CHEST®

Official publication of the American College of Chest Physicians

Improving Access to Diagnosis and Treatment of Sleep-Disordered Breathing

Barbara Phillips

Chest 2007;132;1418-1420
DOI 10.1378/chest.07-1793

Respiratory Medicine, Alfred Hospital and Monash University.
The author has no conflict of interest to disclose.

Correspondence to: Matthew T. Naughton, MD, PO Box 315, Prahran, 3181, VIC, Australia; e-mail: m.naughton@alfred.org.au
DOI: 10.1378/chest.07-1486

References

1 Brack T, Thuler I, Clarenbach CF, et al. Daytime Cheyne-Stokes respiration in ambulatory patients with severe congestive heart failure is associated with increased mortality. Chest 2007; 132:1463–1471
2 Mansfield DR, Naughton MT. Sleep apnea and congestive heart failure. Minerva Med 2004; 95:257–280
3 Szollosi I, Roebuck T, Thompson B, et al. Lateral sleeping position promotes ventilatory stability in central sleep apnea/Cheyne-Stokes respiration. Sleep 2006; 29:1045–1051
4 Arzt M, Young T, Finn L, et al. Sleepiness and sleep in patients with both systolic heart failure and obstructive sleep apnea. Arch Intern Med Sep 2006; 166:1716–1722
5 Badr MS, Grossman JE, Weber SA. Treatment of refractory sleep apnea with supplemental carbon dioxide. Am J Respir Crit Care Med 1994; 150:561–564
6 Solin P, Roebuck T, Swieca J, et al. Effects of cardiac dysfunction upon non-hypercapnic central sleep apnea. Chest 1998; 113:104–110
7 Corra U, Pistono M, Mezzani A, et al. Sleep and exertional periodic breathing in chronic heart failure. Circulation 2006; 113:44–50
8 Chiu KL, Ryan CM, Shiota S, et al. Fluid shift by lower body positive pressure increases pharyngeal resistance in healthy subjects. Am J Respir Crit Care Med 2006; 174:1378–1383
9 Roebuck T, Solin P, Kaye DM, et al. Increased long-term mortality in heart failure due to sleep apnoea is not yet proven. Eur Respir J 2004; 23:735–740
10 Naughton MT. Is Cheyne-Stokes respiration detrimental in patients with heart failure? Sleep Breathing 2000; 4:127–128
11 Bradley TD, Logan AG, Kimoff RJ, et al. Continuous positive airway pressure for central sleep apnea and heart failure. N Engl J Med 2005; 353:2025–2033
12 Owan TE, Hodge DO, Herges RM, et al. Trends in prevalence and outcome of heart failure with preserved ejection fraction. N Engl J Med 2006; 355:251–259

Improving Access to Diagnosis and Treatment of Sleep-Disordered Breathing

This issue of *CHEST* includes "Topics in Practice Management" articles addressing split-night polysomnography and portable monitoring.[1,2] Both reviews are well written, current, and immediately relevant to the practice of sleep medicine, but they don't help us with many daily management conundrums, nor do they address serious deficiencies in our current approach to the diagnosis of sleep apnea. For example, the review of split-night polysomnography fails to address such practical questions as, "What do we do when we fail to accomplish an excellent continuous positive airway pressure (CPAP) titration, achieving rapid eye movement sleep, supine, for adequate time?" As of this writing, the infamous "2-h rule" (the Centers for Medicare and Medicaid Services [CMS] requires 2 h of sleep prior to CPAP initiation in a split-night study) makes it quite difficult to accomplish everything that needs to be done in an adequate CPAP titration in a single night, or even a full night. Then what? Options include trying to get the patient to return for another study, using the last pressure reached in the attempted titration, using autotitrating CPAP, or simply guessing what pressure to apply. Fortunately, that usually turns out okay; multiple studies[3–5] of classical obstructive sleep apnea patients have established that in-laboratory CPAP titration does not improve outcomes compared with autotitrating, algorithm-derived, or empiric CPAP titration. The approach of Hukins et al[4] is particularly pragmatic. This group showed that basing CPAP pressure on the patient's body mass index resulted in outcomes similar use of laboratory-titrated pressures. Indeed, most people wind up receiving CPAP at 10 ± 2 cm H_2O. In my view, the main value of in-laboratory titration is that it gives the patient a chance to experience and be educated about CPAP by a competent health-care professional. Of course, this might be better done during the daytime when everyone is awake!

