

Effects of Fixed Versus Auto-Titrating Continuous Positive Airway Pressure on Vascular Function in Patients with Resistant Hypertension and Obstructive Sleep Apnea

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Introduction: Obstructive sleep apnea (OSA) is a common cause of resistant hypertension. We investigated the effects of 2 modalities of positive airway pressure; fixed continuous airway pressure (fCPAP) versus auto-titrating positive airway pressure (APAP) on arterial function in subjects with resistant hypertension and severe OSA.

Objective: To assess in participants with resistant hypertension and OSA the effects of fCPAP vs. APAP on 24h ambulatory blood pressure monitoring (ABPM), as well as sleep indices, heart rate variability (HRV), and arterial stiffness.

Methods: We randomized 14 subjects (56±11 years, baseline SBP and DBP 137±10 and 77±12 mm Hg, respectively, apnea-hypnea index [AHI] 58±31 events/h, Epworth sleepiness scale 7±5) to fCPAP or APAP for 6 weeks, followed by crossover to the other modality for another 6 weeks. Overnight polysomnography, 24h ABPM, HRV, and carotid-femoral pulse wave velocity (cfPWV, arterial stiffness 'gold-standard' measure) were measured at baseline and after each intervention period.

Results: fCPAP and APAP were associated with similar improvements in sleep quality, AHI and oxygen desaturation indices, while the nadir SpO₂ was significantly higher with fCPAP than APAP ($z=-2.251$, $p=0.03$). There were no significant effects of either modality on central BP or 24h ABPM, likely due to controlled BP at baseline. Both fCPAP and APAP improved cfPWV compared to baseline, (fCPAP, $p=0.017$; APAP, $p=0.056$), suggesting that their effects are BP independent. CPAP significantly decreased HR and HRV, whereas APAP had no effect.

Conclusions: No differences in vascular function was observed with treatment with fCPAP or APAP, but there is some suggestion that fCPAP is associated with improved measures of arterial health, i.e.: cfPWV and HR. The effects of fCPAP on arterial stiffness may be independent of BP and potentially mediated by changes in sympathovagal activity. Our results of mild favorable effects of fCPAP need to be confirmed in larger studies.