MÆDICA - a Journal of Clinical Medicine

CASE REPORT

MAEDICA – a Journal of Clinical Medicine
2025; 20(2): 432-436
https://doi.org/10.26574/maedica.2025.20.2.432

The Importance of Diet in Patients with Obstructive Sleep Apnea Syndrome and Continuous Positive Airway Pressure Therapy – a Case Report

Romica BURCEA[a, b] Florin Dumitru MIHALTAN[b, c]

[a]Rosiori de Vede Pneumology Hospital

[b]"Carol Davila" University of Medicine and Pharmacy Bucharest, Romania

[c]"Marius Nasta" Institute of Pneumology, Bucharest, Romania

ABSTRACT

Introduction: *The increase in the proportion of obese patients in both paediatric and elderly populations worldwide made obstructive sleep apnea syndrome (OSAS) an important contributor to the range of comorbidities encountered in the current population. Continuous positive airway pressure (CPAP) therapy is the main treatment for OSAS and it has an effect in decreasing the severity of OSAS, with decreasing the apnea hypopnea index (AHI) and improving hypoxemia.*

Results and discussion: *We present the case of a 48-year-old woman with newly diagnosed severe OSAS for which she was on CPAP therapy. After the patient followed a diet and had a significant weight loss, her symptomatology improved and overnight cardiorespiratory polygraphy showed a decrease in nocturnal respiratory events. This demonstrates the important role that weight loss plays in certain diseases – in this case, in a patient with OSAS.*

Conclusions: *Losing weight can have important benefits in many diseases. In OSAS, weight reduction is associated with significant improvement in symptoms and nocturnal respiratory events, including apnea and hypopnea.*

Keywords: diet, OSAS, CPAP, weight loss.

INTRODUCTION

Obesity is defined by the World Health Organisation (WHO) as "abnormal and excessive accumulation of fat that poses a risk to health" and is generally classified based on BMI (body mass index). According to WHO, obesity has reached epidemic proportions, with 1.9 billion people being considered overweight and 650 million people falling into one of the obesity degrees (1). Obesity is also associated with far more health costs and greater use of health services (2).

Address for correspondence:
Romica Burcea
Email: romica12418@yahoo.com

Article received on the 26th of May 2025 and accepted for publication on the 20th of June 2025

Eating behavior, choosing excessively processed foods with a lot of sugars and hypercaloric, cheap and poor nutritional value, family environment and entourage are some of the several factors that cause an increase in the number of calories ingested by a person daily (3).

Regarding obesity treatment, weight loss and other interventions such as exercise are important for therapy, with positive results being seen from the beginning for some people but only after a longer period of time for other individuals (4).

The increase in the proportion of obese patients in both paediatric and elderly populations worldwide made obstructive sleep apnea syndrome (OSAS) an important contributor to the range of comorbidities encountered in the current population (5). Obstructive sleep apnea syndrome and its consequences, in particular the decrease in patient alertness, have also led to an increase in road accidents in this group of patients, which are much more common than in the general population (6, 7). Obesity represents the main risk factor for obstructive sleep apnea in adults. Continuous positive airway pressure therapy (CPAP) is the main treatment for OSAS and it has an effect in decreasing the severity of OSAS, with decreasing the apnea hypopnea index (AHI) and improving hypoxemia (8).

For this study, informed consent was obtained from the patient and the ethics council of Rosiori de Vede Pulmonology Hospital approved its performance. ❑

CASE PRESENTATION

We describe the case of a 48-year-old woman who came for pneumological evaluation with the following symptoms: snoring, episodes of apneas reported by the entourage and excessive daytime sleepiness. The patient does not have any significant diseases, except for systemic arterial hypertension (180/90 mm Hg at the time of assessment), for which she is being treated.

The patient was overweight (weight 83 kg, height 172 cm, BMI 28 kg/m^2) and her Epworth score (diurnal drowsiness level) was 10/24. She had a diagnostic suspicion of OSAS.

Nocturnal cardiorespiratory polygraphy, which was performed in November 2024, revealed a severe OSAS: an AHI of 70.9/h of sleep, with a predominance of obstructive events (Table 1). The oxygen desaturation index (ODI) was also 69.9/h of sleep, with a minimum oxyhaemoglobin saturation of 69% and a mean oxyhaemoglobin saturation of 92.8% (Table 2).

