

Oxygen Saturation Targeting In Preterm Infants Receiving Continuous Positive Airway Pressure

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Objective

The precision of oxygen saturation (SpO₂) targeting in preterm infants on continuous positive airway pressure (CPAP) is incompletely characterized. We therefore evaluated SpO₂ targeting in infants solely receiving CPAP, aiming to describe their SpO₂ profile, to document the frequency of prolonged hyperoxia and hypoxia episodes and of fraction of inspired oxygen (FiO₂) adjustments, and to explore the relationships with neonatal intensive care unit operational factors.

Study Design

Preterm infants <37 weeks' gestation in 2 neonatal intensive care units were studied if they were receiving CPAP and in supplemental oxygen at the beginning of each 24-hour recording. SpO₂, heart rate, and FiO₂ were recorded (sampling interval 1-2 seconds). We measured the proportion of time spent in predefined SpO₂ ranges, the frequency of prolonged episodes (≥ 30 seconds) of SpO₂ deviation, and the effect of operational factors including nurse-patient ratio.

Results

A total of 4034 usable hours of data were recorded from 45 infants of gestation 30 (27-32) weeks (median [IQR]). When requiring supplemental oxygen, infants were in the target SpO₂ range (88%-92%) for only 31% (19%-39%) of total recording time, with 48 (6.9-90) episodes per 24 hours of severe hyperoxia (SpO₂ $\geq 98\%$), and 9.0 (1.6-21) episodes per 24 hours of hypoxia (SpO₂ <80%). An increased frequency of prolonged hyperoxia in supplemental oxygen was noted when nurses were each caring for more patients. Adjustments to FiO₂ were made 25 (16-41) times per day.

Conclusion

SpO₂ targeting is challenging in preterm infants receiving CPAP support, with a high proportion of time spent outside the target range and frequent prolonged hypoxic and hyperoxic episodes.