The second "Topics in Practice Management" article addresses portable (home) diagnosis of sleep apnea, which has long been advocated as a way to reduce the time and cost of diagnosis.[2] Multiple ambulatory systems exist, and most can monitor the same parameters as does in-laboratory polysomnography. Indeed, the Sleep Heart Health Study (SHHS) was done using unattended polysomnography in the home. Oximetry appears to be the most reliable and predictive component of portable or laboratory-based polysomnography.[6,7] The oxygen desaturation index has been used in the United Kingdom and much of Western Europe for more than a decade. In fact, scoring criteria in the SHHS required a 4% oxyhemoglobin desaturation to score either an apnea or a hypopnea because scorers could not achieve interrater reliability of apneas and hypopneas otherwise.[8] In other words, the SHHS outcome data are essentially based on oximetry.

As of this writing, the CMS is once again evaluating its policies about the use of portable monitoring for diagnosis of suspected sleep apnea. Not coincidentally, the Agency for Health Quality Research (AHQR) recently issued an exhaustive and mostly positive review of the clinical utility of portable

monitoring.[9] Unlike some previous work in which the apnea-hypopnea index (AHI) generated by portable monitors was compared to that of in-laboratory polysomnography, the AHRQ analysis addresses more valid questions, such as whether or not portable monitoring can be used to predict clinical outcomes. Among the key findings of this report was that although facility-based polysomnography is the reference method to identify people with AHI suggestive of sleep apnea, it does not mean that facility-based polysomnography is an error-free "gold standard" for the diagnosis of sleep apnea, which requires a clinical evaluation. For those with a high probability for obstructive sleep apnea/hypopnea syndrome, initial management with facility-based polysomnography does not result in better outcomes than an ambulatory approach in terms of diagnosis or CPAP titration. Based on this report and the burgeoning numbers of patients with suspected sleep apnea, I think it is likely that by the time you read this, the CMS will have endorsed portable monitoring as the primary diagnostic tool for sleep-disordered breathing.

A colleague's physician obstructive sleep apnea was recently diagnosed by his spouse; my colleague asked me whether he should try CPAP, or just purchase a machine, with no interest in undergoing polysomnography. This patient (and many others I have encountered) made it clear that he would not be making a trip to the sleep laboratory for overnight testing: it's either empiric CPAP or nothing. Considering this, I chose to give him advice about how to go about it because I believe that the routine requirement of polysomnography prior to safe effective treatment directly opposes a major public health principle. We should remove, not impose, barriers between patients with deadly diseases and safe, effective treatments.

Faced with the reality that testing (and retesting) impose fiscal, physical, and temporal barriers to treatment of sleep apnea, a few intrepid investigators have evaluated bypassing the sleep laboratory altogether. Mulgrew and colleagues[10] applied autotitrating CPAP to patients with a high likelihood of sleep apnea and demonstrated comparable outcomes to those who went through the sleep laboratory. The only difference was that the group that bypassed the sleep laboratory had better adherence to CPAP! Senn at al[11] have gone one better; these investigators recruited classical obstructive sleep apnea patients and effectively demonstrated excellent outcomes with the use a therapeutic trial of CPAP as a diagnostic test.