Evolution of the case

The patient was recommended an Auto-CPAP device to which she had moderate adherence: the average number of hours of daily use was 3:45 and the percentage of days during which the therapy was used for at least four hours *per* day was 47%. However, she reported an improvement in diurnal and nocturnal symptoms

Respiratory evaluation	Findings
Apnea hypopnea index (AHI) (desat.-cor.)[*per* hour]	70.9 (62.8)
Respiratory disturbance index (RDI) (desat.-cor.) [*per* hour]	70.9 (62.8)
Apnea index (AI) (desat.-cor.) [*per* hour]	54.8 (49.6)
Hypopnea index (HI) (desat.-cor.) [*per* hour]	16.1 (13.1)
No. of apnea [n]	438
Of them central: [n]	5
Mean duration of apneas [sec]	23
No. of hypopnea [n]	129
Total apnea/hypopnea time [respiratory disturbance time (RDT)] [hours]	3:39:47
Apnea/hypopnea time *per* hour [min *per* hour]	27:28
Longest apnea [min] (t=04:11:11)	1:44
Longest hypopnea [min] (t=03:13:32)	1:56
Central sleep apnea (CSB) time *per* hour [sec *per* hour]	10
Snoring index (SI) [*per* hour]	15.1
SI irregular [*per* hour]	6.5
Total snoring time (ST) [min]	20:33

TABLE 1. Nocturnal cardiorespiratory polygraphy in November 2024: respiratory events

TABLE 2. Nocturnal cardiorespiratory polygraphy in November 2024: pulse oximeter parameters

Evaluation of SpO_2/pulse	Findings
Oxygen desaturation index (ODI) [*per* hour]	69.9
No. of desaturations [n]	558
No. of desaturations < 90%: [n]	273
Total time [hours]	3:41:36
Time per hour [min *per* hour]	27:45
Lowest desaturation [%] (01:01:02)	69
Longest desaturation [min] (03:33:14)	1:57
Mean duration [sec]	23
Mean desaturation [%]	88.9
Mean saturation [%]	92.8
Max. saturation [%] (22:46:25)	99
Min. saturation [%] (01:01:01)	69
t90 [%]	12.9
Min. pulse (01:00:52) [1/min]	47
Max. pulse (01:42:49) [1/min]	116
Mean pulse [1/min]	67
Pulse variances [n]	476
Pulse variance index [*per* hour]	59.6

TABLE 3. Report of patient adherence to continuous positive airway pressure therapy (CPAP) therapy

Therapy Mode: **AutoSet**	EPR: **FULL_TIME**	EPR Level: **3.0 cmH2O**
EPR Enable: **OFF**	EPR Patient Enable: **OFF**	Ramp Enable: **RAMP_ON**
Ramp Time: **40.0 Minutes**	Essentials: **ON**	Response: **STANDARD**
Minimum Pressure: **4.0 cmH2O**	Maximum Pressure: **16.0 cmH2O**	
Pressure - cmH2O		
Median: **9.0**	95th Percentile: **14.4**	Maximum: **15.8**
Leak - L/min		
Median: **0.0**	95th Percentile: **3.6**	Maximum: **17.4**
Respiratory Indices - events/hr		
Apnea Index: **0.5**	Hypopnea Index: **0.8**	AHI: **1.3**
Obstructive: **0.0**	Central: **0.4**	Unknown: **0.0**
% Time in CSR: **0.0**		
Total Usage		
Used Days >= 4 hrs : **62**	Used Days < 4 hrs : **64**	% Used Days >= 4 hrs : **47**
Days not used: **5**	Total days: **131**	Total hours used: **492:35**
Median daily usage: **3:55**	Average daily usage: **3:45**	

(Epworth score 2/24) under CPAP therapy. A decrease in the number of respiratory events during sleep was also observed: residual AHI 1.3/h (Table 3).

Over the next few months, the patient followed a diet that led to 13-kg weight loss (weight 70 kg, height 172 cm, BMI 23.66 kg/m^2).

