

Nocturnal Oximetry-based Evaluation of Habitually Snoring Children

Hornero, R., Kheirandish-Gozal, L., Gutiérrez-Tobal, G. C., Philby, M. F., Alonso-Álvarez, M. L., Álvarez, D., Dayyat, E. A., Xu, Z., Huang, Y. S., Tamae Kakazu, M., Li, A. M., Van Eyck, A., Brockmann, P. E., Ehsan, Z., Simakajornboon, N., Kaditis, A. G., Vaquerizo-Villar, F., Crespo Sedano, A., Sans Capdevila, O., von Lukowicz, M., ... Gozal, D. (2017). Nocturnal Oximetry-based Evaluation of Habitually Snoring Children. *American journal of respiratory and critical care medicine*, 196(12), 1591–1598. <https://doi.org/10.1164/rccm.201705-0930OC> <10.1164/rccm.201705-0930OC> Accessed 24 May 2021.

Abstract

Rationale: The vast majority of children around the world undergoing adenotonsillectomy for obstructive sleep apnea-hypopnea syndrome (OSA) are not objectively diagnosed by nocturnal polysomnography because of access availability and cost issues. Automated analysis of nocturnal oximetry (nSpO₂), which is readily and globally available, could potentially provide a reliable and convenient diagnostic approach for pediatric OSA. **Methods:** Deidentified nSpO₂ recordings from a total of 4,191 children originating from 13 pediatric sleep laboratories around the world were prospectively evaluated after developing and validating an automated neural network algorithm using an initial set of single-channel nSpO₂ recordings from 589 patients referred for suspected OSA. **Measurements and main results:** The automatically estimated apnea-hypopnea index (AHI) showed high agreement with AHI from conventional polysomnography (intraclass correlation coefficient, 0.785) when tested in 3,602 additional subjects. Further assessment on the widely used AHI cutoff points of 1, 5, and 10 events/h revealed an incremental diagnostic ability (75.2, 81.7, and 90.2% accuracy; 0.788, 0.854, and 0.913 area under the receiver operating characteristic curve, respectively). **Conclusions:** Neural network-based automated analyses of nSpO₂ recordings provide accurate identification of OSA severity among habitually snoring children with a high pretest probability of OSA. Thus, nocturnal oximetry may enable a simple and effective diagnostic alternative to nocturnal polysomnography, leading to more timely interventions and potentially improved outcomes..

Keywords

Automated pattern recognition, Blood oxygen saturation, Childhood obstructive sleep apnea–hypopnea syndrome, Neural network, Nocturnal oximetry..