Lungs and Breathing

Editorial ISSN: 2515-1010

Role of high-flow nasal cannula therapy in the respiratory distress: is it time to change the strategy?

Maria-Inés Mattioli, Noelia Escalier and Salvador Díaz-Lobato*

Department of Pneumological, University Hospital Ramón y Cajal, Madrid, Spain

Respiratory distress syndrome (ARDS) is a condition in which acute deterioration of gas exchange occurs due to increased capillary permeability and the development of an inflammatory response that is not explained by cardiac causes, in the context of injury caused by different noxas (infections, physical and / or biochemical agents, traumatisms, among others). For its definition, the Berlin Classification of 2012 [1] is used, which includes temporality, radiographic, biochemical and clinical criteria, with 3 levels of severity (mild, moderate and severe) according to the degree of hypoxemia that the patient presents. For many years now, pharmacological and non-pharmacological treatment strategies have been proposed, as the protective ventilation, with low tidal volume and high pressure at the end of expiration (PEEP), which has been shown to give better results so far; the pronation of patients is another validated tool. Lately, oxygen therapy with high-flow nasal cannula (HFNC) is presented as a non-invasive alternative for ventilatory support, which should be taken into account.

There are series of cases in which it was observed that the HFNC was not beneficial in terms of morbidity and mortality in patients with severe ARDS, reaching up to 50%, if we compare this figure with 29% of those treated with invasive mechanical ventilation [2]. In cases of mild to moderate hypoxemia, both bi-level non-invasive ventilation (BIPAP) or continuous pressure ventilation (CPAP) and oxygen therapy with HFNC have proven to be acceptable alternatives before making the decision to invade the patient and intubate it. The reevaluation is performed between 1 and 2 hours after the start of non-invasive ventilatory support [3]. Could we consider using HFNC for at least 12 to 24 hours before determining that non-invasive ventilatory therapy has failed? Can we include in this treatment group patients with heterogeneous alteration of the chest X-ray? Many patients do not meet all the criteria of the Berlin Classification, and yet they have blood gas analysis that is sufficiently altered to be considered a high-risk and severe group. Many of these belong to the oldest population, which is the reason why they often have the label "DNR" (do not reanimation) or "DNI" (do not intubate) in the context of the multiple associated comorbidities. The question then arises: is high-flow nasal cannula therapy feasible and effective in these cases? Should it be considered first choice in other age groups? Is it reproducible in young adults affected by ARDS? As we can see, many questions arise around HFNC therapy in ARDS.

From the physiopathological point of view, when applying positive pressure in a patient with heterogeneous alteration of the pulmonary parenchyma, the recruitment of previously collapsed areas is favored, with the disadvantage that there is overdistension of the alveolar units that have a conserved compliance or "normal" [4]. The pronation of the patients would allow adapting the V / Q ratio within the lung, since it produces a better distribution of oxygenated air during ventilation, which results in an overall improvement of oxygenation. This is evident in the improvement in the relationship between the arterial oxygen partial pressure and the inspired oxygen fraction (PaO_2 / FiO_2). The HFNC allows to deliver humidified and hot air, with high concentrations of oxygen, generating a PEEP of between 3 and 7 mmHg, reducing the dead space, being very well tolerated by most of patients [5] Probably in a homogeneous lung, the ventilatory pressures are distribute in a homogeneous way, but in a heterogeneous lung, the pressures can overdisten normal lung areas. Probably HFNC would take any advantage over mechanical ventilation in this heterogeneous lung.

From the therapeutic point of view, in severe ARDS, mechanical ventilation with positive pressure at the end of expiration is considered the first choice. However, there are already indications that patients with mild to moderate distress could be treated with the HFNC technique. We firmly believe that conscious studies should be developed to evaluate this option, since the fate of many patients who are currently in a "gray area" in terms of treatment could be modified.

References

1. ARDS Definition Task Force, Ranieri VM, Rubenfeld GD, Thompson BT, Ferguson ND, et al. (2012) Acute respiratory distress syndrome: the Berlin Definition. *JAMA* 307: 2526-2533. [Crossref]

2. Medina A, Modesto V (2015) Seriously, Should We Be Treating Severe ARDS With High-Flow Nasal Cannula Oxygen? *Respir Care* 60: e148. [Crossref]

3. Bhattacharyya D, Prasad B, Rajput A (2011) Recent advances in the role of non-invasive ventilation in acute respiratory failure. *Med J Armed Forces India* 67: 187-191. [Crossref]

4. Gattinoni L, Quintel M (2016) How ARDS should be treated. *Critical Care* 20: 86. [Crossref]

5. Ou X, Hua Y, Liu J, Gong C, Zhao W (2017) Effect of high-flow nasal cannula oxygen therapy in adults with acute hypoxemic respiratory failure: a meta-analysis of randomized controlled trials. *CMAJ* 189: E260-E267. [Crossref]

Correspondence to: Salvador Díaz-Lobato, Department of Pneumological, University Hospital Ramón y Cajal, Carretera de Colmenar Viejo, Km 9,100, 28034 Madrid, Spain, Tel: 0034 913368133; E-mail: sdiazlobato@gmail.com

Received: March 24, 2018; **Accepted:** April 23, 2018; **Published:** April 26, 2018