

# Management of Refractory Hypertension in a Patient with Untreated Sleep Apnea Syndrome Using Continuous Positive Airway Pressure Therapy

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## Abstract

**Background:** Sleep apnea syndrome (SAS) is a common sleep disorder characterized by recurrent episodes of upper airway obstruction during sleep, leading to disrupted sleep patterns and oxygen desaturation. SAS can have significant implications for cardiovascular health, with hypertension being a common co-morbidity. Despite its prevalence and associated risks, SAS often remains undiagnosed and untreated for many years, contributing to worsening cardiovascular outcomes. **Case Report:** This case report presents the clinical course of a patient initially diagnosed with severe SAS with an Apnea-Hypopnea Index (AHI) of 34 at the age of 30, the patient remained untreated for approximately two decades. Following a recent medical checkup in 2022, the patient was diagnosed with hypertension and referred to the hospital. Despite oral administration of antihypertensive drugs for less than a year, no significant improvement in blood pressure was observed. Due to persistent symptoms such as daytime sleepiness and early morning headaches, along with a history of SAS, Continuous Positive Airway Pressure (CPAP) therapy was initiated. **Conclusion:** Detailed blood pressure recordings over the preceding months demonstrated a statistically significant improvement, highlighting the efficacy of CPAP therapy in managing refractory hypertension in patients with SAS. Enhanced compliance with CPAP therapy can be facilitated through regular blood pressure monitoring, ultimately improving clinical outcomes and quality of life in this patient population.

**Keywords:** Blood Pressure, Continuous Positive Airway Pressure, Hypertension, Sleep Apnea Syndrome.

## Introduction

Obstructive Sleep Apnea Syndrome (OSAS) affects approximately 4% of middle-aged men and 2% of middle-aged women [1], with around 10% of hypertensive patients having coexisting OSAS [2]. The well-documented complications of hypertension and cardiovascular disease in patients with OSAS emphasizes the importance of timely intervention [1,3]. Therapeutic interventions, including the use of continuous positive airway pressure (CPAP), are crucial for managing OSAS, with CPAP being a non-invasive and easily implementable option [4,5]. However, the initial

stages of CPAP therapy can pose challenges for patients due to the adjustment process [4].

Given the prevalence of OSAS among hypertensive patients and the known benefits of CPAP therapy, it is essential to explore the impact of CPAP on blood pressure control in this population. This case report highlights a significant improvement in blood pressure following the introduction of CPAP in OSAS patients with hypertension. Additionally, providing individualized data to patients in a clinical setting may enhance their compliance with CPAP treatment, ultimately improving their overall health outcomes.

## Case Report

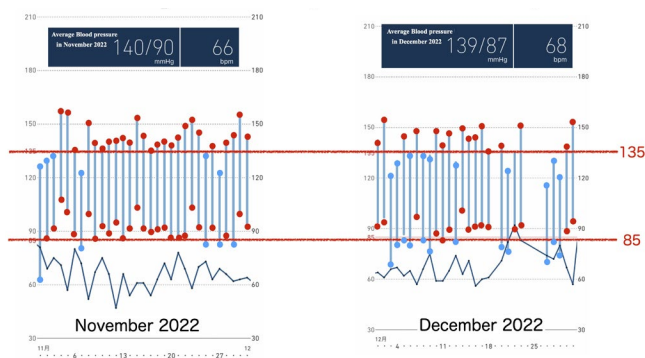
A 51-year-old male presented with a history of hypertension and a prior diagnosis of OSAS. He had a weight of 80 kg, a height of 172 cm, and a BMI of 27 kg/m<sup>2</sup>. The patient had smoked cigarettes for ten years but had been a non-smoker for 17 years. He consumed alcohol socially. OSAS was diagnosed at approximately 30 years old with an Apnea-Hypopnea Index (AHI) of 34, indicating a severe form of OSAS. However, no treatment, such as CPAP, had been administered at the time. The patient was diagnosed with hypertension during a health checkup at age 50 and initiated treatment with anti-hypertensive drugs (Exforge®; Amlodipine 5 mg/day; Valsartan 80 mg/day). Despite medication, his blood pressure remained elevated, especially in the early morning. He reported morning headaches and daytime sleepiness, prompting consultation for OSAS. Polysomnography confirmed the diagnosis of OSAS, and CPAP therapy (AEONMED AS100A-RT) was initiated in January 2023 with auto-CPAP (pressure settings: 3-12 cm H<sub>2</sub>O).

