

Study of Early Warning for Desaturation Provided by Oxygen Reserve Index in Obese Patients

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Abstract

Acute hemoglobin desaturation can reflect rapidly decreasing PaO₂. Pulse oximetry saturation (SpO₂) facilitates hypoxia detection but may not significantly decrease until PaO₂ < 80 mmHg. The Oxygen Reserve Index (ORI) is a unitless index that correlates with moderately hyperoxic PaO₂. This study evaluated whether ORI provides added arterial desaturation warning in obese patients. This IRB approved, prospective, observational study obtained written informed consent from Obese (body mass index (BMI) kg m⁻²; 30 < BMI < 40) and Normal BMI (19 < BMI < 25) adult patients scheduled for elective surgery requiring general endotracheal anesthesia. Standard monitors and an ORI sensor were placed. Patient's lungs were pre-oxygenated with 100% FiO₂. After ORI plateaued, general anesthesia was induced, and endotracheal intubation accomplished using a videolaryngoscope. Patients remained apneic until SpO₂ reached 94%. ORI and SpO₂ were recorded continuously. Added warning time was defined as the difference between the time to SpO₂ 94% from ORI alarm start or from SpO₂ 97%. Data are reported as median; 95% confidence interval. Complete data were collected in 36 Obese and 36 Normal BMI patients. ORI warning time was always longer than SpO₂ warning time. Added warning time provided by ORI was 46.5 (36.0-59.0) seconds in Obese and 87.0 (77.0-109.0) seconds in Normal BMI patients, and was shorter in Obese than Normal BMI patients difference 54.0 (38.0-74.0) seconds ($p < 0.0001$). ORI provided what was felt to be clinically significant added warning time of arterial desaturation compared to SpO₂. This added time might allow earlier calls for help, assistance from other providers, or modifications of airway management. Trial registration ClinicalTrials.gov [NCT03021551](#).