More Isn’t Always Better: Cost-Effectiveness Analysis and the Case for Using a Split-Night Protocol  

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As sleep physicians, we should be concerned about not only the improvement of our patients’ health but also whether we are unnecessarily burdening our patients or society with treatments that do not provide good value for money. This is particularly important in the case of the diagnosis of and initiation of continuous positive airway pressure (CPAP) treatment for obstructive sleep apnea because the high prevalence of undiagnosed disease, as well as the high costs of the standard approach (2 nights of polysomnography), impose a significant economic burden on society. A number of alternative strategies for the diagnosis and treatment initiation are available. The debate about which approach is the best is contentious and may be obscured by issues that include physicians’ familiarity with strategies or personal financial incentives.

Cost-effectiveness analysis is a technique that provides a framework for assessing value for money among alternative treatment strategies. It summarizes relevant information to determine how to best allocate limited healthcare resources. Unfortunately, this estimation technique is not immune to bias and inaccuracy. Its trustworthiness depends on the skill of the analysts, the development of a realistic decision tree, and the use of data from valid studies in the medical literature. Of particular concern is when objective data are insufficient or not available in the medical literature and “reasonable” assumptions based on experience are made. We need to become familiar with cost-effectiveness analysis as a tool, given its possible use by those who control and allocate healthcare resources.

In this issue of the Journal of Clinical Sleep Medicine, Deutsch et al provide a useful cost-effectiveness analysis that compares the standard approach with 2 alternative methods of diagnosing and initiating treatment for sleep apnea. The analysis presented is unique in that it includes split-night polysomnography (PSG) as one of the methods. Split-night PSG is a sleep study during which the first 2 or more hours of the sleep period are used to assess obstructive sleep apnea, and, if criteria are met, CPAP titration is performed during the remainder of the night. Otherwise, a second standard CPAP-titration study is performed. A second CPAP-titration study can also be performed if the initial titration is incomplete. Evidence-based practice parameters by the American Academy of Sleep Medicine include the split-night PSG protocol as an acceptable alternative to the standard approach. Nevertheless, surveys suggest that this approach is not routinely used by many sleep physicians.

The authors found that the standard and split-night PSG strategies provide additional gains in quality-adjusted life expectancy (QALY) at an acceptable cost when compared with home-based study followed by CPAP autotitration. This analysis, as well as previously published studies in this area, demonstrate that the diagnosis and treatment of OSA are cost-effective in a clinic population with a high prevalence of symptomatic patients with moderate to severe obstructive sleep apnea, when compared with other accepted medical interventions such as the use of antihypertensive medication.

Which approach is the most cost-effective? The analysis by Deutsch et al suggests that the standard approach or split-night PSG provides similar value and is preferred over home-based study when willingness to pay for an additional quality-adjusted year of survival is greater that $6500. Though the standard approach provides additional benefit in terms of QALY over split-night PSG, the magnitude is very small (0.02 QALY or 7 additional quality-adjusted days of survival). This suggests that, even if the incremental cost-effectiveness of the standard approach compared with split-night PSG is acceptable, the additional benefit gain is small and may not be clinically relevant. Also, even though the additional benefit of using the standard approach over the home-based sleep study is greater in magnitude (0.10 QALY or 36 quality-adjusted days of survival), it is still small relative to the benefit provided by the least-expensive approach (2.23 QALY or 814 quality-adjusted days of survival).

One can even question the finding of minimal additional ben-
The sensitivity analysis from the current study indicates that the relative CPAP acceptance rate of patients who use the standard approach versus a split-night PSG is an important one in determining which approach is superior. The authors chose a higher acceptance rate for the standard approach, even though retrospective controlled studies indicate similar acceptance rates and CPAP compliance. There are no randomized prospective comparisons of these approaches to inform us, with adequate certainty, whether there are differences in long-term compliance between the approaches. The split-night approach may in fact be the superior method (lower cost with equal or greater benefit).

Cost-effectiveness analysis alone, though informative, can not adequately resolve the controversy concerning which of the 3 strategies to use because of insufficient experimental data. Well-powered, randomized, controlled trials of treatment efficacy that collect data on quality of life, health, and economic outcomes are needed to provide more-accurate inputs for a cost-effectiveness analysis. Ideally, these trials would include subjects with the full spectrum of obstructive sleep apnea severity and, therefore, also provide data on the cost-effectiveness of the diagnosis and treatment of patients with mild obstructive sleep apnea. The value of a randomized controlled trial is highlighted by a recent study of alternative CPAP-titration options by Masa et al. The results of this study contradicted the conventional assumption that the standard (most resource intensive) approach is the best; CPAP compliance, as well as improvements in subjective sleepiness and apnea-hypopnea index, were similar in groups that had CPAP pressures chosen by polysomnography, autotitrator, or a prediction formula. The sleep community needs to vigorously pursue clinical trials to evaluate split-night and other potentially resource-saving methods such as home-testing options so we have the information to appropriately treat our patients.

As sleep physicians, we have a responsibility to our patients to provide them with optimal care without wasting their money and time. We also have a responsibility to society to use shared resources wisely. Previous studies have indicated that a split-night protocol provides similar summary information with regard to indexes of sleep-disordered breathing and comparable results in CPAP acceptance, long-term adherence, and nightly use. In this issue, Deutsch et al present a cost-effectiveness analysis that shows that split-night PSG provides benefits similar to those of the standard approach at a lower cost. We should not wait for outside parties to tell us how to use resources wisely. We need to ignore personal economic incentives and utilize a strategy that saves money and reduces patient inconvenience and time to effective treatment by potentially eliminating the need for a second study night.

REFERENCES