Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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LETTER TO THE EDITOR

Advantages and limitations of the ROX index

Dear editor

We have read with interest the study by Vega et al[1] published in the latest issue of the journal, where the authors propose the ROX index as a predictor of failure of high-flow nasal cannula (HFNC) therapy in patients with pneumonia due to SARS-CoV-2, and we would like to share some considerations on the advantages and disadvantages of using this index.

Non-invasive ventilatory support has gained relevance in recent years with the popularization of HFNC in patients with pneumonia. This therapy has been shown to be more effective than standard oxygen therapy and is recommended as first-line treatment for acute hypoxemic respiratory failure (AHRF).[2] These patients usually present dyspnea, hypoxemia, respiratory alkalosis, impaired gas exchange and consolidation images on chest tomography, similar to SARS-CoV-2 patients who also present fever and cough requiring a more advanced oxygen therapy.[3,4]

By demonstrating its effects on gas exchange and respiratory mechanics, a possible delay in endotracheal intubation and invasive mechanical ventilation was quickly observed due to the possibility of masking the deterioration of the clinical picture. To avoid this situation, the ROX index (ratio of oxygen saturation as measured by pulse oximetry/FiO_2 to respiratory rate) was proposed for patients with pneumonia and AHRF, and it showed accuracy in predicting HFNC failure at 12h of treatment (ROC 0.74 CI95% 0.64-0.84 p< .002), with <4.88 being the cut-off value associated with intubation (HR 0.273 CI95% 0.121-0.618 p .002).[5]

In the last 5 years, this index has been widely used due to its easy application at the bedside, which requires non-invasive variables for its measurement and can be evaluated at any time, even by non-medical health professionals. However, this same characteristic could cause small variations in its components to produce very dissimilar results. We must consider that the parameters to be evaluated can easily vary throughout the day or in different clinical situations (fever, mobilization, fatigue, pain, acidosis, hypotension). In addition, it could be considered as a static index that refers to a specific moment in time and not to the clinical evolution of the patient. Another disadvantage is that the index does not include the flow rate provided and it has been reported that changes in the flow rate can modify the result of the therapy[6] because it can generate a continuous pressure effect in the airway and favor the lavage of the dead space, increased end-expiratory volume and decreased respiratory rate and work of breathing. Due to these possible biases, other monitoring alternatives have been proposed, which we have discussed elsewhere.[7] The role of lung ultrasonography (LUS) has also been mentioned as a tool to predict intubation: in addition to the evaluation of the excursion and diaphragmatic contraction, at bedside and non-invasively, LUS has proven the worsening of the disease in the presence of B lines pattern and the lack of aeration when dyspnea and hypoxemia were present.[4]

Vega et al demonstrated the usefulness of the ROX Index to guide the intubation decision in patients with COVID-19 pneumonia outside the ICU with a cut-off level <5.9,[1] however we suggest that the other parameters are not ignored, when taking decisions in scenarios of low vigilance, such as neurological deterioration, work of breathing, mental status alterations, agitation, drowsiness or stupor.

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Conflicts of interest

All authors declare no conflicts of interest.

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