The patient diligently recorded his blood pressure before and after CPAP treatment. Blood pressure measurements were recorded 77 times immediately before and 93 times immediately after CPAP treatment. In addition, pre-bedtime blood pressure measurements before and after CPAP treatment were analyzed (53 and 89 measurements, respectively). Before CPAP treatment, the average morning blood pressure was 146/96 mmHg,

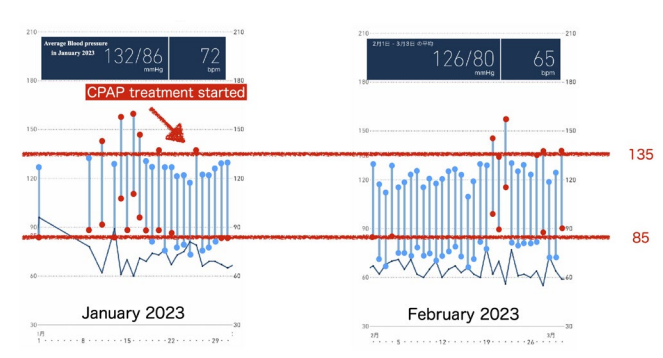
higher than the average bedtime blood pressure of 128/77 mmHg [Fig.1]. After CPAP therapy, the average morning blood pressure decreased significantly to 130/86 mmHg, representing a 15 mmHg reduction in systolic pressure ( $p < 0.0001$ ) [Fig.2,3]. Similarly, bedtime blood pressure also improved compared to pre-CPAP therapy [Table 1]. Additionally, the patient reported improvement in morning headaches and daytime sleepiness. The CPAP device recorded a simple AHI of 4.0, indicating alleviation of symptoms due to marked improvement in OSAS.

