

## **Oxygen Reserve Index: Validation of a New Variable.**

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**BACKGROUND:** Pulse oximetry-derived oxygen saturation is typically >97% in normoxia and hyperoxia, limiting its clinical use. The new Oxygen Reserve Index (ORi), a relative indicator of the partial pressure of oxygen dissolved in arterial blood (PaO<sub>2</sub>) in the range of 100-200 mm Hg, may allow additional monitoring of oxygen status.

**METHODS:** In this prospective validation intervention study, 20 healthy volunteers were breathing standardized oxygen concentrations ranging from mild hypoxia (fraction of inspired oxygen = 0.14) to hyperoxia (fraction of inspired oxygen = 1.0) via a tight-fitting face mask. ORi was measured noninvasively by multiwavelength pulse co-oximetry using 2 finger sensors. These ORi values (unitless scale, 0.00-1.00) were compared with measured PaO<sub>2</sub> values.

Repeated-measurements correlation analysis was performed to assess the ORi/PaO<sub>2</sub> relationship. ORi trending ability was assessed using a 4-quadrant plot. The area under the receiver operating characteristics curve was calculated to assess the prediction of hypoxia (low-ranged PaO<sub>2</sub>, <100 mm Hg).

**RESULTS:** Within the ORi-sensitive range, a strong positive correlation was found between ORi and PaO<sub>2</sub> for both sensors (R = 0.78 and 0.83; P < .0001). ORi trending of PaO<sub>2</sub> was good within this range (concordance rate = 94%). The

prediction of PaO<sub>2</sub> <100 mm Hg was also good, with an area under the receiver operating characteristics curve of 0.91 and 99% sensitivity and 82% specificity.

**CONCLUSIONS:** In this prospective volunteer validation study, a strong and positive correlation between PaO<sub>2</sub> and ORi was found, together with a good trending ability. Based on these data, the future use of ORi as a continuous noninvasive monitoring tool for assessing oxygenation status in patients receiving supplemental oxygen might be supported.