Ambulatory titration of continuous positive airway pressure was as effective as polysomnography for obstructive sleep apnea

Mulgrew AT, Fox N, Ayas NT, Ryan CF. **Diagnosis and initial management of obstructive sleep apnea without polysomnography: a randomized validation study.** Ann Intern Med. 2007;146:157-66.

Clinical impact ratings: Pulmonology ★★★★★★★

QUESTION

In patients with a high probability of obstructive sleep apnea (OSA), how does an ambulatory algorithm for titration of continuous positive airway pressure (CPAP) at home compare with titration by overnight polysomnography (PSG) in the sleep laboratory?

METHODS

Design: Randomized controlled trial.
Allocation: Not concealed.*
Blinding: Blinded (data analysts).*
Follow-up period: 3 months.
Setting: Sleep disorders clinic in Vancouver, British Columbia, Canada.
Patients: 68 adult patients (mean age 53 y, 77% men, mean body mass index 38 kg/m^2) who had a high probability of moderate to severe OSA based on a clinical algorithm incorporating overnight oximetry in the home (positive predictive value 94%), were medically stable, and were not taking any sedative medications. Patients who had poor lung function, a known cause of daytime sleepiness, a motor vehicle accident attributed to sleepiness in ≤ 5 years, or previous treatment for OSA were excluded.
Intervention: Ambulatory titration of CPAP at home without a diagnostic PSG (autotitration using the AutoSet Spirit machine for 1 wk, then pressure set at the 95th percentile pressure [or higher if indicated], adjusted at the end of the second wk and maintained at that level for the rest of the study) (n = 33) or diagnostic PSG followed by titration of CPAP by PSG in the sleep laboratory, with treatment fixed at the determined pressure throughout the study (n = 35).
Outcomes: Apnea–hypopnea index (AHI) on CPAP treatment by PSG (AHI > 15 episodes/h is diagnostic of moderate to severe OSA; AHI < 5/h is considered normal), daytime sleepiness (Epworth Sleepiness Scale), quality of life (Sleep Apnea Quality of Life Index 7), CPAP adherence, final CPAP level.
Patient follow-up: 90% (intention-to-treat analysis).

MAIN RESULTS

The final mean CPAP level was 12.1 (SD 2.1) cm H_2O in the ambulatory group and 11.2 (SD 2.1) cm H_2O in the PSG group (P = 0.08). Groups did not differ for median AHI on CPAP at 3 months (Table). OSA did not resolve (AHI > 15/h) in 1 patient in the ambulatory group (3%) and 3 patients in the PSG group (10%); 20 patients in each group (65% vs 67%) had AHI values in the normal range (< 5/h); and 10 and 7 patients, respectively (32% vs 23%), had intermediate AHI values {P = 0.47}†. Daytime sleepiness and quality of life improved to a similar extent in both groups (Table). Adherence to CPAP was higher in the ambulatory group (Table).

CONCLUSION

In patients with a high probability of obstructive sleep apnea, an ambulatory algorithm for titration of continuous positive airway pressure at home was as effective as titration by overnight polysomnography in the sleep laboratory.

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*See Glossary.
†P value calculated from data in article.

Ambulatory algorithm vs polysomnography for titration of continuous positive airway pressure (CPAP) in obstructive sleep apnea at 3 months‡

Outcomes	Ambulatory algorithm§	Polysomnography§	Difference in medians (95% CI)	P value
Apnea–hypopnea index (episodes/h)	2.5	3.2	–0.8 (–2.3 to 0.9)	0.31
Decrease in ESS (baseline)	8.0 (14)	10.0 (14)	–1.0 (–4.0 to 1.0)	0.26
Increase in SAQLI (baseline)	1.9 (3.5)	2.2 (2.8)	–0.2 (–0.9 to 0.6)	0.69
Adherence to CPAP (h/night)	6.0	5.4	1.1 (0.2 to 2.0)	0.02

‡ESS = Epworth Sleepiness Scale, range 0 to 24 (worst); SAQLI = Sleep Apnea Quality of Life Index, maximum score 7 (best). CI defined in Glossary.
§Values are medians.

COMMENTARY

OSA is a prevalent condition that has major prognostic implications and often is undiagnosed and untreated. Diagnosis and treatment of OSA are currently expensive, laborious, and time-consuming, posing significant challenges to health care systems.

Mulgrew and colleagues concluded that autotitrating CPAP therapy can be initiated without additional PSG in patients predicted to have a high probability of OSA, based on similar measures of patient satisfaction, adherence to CPAP therapy, and CPAP pressures after 3 months in each group. However, about one third of patients in both groups had an abnormal AHI despite symptomatic improvement and compliant use of CPAP therapy, suggesting that neither group was initially titrated or ultimately treated adequately. Had optimal CPAP titration been achieved in the PSG group, differences between the 2 strategies might have been observed.

The study by Mulgrew and colleagues has some major limitations. Symptoms are only loosely correlated with the diagnosis and severity of apnea and response to CPAP therapy (1). Also, cost advantages of these tools, taking into account the human costs of misdiagnosis, faulty stratification, and unnecessary or inadequate therapy, have not been shown. In fact, in the United States, ambulatory studies are appropriately not reimbursed at all and auto-PAP devices are reimbursed at the lower CPAP rate, passing on more expense to the patient.

Ambulatory monitoring and autotitration are ideas whose time has not yet come for the general population. Efforts should be focused on raising awareness of OSA, improving quality and accessibility of polysomnography, and accurately applying CPAP to appropriate patients with assured compliance.

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Reference

1. **Barbé F, Mayoralas LR, Duran J, et al.** Ann Intern Med 2001;134:1015-23.