## Discussion

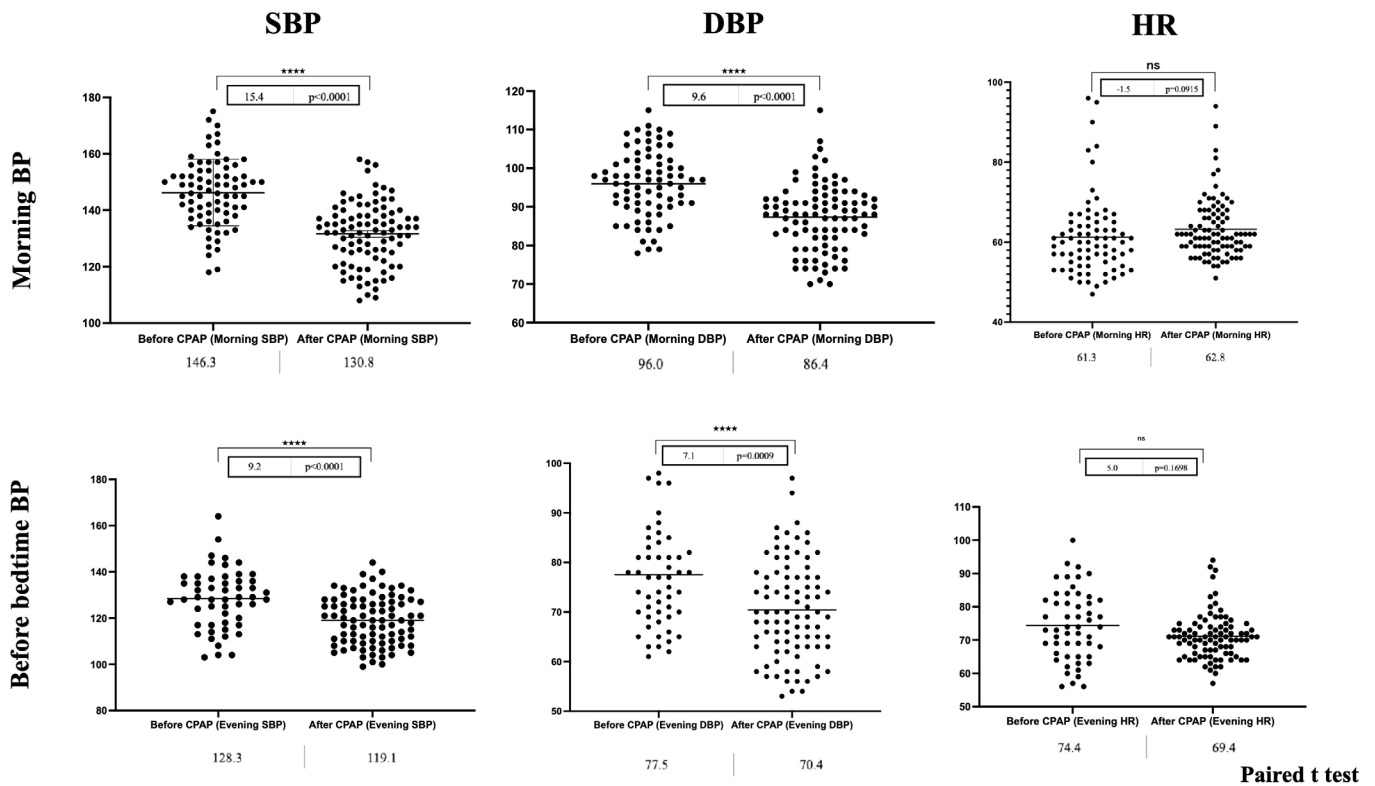
The prevalence of OSAS among hypertensive patients emphasizes the importance of effective management strategies for both conditions [1,2]. CPAP therapy has emerged as a cornerstone in the treatment of OSAS due to its efficacy and non-invasive nature [3,4]. Our case demonstrates a significant reduction in blood pressure following the initiation of CPAP therapy in a patient with coexisting OSAS and hypertension. This finding aligns with previous studies indicating the beneficial effects of CPAP on blood pressure control in hypertensive patients with OSAS [5,6]. Moreover, the improvement in morning headaches and daytime sleepiness observed in our patient highlights the broader impact of CPAP therapy on symptom management and quality of life [7]. Individualized data given to patients regarding the effects of CPAP treatment may contribute to



**Fig.1:** Blood pressure trends (before CPAP treatment).



**Fig.2:** Blood pressure trends (after CPAP treatment).



**Fig.3:** Blood pressure trends (before and after CPAP treatment).

enhanced compliance and long-term adherence.

While our case provides valuable insights into the therapeutic potential of CPAP in OSAS patients with hypertension, further research is warranted to elucidate the mechanisms underlying the observed blood pressure reduction and to assess the long-term cardiovascular outcomes associated with CPAP therapy in this population.

**Conclusion**

Our case emphasizes the significant role of CPAP therapy in improving blood pressure control and alleviating symptoms in patients with OSAS and hypertension. The successful management of hypertension through CPAP therapy highlights the importance of comprehensive treatment approaches in individuals with co-existing sleep disorders and cardiovascular conditions. Further research is needed to elucidate the long-term effects of CPAP therapy on cardiovascular outcomes and to

Morning average Blood Pressure				
	Before CPAP	After CPAP	Difference	p value
SBP (mmHg)	146.3	130.8	15.4	p<0.0001
DBP (mmHg)	96.0	86.4	9.6	p<0.0001
HR (/minute)	61.3	62.8	-1.5	p=0.0915
	(n=77)	(n=93)		
Night time average Blood Pressure				
	Before CPAP	After CPAP	Difference	p value
SBP (mmHg)	128.3	119.1	9.2	p<0.0001
DBP (mmHg)	77.5	70.4	7.1	p=0.0009
HR (/minute)	74.4	69.4	5.0	p=0.1698
	(n=53)	(n=89)		

**Table 1:** Average blood pressure.

optimize the management of OSAS in hypertensive patients.

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