

Cost Justification for Diagnosis and Treatment of Obstructive Sleep Apnea

Position Statement of the American Academy of Sleep Medicine

INTRODUCTION

SINCE OBSTRUCTIVE SLEEP APNEA SYNDROME (OSAS) WAS FIRST DEFINED 30 YEARS AGO, there has been a substantial increase in health care costs related to diagnosis and treatment of disorders of breathing during sleep. Though the health benefits of treating sleep-disordered breathing (SDB) are well established, the potential cost savings to health care insurers of detecting and treating SDB have only recently been explored. This paper reviews current evidence supporting cost justification for the current standards of practice in detecting and treating SDB.^{1,2}

EVIDENCE FOR COST JUSTIFICATION

Untreated SDB is associated with an increased risk of morbidity and mortality. From retrospective and matched control studies, mortality appears to be related in a graded fashion to the intensity of SDB and is highly influenced by co-morbidity.³⁻⁶ Sleep-disordered breathing likely plays a causal or contributing role in the development of comorbidities such as hypertension⁷⁻⁹ and cardiovascular events.^{10,11} Untreated SDB is also associated with increased risk of motor vehicle accidents in controlled studies.^{12,13}

Prior to treatment, patients with untreated sleep apnea are more likely to be hospitalized and incur higher health care costs than matched control subjects. In one two-year study of 97 untreated sleep apnea patients, hospitalization days were increased 2.8-fold and incurred excess hospital costs of \$100,000-\$200,000, and physician costs for sleep apnea patients doubled.¹⁴ The same group performed a follow-up 10-year study of 181 patients which demonstrated an increase in hospital stays of 2.5 days and a 101% excess physician costs for patients as compared to control subjects.¹⁵ In another study of 238 patients with obstructive sleep apnea (OSA) compared to age- and gender-matched control subjects, mean annual medical cost prior to diagnosis was \$2720 for patients vs. \$1384 for control subjects.¹⁶ In this study, the magnitude of medical costs correlated with the intensity of SDB.

There is only one study detailing the effect of treatment of SDB on costs of health care utilization.¹⁷ Physician costs and hospitalization of 344 patients with the clinical

diagnosis of OSA were examined for two years following the diagnosis, and then compared for the same periods of time with control subjects matched for gender, age, and location. Compared to the difference in cost of physician claims between patients and matched control subjects before treatment, physician costs fell 33% after treatment. Duration of hospital stays for sleep apnea patients decreased from 1.27 days \pm 0.25(SE) per patient per year one year before diagnosis to 0.54 \pm 0.13 per patient per year ($p=0.01$). These differences in physician costs and hospital stay were only significant in patients adhering to treatment.¹⁷

There appear to be cost advantages to including sleep-monitoring procedures in the diagnosis of SDB. A recent cost analysis of the benefit of including sleep monitoring procedures in the detection of SDB demonstrated cost savings of \$9200-\$13400 per quality-adjusted life year gained.¹⁸ The cost of using polysomnography (PSG) in detecting SDB compares favorably with other outpatient diagnostic tests. A diagnostic PSG is one-fourth the cost of screening asymptomatic patients for carotid stenosis.¹⁸

CONCLUSIONS

Diagnosis and treatment of sleep-disordered breathing (SDB) are justifiable on the basis of short-term and lifetime cost savings.

Diagnosis and treatment of SDB are more efficiently accomplished by physician evaluation and sleep monitoring rather than physician evaluation alone.

REFERENCES

1. Anonymous. Practice parameters for the treatment of obstructive sleep apnea in adults: the efficacy of surgical modifications of the upper airway. Report of the American Sleep Disorders Association. *Sleep* 1996;19(2):152-5.
2. Anonymous. Practice parameters for the indications for polysomnography and related procedures. Polysomnography Task Force, American Sleep Disorders Association Standards of Practice Committee. *Sleep* 1997;20(6):406-22.
3. Lindberg E, et al. Increased mortality among sleepy snorers: a prospective population based study [see comments]. *Thorax* 1998;53(8):631-7.
4. Lavie P, et al. Mortality in sleep apnea patients: a multivariate analysis of risk factors [see comments]. *Sleep* 1995;18(3):149-57.
5. He J, et al. Mortality and apnea index in obstructive sleep apnea. Experience in 385 male patients. *Chest* 1988;94(1):9-14.

6. Zaninelli A, et al. Snoring and risk of cardiovascular disease. *International Journal of Cardiology* 1991;32(3):347-51.
7. Young T, et al. Snoring as part of a dose-response relationship between sleep-disordered breathing and blood pressure. *Sleep* 1996;19(10 Suppl):S202-5.
8. Hla KM, et al. Sleep apnea and hypertension. A population-based study. *Annals of Internal Medicine* 1994;120(5):382-8.
9. Lavie P. Hypertension in sleep apnea syndrome: lessons from nearly 8,000 male patients. *Sleep* 1999;22: S104.
10. Palomaki H, et al. Snoring, sleep apnea syndrome, and stroke. *Neurology* 1992;42(7 Suppl 6):75-81;discussion 82.
11. Bassetti C, et al. Sleep apnea in patients with transient ischemic attack and stroke: a prospective study of 59 patients. *Neurology* 1996;47(5):1167-73.
12. Ter'an-Santos J, et al. The association between sleep apnea and the risk of traffic accidents. *New Eng J of Med* 1999;340:847-51.
13. Haraldsson PO. Clinical symptoms of sleep apnea and automobile accidents. *ORL Journal of Otorhinlaryngology* 1990;52:57-62.
14. Kryger MH, et al. Utilization of health care services in patients with severe obstructive sleep apnea. *Sleep* 1996;19(9 Suppl):S111-6.
15. Ronald J, et al. Health care utilization in the 10 years prior to diagnosis in obstructive sleep apnea syndrome patients. *Sleep* 1999;22:225-9.
16. Kapur V, et al. The medical cost of undiagnosed sleep apnea. *Sleep* 1999;22(6):749-55.
17. Bahammam A, et al. Health care utilization in males with obstructive sleep apnea syndrome two years after diagnosis and treatment. *Sleep* 1999;22(6):740-7.
18. Chervin RD, et al. Cost-utility of three approaches to the diagnosis of sleep apnea: polysomnography, home testing, and empirical therapy [see comments]. *Annals of Internal Medicine* 1999;130(6):496-505.
19. Peker Y, et al. Reduced hospitalization with cardiovascular and pulmonary disease in OSA patients on nasal CPAP treatment. *Sleep* 1997;20(8):645-53.