



Revista de la Facultad de Medicina

ISSN: 2357-3848

ISSN: 0120-0011

Universidad Nacional de Colombia

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Revista de la Facultad de Medicina, vol. 67, no. 1, 2019, January-March, pp. 7-8
Universidad Nacional de Colombia

DOI: 10.15446/revfacmed.v67n1.79386

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Editorial

DOI: <http://dx.doi.org/10.15446/revfacmed.v67n1.79386>

Comments on split-night polysomnography

The need for speeding up the diagnosis and treatment of sleep-disordered breathing has increased in recent years. In order to achieve that, a split-night protocol has been implemented, in which the patient with suspected sleep-disordered breathing undergoes a diagnostic and therapeutic study in one night. Elshaug *et al.* (1), by using the split-night protocol, were able to reduce the time to initiate continuous positive airway pressure (CPAP) therapy by 15% in patients with severe obstructive sleep apnea. However, reviewing the limitations of said protocol is necessary to make it more streamline.

On the one hand, the importance of the first 2 to 3 hours of the night to diagnose sleep apnea should be considered; the more severe the sleep apnea is, the more relevant the split-night protocol will be for the decision-making process. On the other hand, the success of the protocol could be affected by the first-night effect, since patients are not be able to fall asleep within the first 2 to 3 hours of the study, which is important in patients who have comorbid insomnia and sleep-disordered breathing. (2) Although night-to-night variability does not affect the mean hypopnea apnea index (AHI) at different nights, 35 % of the patients present with a difference in AHI >10 events per hour at different nights. (3)

In 1997, the practice guidelines of the American Academy of Sleep Medicine (AASM) (4) stated that split-night polysomnography (SNPSG) is acceptable only when the AHI is ≥ 40 for a minimum of 2 hours of diagnostic PSG, but clinical judgment suggests that AHI >20 is a more lenient threshold and is appropriate. The criteria implemented in this AASM document was based on articles written by Sanders *et al.* (5), Yamashiro & Kryger (6) and Iber *et al.* (7), but if these criteria were adopted, 60% of the population with AHI >5 would not be candidate for SNPSG.

Furthermore, those articles show that an effective pressure was found in 320 (78%) patients during their split-night protocol. Yamashiro & Kryger (6) concluded that in a population with obstructive sleep apnea-hypopnea syndrome (OSAHS) and AHI >40, there was no difference when compared to a full-night CPAP titration study. Nevertheless, when the full-night AHI was <20, full-night titration pressures were higher by 1.5 cmH₂O on average than split-night titration. In a population with AHI <20, less than 3 hours were available for CPAP titration, which was considered as unacceptable at the time.

These strict and outdated parameters established to implement a SNPSG protocol have been recently challenged by a paper (8) where the AHI derived from the first 2 or 3 hours of sleep had sufficient diagnostic accuracy to rule out OSAHS, with a threshold of 5 in patients with suspected OSAHS. That study compared the concordance correlation coefficients of the respiratory indexes between 2-hour, 3-hour, and full-night polysomnography, which were very good (above 0.92). This study also suggested that the current recommended threshold for split-night studies (AHI ≥ 20 to 40) should

be revised and taken to a lower number, allowing for a more efficient use of the resources.

The paper published by Osuna-Suárez *et al.* (9), and presented in this issue of the journal, tries to establish the relevance of using a split-night protocol in the workflow of their sleep laboratory. This study is an observational, longitudinal, retrospective analysis with non-consecutive patients referred to a sleep center. In their sample, there was a high incidence of obstructive sleep apnea since 54.7% of patients were in the severe sleep apnea category. The criteria used for being included in the sleep study and qualify for the split-night protocol required that the patient had 3 hours of recording and AHI >20/h or AHI 5-20/h, in addition to adequate presence of supine position and REM sleep. Among the patients who qualified for split protocol, 77% were able to have adequate titration, but in one fifth of the patients, the CPAP titration was inadequate requiring a second CPAP titration sleep study.

Although this was not studied by Osuna-Suárez *et al.* (9), the literature states that the use of a split-night protocol affect the degree of future treatment response to CPAP (9,10). SNPSG does not adversely affect short-term continuous positive airway pressure adherence in patients with obstructive sleep apnea. (11) In fact, Collen *et al.* (12) gathered 267 patients who underwent a split protocol, of which 133 underwent dual-night studies. They found no difference in the therapeutic adherence between the groups as measured by percentage of nights used (78.7% vs. 77.5%; $p=0.42$), hours per night used (3.9 vs. 3.9; $p=0.95$), or percentage of patients using continuous positive airway pressure for >4 hours per night during >70% of nights (52.9% vs. 51.8%; $p=0.81$). In addition, there was no difference in use after adjusting for severity of disease.

In conclusion, SNPSG is a viable alternative in a daily sleep practice. The medical staff involved should be aware of the limitations of this modality and less strict criteria than that chosen by the AASM may be necessary. The most important piece of advice is to avoid this modality in patients that require more than 3 hours to achieve a diagnosis or more than 3 hours to receive adequate treatment.

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