Letter

Respiratory arousal control needed for insomnia OSA patients—authors’ reply

Barry Krakow\textsuperscript{a,b,*}, Natalia D. McIver\textsuperscript{a,b}, Victor A. Ulibarri\textsuperscript{a,b}

\textsuperscript{a} Sleep & Human Health Institute, 6739 Academy Rd NE, Ste 380, Albuquerque, NM 87109, USA
\textsuperscript{b} Maimonides Sleep Arts & Sciences, Ltd., 6739 Academy Rd NE, Ste 380, Albuquerque, NM 87109, USA

\begin{ARTICLEINFO}

\ArticleHistory{Received 31 October 2019\newline Accepted 4 November 2019\newline Available online 25 November 2019}

The letter by Johnson & Johnson highlights important clinical variations on how sleep centers conduct titration studies to treat obstructive sleep apnea (OSA)/upper airway resistance syndrome (UARS). The American Academy of Sleep Medicine recommends decreasing the Respiratory Disturbance Index (RDI= total apneas+hypopneas+RERAs) to below 5 events/h. However, these subtle RERA (respiratory effort-related arousal) breathing events are largely ignored by most sleep centers that instead appear to focus exclusively on decreasing the apnea-hypopnea index (AHI) \cite{1}. Note Johnson & Johnson raised the issue of RERAs/RDI and their treatment, yet later only mention AHI and do not describe how they resolve RERAs to bring the RDI < 5.

Nonetheless, eliminating RERAs is not straightforward, and we have found CPAP wanting as it almost invariably triggers expiratory pressure intolerance (EPI) when pressures are raised to eliminate RERAs. This phenomenon of EPI is most notable in mental health patients with OSA/UARS, the cases we have specialized in treating for a quarter century. EPI is associated with objectively disrupted sleep quality (more sleep stage transitions, less REM consolidation, and greater arousal activity or awakenings \cite{2}); and, adaptive servo-ventilation (ASV) use has been associated with reversal of these sleep architecture abnormalities \cite{2}. Indeed, among 4000+ cases of CPAP failure referred to us for second opinions, in every instance patients presented with EPI or central apneas or both on their first titration study, despite actively having been using CPAP for months or years \cite{3}. This phenomenon is most pronounced in trauma patients who described EPI as “drowning in air.” From our perspective, reliance on CPAP in a sizeable proportion of OSA/UARS patients violates the dictum, primum non nocere. Accordingly, 15 years ago we ceased use of CPAP and switched all patients to bilevel modes.

In our study, we proved ASV was superior to CPAP in yielding not only greater reductions in RERAs/RDI, but also in yielding significantly greater time spent with normalized breathing—a new metric we devised to highlight the value of looking at airflow improvement as opposed to residual breathing events \cite{4}. Unfortunately, no evidence-based standard in the field of sleep medicine defines normalized breathing, thus we offered this metric as a starting point to guide further research. Clinically, we use the model developed by Condos et al. to round the airflow curve \cite{5} as a consistently useful approach to fine-tune pressurised air settings. The vast majority of our patients are prescribed auto-bilevel or ASV, following manual titration of auto-adjusting technology in the sleep lab. This manual override of the auto-adjusting technology is a nuanced approach to ensure RERAs are eliminated while preventing EPI.

\DeclarationofCompetingInterest

Authors NDM and VAU report grants from ResMed Science during the conduct of the study.

Author BK reports: 6 main activities related to his work in sleep medicine:
- For websites, Dr. Krakow owns and operates 6 sites that provide education and offer products and services for sleep disorders patients: www.nightmaretrement.com: www ptsdsleepclinic.com: www sleeptreatment.com: wwwsleepdynamictherapy.com: wwwsound sleepsoundmind.com: wwwnocturiacures.com
- For professional services, he is the medical director of a national DME company Classic SleepCare for which his sole functions are consultation and QA; he has neither patient encounters nor does he benefit from the sale of any DME equipment. For intellectual property, Dr. Krakow markets and sells 3 books for sleep disorders patients: Insomnia Cures, Turning Nightmares into Dreams, and Sound Sleep, Sound Mind. For clinical services, he owns and operates one commercial sleep center: Maimonides Sleep Arts & Sciences, Ltd. For educational and consulting services: Dr. Krakow conducts CME/CEU educational programs for medical and mental health providers to learn about sleep disorders. Sometimes these programs involve the attendee paying a fee directly to Maimonides Sleep Arts & Sciences. Other times, he conducts the workshops at other locations, which may be paid for by vendors such as Respironics and RESMED or other institutions such as the AMEDDC&S, VAMC, and regional sleep center conferences. He is also president and principal investigator of a non-profit sleep research institute: Maimonides Sleep Arts & Sciences, Ltd. For educational programs, he conducts the workshops at other locations, which may be paid for by vendors such as Respironics and RESMED or other institutions such as the AMEDDC&S, VAMC, and regional sleep center conferences. He is also president and principal investigator of a non-profit sleep research institute: Maimonides Sleep Arts & Sciences, Ltd.

\DOI{10.1016/j.eclinm.2019.10.018}

* Corresponding author at: Sleep & Human Health Institute, 6739 Academy Rd NE, Ste 380, Albuquerque, NM 87109, USA.

E-mail address: bkrakow@sleeptreatment.com (B. Krakow).

https://doi.org/10.1016/j.eclinm.2019.11.002

2589-5370/© 2019 Published by Elsevier Ltd. This is an open access article under the CC BY-NC-ND license. (http://creativecommons.org/licenses/by-nc-nd/4.0/)
center, the Sleep & Human Health Institute (www.sleepingresearch.org, www.shhi.org) that occasionally provides consultation services or receives grants for pilot studies, the most recent: ResMed ~$400,000 January 2015 (funding for this randomized control trial of treatment in insomnia patients). Recently, and after this research had been conducted, he provided a brief consultation to ASOCorp, a medical supply company that manufactures nasal strips.

Reference

[1] Krakow B, Krakow J, Ulibarri VA, et al. Frequency and accuracy of “RERA” and “RDI” terms in the journal of clinical sleep medicine from 2006 through 2012. J Clin Sleep Med 2014;10(2):121–4.

[2] Krakow B, Ulibarri VA, Romero EA, et al. Adaptive servo-ventilation therapy in a case series of patients with co-morbid insomnia and sleep apnea. J Sleep Disord: Treat Care 2013;2(1):1–10.

[3] Krakow B, Ulibarri VA, McIver ND, et al. Reversal of pap failure with the repap protocol. Respir Care 2017;62(4):396–408.

[4] Krakow B, McIver ND, Ulibarri VA, et al. Prospective randomized controlled trial on the efficacy of continuous positive airway pressure and adaptive servo-ventilation in the treatment of chronic complex insomnia. E Clin Med 2019;13:57–73.

[5] Condos R, Norman RC, Krishnasamy L, et al. Flow limitation as a noninvasive assessment of residual upper-airway resistance during continuous positive airway pressure therapy of obstructive sleep apnea. Am J Respir Crit Care Med 1994;150(2):475–80.