

Sleep Desaturation: Comparison of Two Oximeters.

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Introduction

Oxygen saturation is measured by pulse oximetry during sleep studies. Body movements and peripheral vasoconstriction related to respiratory events may interfere with measurements by conventional oximeters. Our objective was to compare the detection rate of sleep desaturations by two oximeters, one of which used new motion-resistant technology.

Methods

We studied 34 children (median age, 13 years; range, 3-18) with suspected sleep-disordered breathing. During polysomnography, oxygen saturation was measured by two oximeters set on fast mode: the motion-resistant Radical oximeter (2-sec averaging), and the conventional Nellcor N-200 oximeter (2-3-sec averaging). Respiratory events were identified based on airflow signal. The numbers of respiratory event-related desaturations $\geq 3\%$ or $\geq 5\%$ detected by each oximeter were determined. Valid desaturations were defined using the Nellcor plethysmographic waveform and the Radical signal-quality data. Hypoxemic respiratory events were those with associated valid desaturation.

Results

In total, 1,278 respiratory events were identified and pooled. Basal oxygen saturation measured just before event onset was not different between oximeters (Radical: 98%; range, 84-100; Nellcor: 97%; range, 86-100; $P = \text{ns}$). However, the Radical detected a greater number of valid desaturations than did the Nellcor for any level of desaturation (respectively, $N = 651$ and 476 desaturations $\geq 3\%$, $P < 0.001$; and $N = 232$ and 146 desaturations $\geq 5\%$, $P = 0.01$). Consequently, for each patient, the number of hypoxemic respiratory events per hour of sleep was greater using the Radical than using the Nellcor ($P = 0.002$, and $P = 0.021$, for desaturation $\geq 3\%$ and $\geq 5\%$, respectively).

Conclusion

In conclusion, standardized oximeter settings are required to achieve more accurate assessments of hypoxemia in children with sleep-disordered breathing.