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EDITORIAL

Home non-invasive ventilation: current controversies, technological progress, and personalized care

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Since its beginnings in the late 1980s, home non-invasive ventilation (NIV) has become an essential tool in the management of chronic hypercapnic respiratory failure. Technological advances have enabled the development of increasingly smaller ventilators with improved performance and monitoring systems that facilitate follow-up and optimization of personalized treatment. However, controversies persist regarding the treatment of pathologies such as obesity hypoventilation syndrome (OHS) and the actual clinical value of new technologies applied to ventilation. The articles included in this issue reflect some of these topics.

Regarding indications, one of the most frequent and expected to continue increasing is OHS. Rabec[1] addresses the challenge of positive pressure management in these patients. The article explores the complex relationship between OHS and obstructive sleep apnea (OSA), highlighting that both conditions can lead to acute and chronic respiratory failure, and the selection of continuous positive airway pressure or NIV differs in each scenario. Different ventilation modalities and their potential benefits are reviewed. In conclusion, the article proposes individualized patient management based on the severity of hypercapnia and the presence of OSA.

Lujan[2] provides an update on several key issues in NIV, including ventilation modes, ventilatory parameters, the role of hybrid modes, and the shift from a hospital-centered model of ventilation adaptation to a home-based model approach. This review emphasizes the importance of personalizing ventilatory parameters based on patients' physiological characteristics, with the aim of adapting the ventilator to the patient, not the patient to the ventilator. The real contribution of hybrid modes is also reviewed.

One of the tools that has most revolutionized home NIV is continuous remote monitoring using built-in software. In their article, Gonzalez et al.[3] demonstrate its usefulness both at treatment initiation and during follow-up, but also highlight the limitations related to reliability and variability depending on the manufacturer. A practical NIV monitoring strategy based on built-in software is proposed, and new future perspectives, including artificial intelligence, big data, and integration with other wearable devices, are explored.

Although current ventilator technology allows correct and personalized adjustment of NIV parameters in most patients, in some cases, complete polysomnography remains indispensable, as shown by Embid.[4] This article highlights the role of polysomnography in NIV titration, enabling the accurate identification of certain events and asynchronies that cannot be detected by other methods. This is particularly relevant in selected populations, such as amyotrophic lateral sclerosis patients, impacting not only NIV tolerance and efficacy but also sleep quality.

In the last article, Winck[5] addressed the major obstacle posed by the upper airway to the effectiveness of NIV and mechanical in-exsufflation therapy. Patients with neuromuscular diseases affecting the upper airway musculature may be more prone to airway collapse when positive pressure is applied, and this may

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worsen survival. This review examines the mechanisms involved in upper airway collapse, underlying the possibility that it can be triggered by positive pressure itself or by the use of oral or nasal masks. Different diagnostic approaches are evaluated, ranging from the analysis of ventilator data to the use of polysomnography and transnasal fiberoptic laryngoscopy. The importance and future role of new, less invasive techniques, such as laryngeal ultrasound and electrical impedance tomography for real-time monitoring, are also highlighted.

In conclusion, the reviews appearing in this issue of BRN provide a comprehensive overview of the most relevant topics currently in the field of home mechanical ventilation. These range from treatment selection based on etiology to the use of new systems for ventilation adaptation and monitoring. Medicine is increasingly moving towards individualized treatments, and home mechanical ventilation is an example of this trend. Likewise, the technology incorporated into modern ventilators allows for better patient adaptation and monitoring, but understanding its limitations remains crucial for accurate data interpretation.

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