The Quest to Improve CPAP Adherence—PAP Potpourri is Not the Answer

Commentary on Powell et al. A pilot study assessing adherence to auto-bilevel following a poor initial encounter with CPAP. *J Clin Sleep Med* 2012;8:43-47.

Stuart F. Quan, M.D., FAASM^{1,2}; Karim M. Awad, M.D.¹; Rohit Budhiraja, M.D., FAASM^{3,4}; Sairam Parthasarathy, M.D., FAASM⁴

¹Division of Sleep Medicine, Brigham and Women's Hospital and Harvard Medical School, Boston, MA; ²Arizona Respiratory Center; University of Arizona College of Medicine, Tucson, AZ; ³Pulmonary and Critical Care Medicine Section, Southern Arizona VA Health Care System, Tucson, AZ; ⁴Pulmonary and Critical Care Medicine Section, Department of Medicine, University of Arizona College of Medicine, Tucson, AZ

Continuous positive airway pressure (CPAP) is considered the gold standard for effective treatment of obstructive sleep apnea (OSA). However, many patients refuse to initiate or adhere to this form of therapy. Thus, a variety of interventions have been explored to improve CPAP compliance, ranging from sleep hypnotics¹ to nasal steroids,² but variations in the methodology of delivering positive airway pressure (PAP) are commonly advocated to improve adherence.

In this issue of the *Journal*, there are 2 superficially unrelated papers pertaining to delivery of PAP to patients with obstructive sleep apnea (OSA). In the first paper, Marcus and colleagues describe a randomized clinical trial in children with OSA of standard CPAP or a proprietary mode of PAP during which pressure decrements during both late inspiration and expiration were permitted.³ There was no difference in adherence between the 2 modes after 3 months. With both modes, adherence was suboptimal, with substantial variability in hours of usage within the experimental groups. In the second paper by Powell and colleagues,⁴ a group of adults with OSA who had a suboptimal laboratory CPAP titration were randomized to either standard CPAP or a proprietary auto-adjusting bilevel device with inspiratory and expiratory pressure relief options. Similar to the study by Marcus et al., there was no difference in adherence after 3 months. However, the absence of statistical significance between the 2 groups despite 73% of bilevel users being compliant to PAP therapy vs. 59% in the CPAP group could reflect that the study may have been underpowered to detect a smaller, but clinically meaningful, difference (Type II error). Nonetheless, 2 studies are presented, 1 in children and 1 in adults. Both tested an alternative new method of delivering PAP, with results in both failing to show any clear advantages with the new technology.

What are the lessons to be learned from these 2 studies? First, it does not seem that for the average patient, either child or adult, there is any clear advantage to using these newer modes of delivering PAP. Admittedly, there is less data concerning PAP adherence in children, and it is possible that future studies may provide greater clarity for this group. However, given the heterogeneity in results from a number of studies, routine use

of auto-bilevel or flexible inspiratory or expiratory relief cannot be recommended. Nevertheless, for an individual patient, these alternatives may address an impediment to using PAP and increase adherence. Second, new PAP modes do not appear to be the “magic bullet” to improve suboptimal adherence to PAP. A recent meta-analysis of auto-CPAP studies found no adherence benefits.⁵ Similarly, a prior Cochrane systematic review had suggested that the effect of auto-CPAP in increasing hours of use was still unclear. The study of Powell and colleagues would be responsive to the need to fill that particular knowledge gap by providing additional information to suggest that the auto-bilevel modality confers no improvement in adherence.⁶ Although unproven, some patients, such as those who require high treatment pressures, may have better adherence with auto-CPAP. Unfortunately, such a subpopulation of patients was not the target for the current study by Powell et al. in this issue of the *Journal*. Fourth, a recent study has suggested that high air leak levels are associated with poor adherence to auto-PAP therapy.⁷ Newer device technologies that abrogate air leak may facilitate adherence, and such newer device technologies need to be conceived and tested. Finally, such negative device trials suggest that any improvement in PAP adherence rates will more likely occur by addressing social and psychological obstacles to usage rather than newer technical innovations in PAP delivery or interface design.⁸⁻¹⁰

These 2 studies remind us that new therapeutic approaches to the treatment of OSA are needed. Despite newer PAP modes/interfaces, multiple types of oral appliances, and a variety of surgical approaches, a large number of patients are left without a viable treatment alternative. There is a substantial body of research that has provided information regarding the pathophysiology of OSA, and certainly more needs to be learned. However, translation of this knowledge into useful treatment options for patients remains an elusive goal.

CITATION

Quan SF; Awad KM; Budhiraja R; Parthasarathy S. The quest to improve CPAP adherence—PAP potpourri is not the answer. *J Clin Sleep Med* 2012;8(1):49-50.

REFERENCES

1. Lettieri CJ, Shah AA, Holley AB, et al. Effects of a short course of eszopiclone on continuous positive airway pressure adherence: a randomized trial. *Ann Intern Med* 2009;151:696-702.
2. Ryan S, Doherty LS, Nolan GM, McNicholas WT. Effects of heated humidification and topical steroids on compliance, nasal symptoms, and quality of life in patients with obstructive sleep apnea syndrome using nasal continuous positive airway pressure. *J Clin Sleep Med* 2009;5:422-7.
3. Marcus CL, Beck SE, Traylor J, et al. Randomized, double-blind clinical trial of two different modes of positive airway pressure therapy on adherence and efficacy in children. *J Clin Sleep Med* 2012;8:37-42.
4. Powell ED, Gay PC, Ojile JM, Litinski M, Malhotra A. A pilot study assessing adherence to auto-bilevel following a poor initial encounter with CPAP. *J Clin Sleep Med* 2012;8:43-7.
5. Ayas NT, Patel SR, Malhotra A, et al. Auto-titrating versus standard continuous positive airway pressure for the treatment of obstructive sleep apnea: results of a meta-analysis. *Sleep* 2004;27:249-53.
6. Haniffa M, Lasserson TJ, Smith I. Interventions to improve compliance with continuous positive airway pressure for obstructive sleep apnoea. *Cochrane Database Syst Rev* 2004;(4):CD003531.
7. Valentin A, Subramanian S, Quan SF, Berry RB, Parthasarathy S. Air leak is associated with poor adherence to autoPAP therapy. *Sleep* 2011;34:801-6.
8. Stepnowsky CJ, Palau JJ, Gifford AL, Ancoli-Israel S. A self-management approach to improving continuous positive airway pressure adherence and outcomes. *Behav Sleep Med* 2007;5:131-46.
9. Weaver TE, Grunstein RR. Adherence to continuous positive airway pressure therapy: the challenge to effective treatment. *Proc Am Thorac Soc* 2008;5:173-8.
10. Aloia MS, Arnedt JT, Stepnowsky C, Hecht J, Borrelli B. Predicting treatment adherence in obstructive sleep apnea using principles of behavior change. *J Clin Sleep Med* 2005;1:346-53.

SUBMISSION & CORRESPONDENCE INFORMATION

Submitted for publication December, 2011

Accepted for publication December, 2011

Address correspondence to: Stuart F. Quan, M.D., Division of Sleep Medicine, Harvard Medical School, 401 Park Dr., 2nd Floor East, Boston, MA 02215; Tel: (617) 998-8842; Fax: (617) 998-8823; E-mail: squan@arc.arizona.edu

DISCLOSURE STATEMENT

Dr. Quan is Editor-in-Chief of *Journal of Clinical Sleep Medicine*. The other authors have indicated no financial conflicts of interest.