



Does the oxygen reserve index play a role in oxygen therapy?

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To the Editor:

We read the review article by Ishida et al. with interest [1]. They elegantly summarized the Oxygen Reserve Index (ORi), which indicates a relative oxygen partial pressure dissolved in arterial blood (PaO_2) in the range of 100–200 mmHg shown as indices from 0 to 1 [1]. Ishida et al. [1] mentioned that normoxia is where PaO_2 is about 100 mmHg (Fig. 2 in the Ref. [1]). However, we are somewhat confused regarding their definition of normoxia when we take a recent trend of oxygen therapy in patients with advanced diseases into account. A systematic review and meta-analysis included 25 randomized controlled trials that enrolled 16,037 patients with sepsis, critical illness, stroke, trauma, myocardial infarction, cardiac arrest, and patients who had emergency surgery [2]. The analysis examined whether oxygen strategy affects the patients' outcome, and the results indicated that supplemental oxygen is unfavorable above the oxygen saturation (SpO_2) range of 94–96% in severely ill patients [2]. A New Zealand study group has documented in adult patients undergoing mechanical ventilation in the intensive care unit that the use of conservative oxygen therapy, in which a SpO_2 was maintained in a range of 90–97%, as compared with standard oxygen therapy, did not significantly affect the number of ventilator-free days [3]. The results suggest that such a conservative oxygen therapy is sufficient for managing patients undergoing mechanical ventilation. A multicenter, prospective, randomized, controlled trial evaluated the role of oxygen administration (8

L/min) in patients with ST-elevation-myocardial infarction diagnosed on a 12-lead electrocardiogram [4]. Compared with no oxygen therapy demonstrating $\text{SpO}_2 < 100\%$, the supplemental oxygen therapy increased early myocardial injury and was associated with larger myocardial infarct size assessed at 6 months [4]. According to the study results, supplying oxygen therapy appears unnecessary and even involves risks since most cardiovascular patients are not hypoxemic at baseline, and thus, normoxia is currently defined as $\text{SpO}_2 \geq 90\%$ in the disease population [5]. All of the above recent studies sufficiently indicate that $\text{PaO}_2 < 100$ mmHg, which is outside of the ORi's range, is critical to monitor to avoid detrimental effects caused by hyperoxia in the current oxygen therapy. Therefore, further studies will be required to verify the ORi's usefulness in patients with advanced diseases.

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