
New Study Investigates the Clinical Utility of ORi™, Masimo Oxygen Reserve Index™



[Masimo](#) has announced the findings of an abstract presented at the recent International Anesthesia Research Society (IARS) Annual Meeting in Washington, DC. In the study, researchers at the UC Davis School of Medicine evaluated the potential clinical utility of Masimo Oxygen Reserve Index™ (ORi™) as an early warning of arterial hemoglobin desaturation in critically ill patients.¹

ORi is a relative indicator of the partial pressure of oxygen in arterial blood (PaO₂) in the range of 100 to 200 mmHg. ORi is intended to supplement, not replace, oxygen saturation (SpO₂) monitoring and PaO₂ measurements. As an “index” parameter with a unit-less scale between 0 and 1, ORi can be trended and has optional alarms to notify clinicians of changes in a patient’s oxygen reserve.

In the prospective, collaborative, observational study, Dr. Leonard Lee and colleagues enrolled 40 adult critically ill patients who were scheduled for elective surgical procedures requiring endotracheal intubation and planned arterial pressure monitoring catheter placement prior to induction of general anesthesia. The patients’ ORi values were measured using a Masimo Radical-7® Pulse CO-Oximeter®. The researchers recorded the time elapsed from the start of ORi alarming (triggered by decrease in the absolute value and rate of change in ORi) to 94% oxygen saturation, as well as the time elapsed from 98% to 94% saturation. The average time interval between the start of ORi alarming and 98% saturation was considered to be the average increase in warning time provided by ORi.

The researchers found that among the patients, the average time from the start of ORi alarming to 94% oxygen saturation was 80±38 seconds (ranging from 29 to 227 seconds). The average time from 98% to 94% saturation was 46±23 seconds (ranging from 12 to 108) seconds. Therefore, the average increase in warning time provided by ORi was 34±23 seconds (ranging from 4 to 119) seconds. On a percentage basis, the increase provided by ORi was 96%±92% (ranging from 5% to 479%).

The researchers concluded that the study “demonstrates the potential utility of ORi as an advanced warning of arterial desaturation and as an adjunct to SpO₂. This additional warning time can potentially translate to improved patient safety by allowing earlier calls for help, assistance from a more experienced person, or modification of airway management. For this analysis we defined the advance warning to end at 98% SpO₂. In clinical situations this SpO₂ might not be considered to be critical. Using a lower SpO₂ as the alarm level would increase the advance warning provided by ORi. Further analysis of the correlation of ORi and PaO₂, the use of ORi as a guide to pre-oxygenation, and its utility in the morbidly obese are areas for future study.”

In another recent study, researchers at Children’s Medical Center in Dallas, Texas concluded that ORi could provide clinicians with a median of 31.5 seconds advanced warning of impending desaturation in pediatric patients with induced apnea after pre-oxygenation.²

ORi has not received FDA 510(k) clearance and is not available for sale in the United States.

References

1. Lee L, Singh A, Applegate R, and Fleming N. Oxygen Reserve Index: An early warning for desaturation in critically ill patients. Proceedings from the 2017 IARS Annual Meeting, Washington, DC. Abstract #A1406.
2. Szmuk P et al. Oxygen Reserve Index A Novel Noninvasive Measure of Oxygen Reserve—A Pilot Study. *Anesthesiology*. 4 2016, Vol. 124, 779-784. doi:10.1097/ALN.0000000000001009.

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