At this juncture, I must emphasize three caveats. First, it is clear that empiric CPAP should not be used in patients with congestive heart failure or central sleep apnea. The Continuous Positive Airway Pressure for Patients With Central Sleep Apnea and Heart Failure study[12] demonstrated that central sleep apnea due to congestive heart failure requires in-laboratory CPAP titration to find out who is responding to CPAP and who is not because those who don't respond are more likely to die. Second, screening tests (whatever they are) can be used to rule in sleep apnea, but cannot be used to rule it out. Individuals with negative oximetry, portable testing, or empiric CPAP trial results must be carefully tested for sleep-disordered breathing. Finally, use of screening tests is applicable only to high-risk groups: the classic, sleepy, chubby individual with witnessed apneas.

In truth, I personally don't see much use for portable polysomnography. Some people (and if you have read this far, you know who they are) should probably be promptly started on autotitrating or empiric CPAP pressure, with careful, expert follow-up to address mask issues, reinforce adherence, adjust pressure, and to take care of the patient. For the atypical patient, what is needed is a carefully done and meticulously interpreted in-laboratory polysomnogram. Unfortunately, the end result of our overemphasis on testing is that we have too few of these evaluations and have too many "apnea mills."

I fear that we in organized sleep medicine have missed the boat by focusing on the test rather than on the patient. As recently noted by the Institute of Medicine.[13]

> Despite the importance of early recognition and treatment, the primary focus of most existing sleep centers appears to be on diagnosis, rather than on comprehensive care of sleep loss and sleep disorders as chronic conditions. This narrow focus may largely be the unintended result of compliance with criteria for accreditation of sleep laboratories, which emphasize diagnostic standards and reimbursement, for diagnostic testing.

Sleep apnea is as prevalent (and probably as deadly) as is asthma. Unlike asthma, however, sleep apnea kills those who do not have it because it unquestionably increases the risk of car crashes.[14] This makes it a public health problem of significant magnitude. In our obsession with testing, we have failed both to address our responsibility for public health, and to establish the reputation of sleep medicine clinicians as experts in patient care. Unless we can offer our generalist colleagues and their patients genuine expertise in the clinical management of sleep-disordered breathing, we will rapidly become superfluous.

CHEST is second only to the journal *Sleep* in the number of publications about sleep apnea.[15] Let's use our bully pulpit to push the envelope with new

data about the management of sleep-disordered breathing that improves the care of our patients and promotes public health.

Barbara Phillips, MD, MSPH, FCCP
University of Kentucky College of Medicine
Lexington, KY

Dr. Phillips is Professor, Division of Pulmonary, Critical Care and Sleep Medicine, Department of Internal Medicine, University of Kentucky College of Medicine.
As a Director of a Sleep Center, Dr. Phillips can expect a fiscal downturn if and when diagnosis and treatment of sleep-disordered breathing routinely occur outside of a sleep center. As a member of the Medical Review Board of the Federal Motor Carrier Safety Administration, Dr. Phillips can expect motor vehicle crash deaths due to untreated sleep apnea to decline if and when the diagnosis and treatment of sleep-disordered breathing become less cumbersome and more accessible. As a member of the leadership of both the Sleep Institute of the American College of Chest Physicians and the Board of Directors of the National Sleep Foundation, the author has a vested interest in promoting and enhancing the viability and credibility of sleep medicine.

Correspondence to: Barbara Phillips, MD, MSPH, FCCP, University of Kentucky College of Medicine, 119 Sycamore Rd, Lexington, KY 40502; e-mail: Bphil95@aol.com
DOI: 10.1378/chest.07-1793

