

Pulse rate trends in obstructive sleep apnea: a reliable tool to predict long term response to CPAP?

Javier Navarro-Esteva¹, Antonio Ravelo-García², Ibrahim Véliz-Flores¹, Guillermo Pérez-Mendoza¹, Antonio M. Esquinas³

¹Department of Pulmonary Medicine, Hospital Universitario Gran Canaria “Dr. Negrin”, Las Palmas, Spain; ²Institute for Technological Development and Innovation in Communications (IDeTIC), Universidad de Las Palmas de Gran Canaria, Las Palmas, Spain; ³Intensive Care Unit, Hospital Morales Meseguer, Murcia, Spain

Correspondence to: Javier Navarro-Esteva, MD. Department of Pulmonary Medicine, Hospital Universitario Gran Canaria “Dr. Negrin”, Las Palmas, Spain. Email: jnavest@gobiernodecanarias.org.

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To the editor,

A predictive model of long term response to CPAP could be a useful tool for the clinician. In this regard, previous studies considered that changes in heart rate variability (HRV) are a key variable to assess continuous positive airway pressure (CPAP) response (1,2). We read with interest the recent article by Pengo MF *et al.* (3) where authors hypothesized that baseline nocturnal pulse rate (PR) trends help predict long term response to CPAP. In this study, main findings were improvement in daytime sleepiness among obstructive sleep apnea (OSA) patients with baseline negative change in PR contrary to OSA patients with positive change in PR. Nonetheless, we consider that a few aspects of this study deserve reviewing.

First, the diagnostic modality was unattended pulse oximetry. So far, the published data on this method is difficult to compare because of differences in the parameters measured and differences in the reference standard. Some studies reported high specificity while others reported a high sensitivity. For screening purposes, both high sensitivity and high pretest likelihood of OSA are needed. Additionally, age, pulmonary function, and degree of obesity impact on nocturnal desaturation and also influence sensitivity and specificity. Therefore, for research purposes, diagnosis should be confirmed by polygraphy or polysomnography (4-6).

In Pengo MF *et al.* patients in the OSA group had lower mean saturation of hemoglobin (SpO₂) than controls (92.7% *vs.* 95.4%). This difference makes the OSA group more likely to desaturate during sleep just by virtue of

the oxyhemoglobin dissociation curve dynamics (5). Furthermore, some of the OSA patients may have suffered from other comorbidities such as obesity hypoventilation syndrome. This was more likely in the OSA group with positive change PR, where patients were more obese (122+/-26 kg) and had lower mean SpO₂ (90.9%) compared to those with negative change PR (107+/-26 kg, and 93.2%, respectively).

Secondly, inclusion criteria required a $\geq 4\%$ oxygen desaturation index (ODI) ≥ 15 or ODI ≥ 5 plus Epworth sleepiness score (ESS) > 10 . In the developed world, prevalence of daytime hypersomnolence is significantly higher than OSA (7), so subjects with mild OSA were probably overtreated with CPAP.

Third, pulse rate index (PRI) $>$ or $<$ than 20 was used as criteria to select patients from controls. However, low HRV or respiratory events with $< 4\%$ hemoglobin desaturation could make OSA patients be included as controls.

In a previous study, Zamarrón C *et al.* found no significant nightly changes in PR trends among 111 OSA patients (8). In the article by Pengo MF *et al.*, it is not clear how PR trend is defined and why it is considered a determinant variable. One wonders how such a trend makes a patient more or less prone to respond to CPAP. Moreover, different CPAP compliance among OSA groups makes both this hypothesis and ESS outcomes unreliable.

In a nutshell, HRV reflects the relationship between parasympathetic and sympathetic nervous system, and, when abnormal, it raises the risk to future cardiovascular

problems. In regard to the work by Pengo MF *et al.*, we think careful subject characterization and confirmed diagnosis is required, and we agree with the authors that more studies about PR and HRV analysis on assessing CPAP response are needed. Concomitantly, a more reliable pulse oximetry analysis might be used for doubtful OSA wherever access to polygraphy or polysomnography is limited (8-10).

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