LETTER TO THE EDITOR

A Clarion Call for a More Comprehensive Approach to Acute Respiratory Distress Syndrome Severity Categorization

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Received on: 23 October 2022; *Accepted on:* 24 November 2022; *Published on:* 30 November 2022

Keywords: Acute respiratory distress syndrome, Mortality, Positive end expiratory pressure.
Indian Journal of Critical Care Medicine (2022): 10.5005/jp-journals-10071-24373

While the importance of a sound risk assessment and stratification in intensive care medicine cannot be overemphasized, the considerations become manifold when pertaining to critical illnesses like acute respiratory distress syndrome (ARDS) which are associated with a substantial mortality burden.[1]

In this context, the Berlin ARDS severity definition premised on the prevailing partial pressure of arterial oxygen to the fraction of inspired oxygen (PaO_2/FiO_2 or the P/F ratio) has received particular attention.[2] Ahead of the minimum 5-cm H_2O positive end expiratory pressure (PEEP) requirement for the Berlin definition, the latter falls short of accounting for the applied PEEP levels while prognosticating the ARDS subset premised on the eventual P/F ratios.[2] Speaking strictly clinically, a lower set of P/F ratios may itself necessitate higher PEEP administration which in turn is expected to improve the PaO_2. As an extension of the same, one may argue that the isolated P/F ratio-based severity categorization could result in patients being designated as severe ARDS (in the background of lower PEEP) and those with higher PEEP settings characterized as a milder disease form.

Increasing recognition of the aforementioned has translated as corresponding research endeavors, of late.[1,3] Herein, the findings of a recent Palanidurai et al. study deserve mention. The group highlights a superior mortality predictive value of P/FP ratio (10 × P/F × PEEP) when compared to the traditional P/F ratio in an evaluation of 3,442 patients included in the 7 multicenter National Heart, Lung, and Blood Institute (NHLBI) ARDS clinical trials network studies. The area under the curve in the receiver operating characteristics curves (AUC–ROC) for mortality prediction was significantly higher for P/FP ratio [0.710; 95% confidence interval (CI): 0.691–0.730] as opposed to that for P/F ratio (0.659; 95%CI: 0.637–0.681), in patients with PEEP >5-cm H_2O. Interestingly, an improvement in the AUC–ROC was observed for the PEEP levels ≥ 18-cm H_2O (0.963; 95% CI: 0.947–0.978 for P/FP ratio and, 0.828; 95%CI: 0.765– 0.891).[1]

However, concerns relating to an uncertain prognostication and risk-based therapeutic intervention potentially intensify amidst the re-categorization of a sizeable ARDS cohort in the Palanidurai et al. study (12.5% with moderate and 15% with mild ARDS into more severe disease categories and, 13.9% with severe and 33.6% with moderate ARDS into milder disease) when stratified employing the prespecified thresholds of 201–300 (mild), 101–200 (moderate), and ≤100 (severe), for both the P/F and P/FP ratios. Harmonious to the above-mentioned potential pitfall of a P/F ratio-based ARDS categorization, the median PEEP and FiO_2 of patients re-categorized as severe disease form was to the high tune of 14-cm H_2O and 0.70 whereas it was only 5-cm H_2O and 0.40 for those re-classified as mild ARDS.[1]

Talking further in support of the concept of prognostic integration of mechanical ventilation variables, El-Khatib et al. also outline the superiority of the oxygenation factor (OF = P/F × Mean airway pressure (P_{aw}) over the P/F ratio in characterizing the disease severity of ARDS.[3] In addition, El-Khatib and Jamaleddine delineate enhanced reliability of OF as compared to the P/F ratio, in reflecting the degree of an intrapulmonary shunt in postcoronary artery bypass grafting patients without underlying lung disease.[4]

While the proponents of multifactorial oxygenation indices such as P/FP ratio or OF, may support their respective parameters differently (one group citing the dependency of P_{aw} on tidal volume, inspiration:expiration ratio, peak inspiratory pressures and PEEP, etc. to another proposing P_{aw} as a better surrogate of mean alveolar pressures).[5] it is the time that the critical care fraternity cohesively works ahead in the direction toward a more comprehensive and pragmatic approach to the ARDS severity categorization.

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How to cite this article: Magoon R, Suresh V. A Clarion Call for a More Comprehensive Approach to Acute Respiratory Distress Syndrome Severity Categorization. Indian J Crit Care Med 2022;26(12):1308–1309.

Source of support: Nil

Conflict of interest: None

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