References

1 Patel NP, Ahmed M, Rosen I. Topics in practice management: split-night polysomnography. Chest 2007; 132:1664–1671
2 Ahmed M, Patel NP, Rosen I. Topics in practice management: portable monitors in the diagnosis of obstructive sleep apnea. Chest 2007; 132:1672–1677
3 Masa JF, Jimenez A, Duran J, et al. Alternate methods of titrating continuous positive airway pressure: a large multicenter study. Am J Respir Crit Care Med 2004; 170:1218–1224
4 Hukins C. Arbitrary-pressure continuous positive airway pressure for obstructive sleep apnea syndrome. Am J Respir J Crit Care Med 2005; 171:500–505
5 West SD, Jones DR, Stradling JR. Comparison of three ways to determine and deliver pressure during nasal CPAP therapy for obstructive sleep apnoea. Thorax 2006; 61:226–231
6 Whitelaw WA, Brant R, Flemons WW. Clinical usefulness of home oximetry compared with polysomnography for assessment of sleep apnea. Am J Respir Crit Care Med 2005; 171:188–193
7 Netzer N, Eliasson AH, Netzer C, et al. Overnight pulse oximetry for sleep-disordered breathing in adults: a review. Chest 2001; 120:625–633
8 Quan SF, Griswold ME, Iber C, and Sleep Heart Health Study (SHHS) Research Group. Short-term variability of respiration and sleep during unattended nonlaboratory polysomnography: the Sleep Heart Health Study. Sleep 2002; 25:843–849
9 Trikalinos TA, Ip S, Gowri R, et al. Home diagnosis of obstructive sleep apnea-hypopnea syndrome. Rockville MD: Agency for Health Care Research and Quality, 2007
10 Mulgrew AT, Fox N, Ayas NT, et al. Diagnosis and initial management of obstructive sleep apnea without polysomnography: a randomized validation study. Ann Intern Med 2007; 146:157–166
11 Senn O, Brack T, Russi EW, et al. A continuous positive pressure airway trial as a novel approach to the diagnosis of the obstructive sleep apnea syndrome. Chest 2006; 129:67–75
12 Arzt M, Floras JS, Logan AG, et al, and the CANPAP Investigators. Suppression of central sleep apnea by continuous positive airway pressure and transplant-free survival in heart failure: a *post hoc* analysis of the Canadian Continuous Positive Airway Pressure for Patients with Central Sleep Apnea and Heart Failure Trial (CANPAP). Circulation 2007; 115:3173–3180
13 Colten HR, Altevogt BM, eds. Sleep disorders and sleep deprivation: an unmet public health problem. Washington, DC: National Academies Press, 2006; 11
14 George CF. Reduction in motor vehicle collisions following treatment of sleep apnoea with nasal CPAP. Thorax 2001; 56:508–512
15 Lavie P. History of sleep apnea research [abstract]. Sleep Med 2006; 7:S1

Caring Well for the Families of Our Patients

In this issue of *CHEST* (see page 1425), Wall and associates report that family members of patients who died in the ICU rated satisfaction with care higher than families of survivors.[1] At first glance, this seems paradoxical. The prime directive for critical care is to save lives, and while we acknowledge often struggling against long odds, a patient's death can feel like a failure to all involved.

To investigate this phenomenon, the researchers surveyed family members 4 to 8 weeks after a patient's death or discharge from the ICU using a modified and validated version of the Family Satisfaction with ICU Care Survey.[2] Ordinal regression revealed that decedents' families were more satisfied with specific aspects of care, such as being included in decision making, communication with professionals, consideration of their family's needs, and the emotional support, respect, and compassion they received. In fact, these findings are consistent with a series of studies[3] to emerge from efforts to integrate key principles and best practices of palliative medicine within critical care.

One contribution palliative medicine brings to critical care is the recognition that death is not the worst possible outcome of serious illness or injury. Simply put, worse than death is dying badly. In 1995, a study by the SUPPORT Principal Investigators[4] captured national attention in reporting that half of all patients who died in five academic hospitals—including the 38% who had spent ≥ 10 days in an ICU—were believed by families to have been in moderate or severe pain during their last days of life.

We have come a long way since then. Pain is

Improving Access to Diagnosis and Treatment of Sleep-Disordered Breathing

Barbara Phillips

Chest 2007;132; 1418-1420
DOI 10.1378/chest.07-1793