Given the significant weight loss (over 10% of the initial weight), it was decided to repeat the nocturnal cardiorespiratory polygraphy in April 2025, which revealed a mild OSAS: an AHI of 8.6/h of sleep and a predominance of hypopneas (Table 4). The ODI was also 7.3/h of sleep, with a minimum oxyhaemoglobin saturation of 83% and a mean oxyhaemoglobin saturation of 94.7% (Table 5). ❑

DISCUSSIONS

This case report highlights the positive evolution that patients with OSAS may have when they follow a diet which results in significant weight loss.

At the time of diagnosis, our patient was overweight (BMI 28 kg/m^2) and had specific OSAS symptoms. She was initially diagnosed with a severe form of OSAS (AHI 70.9/h of recording) and underwent Auto-CPAP therapy, to which she had moderate adherence (Figure 3). After the patient followed a diet which resulted in significant weight loss, her symptomatology improved and the nocturnal cardiorespiratory polygraphy showed a decrease in nocturnal respiratory events. This demonstrates the important role that weight loss plays in certain diseases – in this case, a patient with OSAS.

A secondary analysis of a six-month clinical trial on 180 adults found a dose-effect relationship between the number of respiratory events experienced by patients with OSAS and the number of kilograms lost on diet and lifestyle changes: an improvement in the number of respiratory events was noted for a 5% decrease in body weight, which was more significant for a 10% decrease (9).

In an interventional study conducted by J Roche and his collaborators, which involved 22 patients, a program based on aerobic exercise and food diet improved subjects' aerobic capacity and sleep architecture without having an effect on AHI (10).

Although weight loss has many benefits for OSAS patients, only very few of them are willing to follow a diet. In our case, the improvement of night and diurnal symptoms under CPAP therapy has led to a strong motivation for following the recommended diet. In a randomized clinical trial on 60 obese adults, low calorie high protein diets improved respiratory events, sleep quality and body composition indices (11). In another randomized clinical trial that included 70 patients, only an eight-kilogram decrease in body weight was associated with a reduction in AHI (12).

In a cohort study carried out by M. Barnes and collaborators, which involved 12 patients,

Respiratory evaluation	Findings
Apnea hypopnea index (AHI) (desat.-cor.)[*per* hour]	8.6 (5.4)
Respiratory disturbance index (RDI) (desat.-cor.) [*per* hour]	9.8 (5.4)
Apnea index (AI) (desat.-cor.) [*per* hour]	4.8 (2.4)
Hypopnea index (HI) (desat.-cor.) [*per* hour]	3.9 (3.0)
No. of apnea [n]	38
Of them central: [n]	4
Mean duration of apneas [sec]	21
No. of hypopnea [n]	31
Total apnea/hypopnea time [respiratory disturbance time (RDT)] [min]	34:52
Apnea/hypopnea time *per* hour [min *per* hour]	4:22
Longest apnea [min] (t=03:41:57)	1:10
Longest hypopnea [min] (t=04:21:30)	2:04
Central sleep apnea (CSB) time *per* hour [sec *per* hour]	0
Snoring index (SI) [*per*]	2.2
Snoring index (SI) irregular [*per* hour]	0.4
Total snoring time (ST) [min]	2:03

TABLE 4. Nocturnal cardiorespiratory polygraphy in April 2025: respiratory events

TABLE 5. Nocturnal cardiorespiratory polygraphy in April 2025: pulse oximetry parameters

Evaluation of SpO_2/pulse	Findings
Oxygen desaturation index (ODI) [*per* hour]	7.3
No. of desaturations [n]	58
No. of desaturations < 90%: [n]	7
Total time [min]	22:17
Time per hour [min *per* hour]	2:47
Lowest desaturation [%] (22:35:05)	83
Longest desaturation [sec] (03:36:00)	46
Mean duration [sec]	23
Mean desaturation [%]	91.5
Mean saturation [%]	94.7
Max. saturation [%] (03:05:08)	99
Min. saturation [%] (22:35:04)	83
t90 [%]	0.2
Min. pulse (23:11:05) [1/min]	42
Max. pulse (05:59:07) [1/min]	105
Mean pulse [1/min]	54
Pulse variances [n]	90
Pulse variance index [*per* hour]	11.3

the combination of an exercise program with diet in subjects with moderate and mild OSAS resulted in weight loss and cardiometabolic and neuropsychic improvements without effect on respiratory events during sleep (13).

In a parallel-group open-label randomized clinical trial on 89 patients, an interdisciplinary weight loss and lifestyle intervention improved OSA severity, comorbidities and quality of life (14).

