

Characteristics of Desaturation and Respiratory Rate in Postoperative Patients Breathing Room Air Versus Supplemental Oxygen: Are They Different?

Taenzer AH, Perreard IM, MacKenzie T, McGrath SP.

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BACKGROUND: Routine monitoring of postoperative patients with pulse oximetry-based surveillance monitoring has been shown to reduce adverse events. However, there is some concern that pulse oximetry is limited in its ability to detect deterioration quickly enough to allow for intervention in patients receiving supplemental oxygen. To address such concerns, this study expands on the current limited knowledge of differences in desaturation and respiratory rate characteristics between patients breathing room air and those receiving supplemental oxygen.

METHODS: PPulse oximetry-derived data and patient characteristics were used to examine overnight desaturation patterns of 67 postoperative patients who were receiving either supplemental oxygen or breathing room air. The 2 modalities with respect to the speed of desaturation, in addition to magnitude and duration of desaturation events, are compared. Night-time pulse rate, oxygen saturation, respiratory rate, and the transition times from normal oxygen saturation levels to desaturated states are also compared. The behavior of respiratory rate in proximity to desaturation events is described. Statistical methods included multivariable regression and inverse probability of treatment weighted to adjust for any imbalance in patient characteristics between the oxygen and room air patients and linear mixed effect models to account for clustering by patient.

RESULTS: The study included 33 patients on room air and 34 receiving supplemental oxygen. The speed of desaturation was not different for room air versus oxygen for 2 types of desaturation (adjusted % difference, 95% confidence interval [CI]: type I; 22.4%, -51.5% to 209%; P = .67, type II; -17.3%, -53.8% to 47.6%; P = .52). Patients receiving supplemental oxygen had a higher mean oxygen saturation (adjusted difference, 95% CI, 2.4 [0.7-4.0]; P = .006). No differences were found

for the average overnight respiratory or pulse rate, or proportion of time in desaturation states between the 2 groups. The time to transition from a normal oxygen saturation (92%) to 88% or below was not longer for supplemental oxygen patients (P = .42, adjusted difference 26.1%: 95% CI, -28.1% to 121%).

Respiratory rates did not differ between the overall mean and desaturation or recovery phases or between the oxygen and room air group.

CONCLUSIONS: In this study, desaturation characteristics did not differ between patients receiving supplemental oxygen and breathing room air with regard to speed, depth, or duration of desaturation. Transition time for desaturations to reach low oxygen saturation alarms was not different, while respiratory rate remained in the normal range during these events. These findings suggest that pulse oximetry-based surveillance monitoring for deterioration detection can be used equally effectively for patients on supplemental oxygen and for those on room air.