

Abstract 4

CPAP Treatment vs Conservative Treatment in Mild Obstructive Sleep Apnea: Implications on Cardiovascular Morbidity

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Background: Obstructive sleep apnea (OSA) is associated with significant cardiovascular morbidity and an increase in overall mortality. The apnea-hypopnea index (AHI), defined as the number of apnea and hypopnea episodes per hour of sleep, defines disease severity (5 to 14.9 mild; 15 to 29.9 moderate; ≥ 30 severe). Continuous positive airway pressure (CPAP) is the treatment of choice for moderate to severe OSA as it results in improved daytime functioning and decreased cardiovascular morbidity. No studies have compared outcomes between CPAP and conservative therapy in mild OSA.

Objective: To determine if CPAP treatment of mild OSA is associated with a lower incidence of cardiovascular morbidity (hypertension, angina, and stroke). This is part of an ongoing larger study. Here we focus on mean arterial blood pressure (MBP), as the other outcomes (stroke, angina, death) require a longer follow-up.

Research Questions: (1) Will treating mild OSA with CPAP lead to reduced or stable MBP 2 years after the diagnosis of OSA? (2) If so, are the differences in outcomes between these groups significant enough to recommend CPAP therapy for mild OSA?

Classification: Retrospective cohort study.

Setting: Cleveland Clinic Sleep Disorders Center.

Participants: Subjects with mild OSA diagnosed between

November 2004 and March 2006.

Inclusion Criteria: Age > 18 years and < 65 years; diagnosis of mild OSA by polysomnography; subject's primary care physician was within Cleveland Clinic Health System.

Exclusion Criteria: Hypertension ($> 130/90$ mmHg), angina, stroke, cigarette smoking, alcohol abuse/dependence, illicit drug abuse.

Intervention: CPAP therapy.

Primary Outcome Measure: MBP 2 years after the diagnosis.

Results: Unmatched for covariates (age, sex, BMI, neck circumference, AHI, arousal index, and family history of cardiovascular problems), subjects with mild OSA on CPAP treatment had a 1.97-point drop in MBP while subjects who did not receive CPAP treatment had a 9.61-point elevation in MBP ($P < .0001$). Analysis of data after propensity score matching for covariates showed a mean difference in MBP of -11.97 (95% CI: -14.03 to -9.92 ; $P < .0001$) with a sensitivity analysis result of 2.646. Furthermore, stratification of propensity scores and quintile analysis revealed a similar result, although the magnitude of the net treatment effect was smaller: -3.83 (95% CI: -1.92 to -5.74).

Conclusions: OSA is a common disorder associated with significant morbidity and an increase in overall mortality. Although benefits of CPAP treatment are well established in moderate and severe OSA, there is a paucity of knowledge regarding the long-term morbidity and treatment benefits associated with mild OSA. This study revealed worsening of MBP in subjects with mild OSA who did not receive CPAP treatment. Also, CPAP treatment effectively stabilized or decreased MBP over a 2-year period. Further research with a large sample and a longer follow-up is recommended to determine if mild OSA is also associated with other cardiovascular and cerebrovascular complications and to determine the effectiveness of CPAP in alleviating these complications.