In a prospective study by S Kuna *et al*, which involved 134 patients, lifestyle interventions for weight loss reduced the OSA severity at 10 years (15). ❑

CONCLUSION

Losing weight can have important benefits in many diseases. In OSAS, weight loss is associated with significant improvement in symptoms. nocturnal respiratory events (apneas and hypopneas) and overnight oxyhaemoglobin saturation. Along with other strategies involved in OSAS management, weight loss should be an important objective, given its beneficial effect on the evolution of OSAS and patient's health. ❑

Conflicts of interest: none declared.

Financial support: none declared.

All authors have accepted responsibility for the entire content of this manuscript and approved its submission.

Ethical approval: Research involving human subjects was in accordance with the tenets of the Helsinki Declaration (as amended in 2013).

References

1. **World Health Organization.** Obesity and overweight. Geneva, WHO. 2017.
2. **Sturm R.** The effects of obesity, smoking, and drinking on medical problems and costs. *Health Affairs* 2022;21:245-253.
3. **Crino M, Sacks G, Vandevijvere S, et al.** The influence on population weight gain and obesity of the macronutrient composition and energy density of the food supply. *Curr Obes Rep* 2015;4:1-10.
4. **Jensen MD, Ryan DH, Apovian CM, et al.** 2013 AHA/ACC/TOSS guideline for the management of overweight and obesity in adults: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines and the Obesity Society. *Circulation* 2014;129(25 Suppl 2):102-138.
5. **Lyons MM, Bhatt NY, Pack AI, et al.** Global burden of sleep-disordered breathing and its implications. *Respirology* 2020;25:690-702.
6. **Rodenstein D.** Sleep apnea: traffic and occupational accidents-individual risks, socioeconomic and legal implications. *Respiration* 2009;78:241-248.
7. **Strohl KP, Brown DB, Collop N, et al.** An official American Thoracic Society Clinical Practice Guideline: sleep apnea, sleepiness, and driving risk in noncomercial drivers. An update of a 1994 Statement. *Am J Respir Crit Care Med* 2013;187:1259-1266.
8. **Bock JM, Vungarala S, Karim S, et al.** Obstructive Sleep Apnea as a Cardiovascular Risk Factor – Beyond CPAP. *Canad J Cardiol* 2021;37:756-765.
9. **Georgoulis M, Yiannakouris N, Kechribari I, et al.** Dose-response relationship between weight loss and improvements in obstructive sleep apnea severity after a diet/lifestyle interventions: secondary analyses of the "MIMOSA" randomized clinical trial. *J Clin Sleep Med* 2022;18:1251-1261.
10. **Roche J, Gillet V, Perret F, et al.** Obstructive Sleep Apnea and Sleep Architecture in Adolescents With Severe Obesity: Effects of a 9-Month Lifestyle Modification Program Based on Regular Exercise and a Balanced Diet. *J Clin Sleep Med* 2018;14:967-976.
11. **Javaheri FSH, Ostradahimi AR, Nematy M, et al.** The effects of low calorie, high protein diet on body composition, duration and sleep quality on obese adults: A randomized clinical trial. *Health Sci Rep* 2023;6:e1699.
12. **Franklin KA, Lindberg E, Svensson J, et al.** Effects of a palaeolithic diet on obstructive sleep apnoea occurring in females who are overweight after menopause-a randomised controlled trial. *Int J Obes* 2022;46:1833-1839.
13. **Barnes M, Goldsworthy UR, Cary BA, et al.** A diet and exercise program to improve clinical outcomes in patients with obstructive sleep apnea – a feasibility study. *J Clin Sleep Med* 2009;5:409-415.
14. **Carneiro-Barrera A, Amaro-Gahete FJ, Guillén-Riquelme A, et al.** Effect of an Interdisciplinary Weight Loss and Lifestyle Intervention on Obstructive Sleep Apnea Severity: The INTERAPNEA Randomized Clinical Trial. *JAMA Network Open* 2022;5:e228212.
15. **Kuna ST, Reboussin DM, Strotmeyer ES, et al.** Effects of Weight Loss on Obstructive Sleep Apnea Severity. Ten-Year Results of the Sleep AHEAD Study. *Am J Respir Crit Care Med* 2021;203:221-229.