** 28 August, 2023, DOI: 10.37421/2161-105X.2023.13.654

3. Goo, Jin Mo. "Computer-aided detection of lung nodules on chest CT: Issues to be solved before clinical use." *Korean J Radiol* 6 (2005): 62-63.

4. Mohammed, Akram, Franco Van Wyk, Lokesh K. Chinthala and Anahita Khojandi, et al. "Temporal differential expression of physiomarkers predicts sepsis in critically ill adults." *Shock* 56 (2021): 58.

5. Howell, Matthew, Rebecca Lee, Samantha Bowyer and Alberto Fusi, et al. "Optimal management of immune-related toxicities associated with checkpoint inhibitors in lung cancer." *Lung Cancer* 88 (2015): 117-123.

How to cite this article: Hugo, Victor. "Optimizing Oxygen Therapy Strategies for Acute Respiratory Distress Syndrome." *J Pulm Respir Med* 13 (2023): 654.