

Eighty Kilograms Weight Reduction in a Case of Obstructive Sleep Apnea with Several Comorbidities: Did the Conditions Improve?

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Abstract- Obstructive sleep apnea (OSA) together with metabolic disorders is common in severely obese patients. Weight reduction is considered as a treatment modality in these cases while few of them can succeed in considerable weight loss. Here, we present a severely obese man with body mass index of 54 suffered from OSA, type 2 diabetes, hypothyroidism, and hypertension. He intentionally lost 80 kilograms weight during the 2-year follow-up. Diabetes and hypertension completely resolved with considerable improvement in OSA syndrome after this huge weight reduction.

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Introduction

Obstructive sleep apnea (OSA) is the commonest breathing disorder in sleep and affects at least 2-26% of general population (1). It is associated with increased mortality and morbidity. Prevalence of OSA in severely obese patients is 10 fold higher than estimated prevalence in adults (2). Although there are studies showing the positive impact of weight loss in patients with OSA or together with diabetes or hypothyroidism separately, our report describes a case of obese OSA with at least three comorbid who succeeded in a huge amount of 80 kg weight loss.

Case Report

A 50-year-old man with severe obesity referred to a sleep clinic with a chief complaint of excessive daytime sleepiness. He also complained of severe headaches more prominent in the morning together with snoring, witnessed apnea and nocturia during night. The conditions have got worse in the past year. He worked in a transit terminal, and the sleepiness made him lose his work. His medical history included type 2 diabetes, hypothyroidism, and a moderate mixed hearing loss. He smoked one pack of cigarettes per day for about 30

years. He denied use of alcohol or illicit drugs. His medications included levothyroxine, metformin, glibenclamide and different types of NSAIDs to control a headache. Physical exam revealed an obese male (Body mass index:54). Oral examination showed an enlarged tongue with a Mallampati score of 4. Neck circumference was 63 cm. Blood pressure was 140/85 mmHg and the arterial blood gas analysis reported the pressure of 65mmHg for pCO₂. The Epworth Sleepiness Scale (ESS) score was calculated 21 out of 24. the patient had complete clinical presentations of a sleep-related breathing disorder and according to STOP-BANG screening questionnaire, he obtained score eight out of eight (score three or more is considered the as high risk for OSA) (3). Thus, he underwent split night study which revealed obstructive sleep apnea (OSA) with the apnea/hypopnea index of 101/h. The conditions also met the criteria for obesity hypoventilation syndrome.

The estimated pressure in titration study to resolve apnea/hypopnea was measured as the pressure of inspiration (PI) as 20cm H₂O and pressure of expiration (PE) as 14 cmH₂O. Thus, the patient was prescribed bilevel respiratory device and seriously recommended to lose weight.

Application of BPAP (bilevel positive airway

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pressure) device at nights resulted in improvement in daytime sleepiness and morning headaches. The patient initiated losing weight by seriously reducing food intake and daily exercise, mainly walking, about an hour each day.

After 2 years, the patient succeeded in 81kg weight

reduction, and he had not any complaint of daytime sleepiness anymore. To evaluate the OSA, The split-night polysomnography was performed and revealed the obstructive apnea index of 65.6 and hypopnea index of 14. The conditions of the patient at the diagnosing time and after 80kg weight loss are shown in Table1.

Table1. The patient's characteristics before and after weight reduction

	Baseline	After two years
Weight	184 kg	103 kg
Neck circumference	63 cm	40 cm
Fasting blood glucose	270 ng/dl	73 ng/dl
pCO2*	65	52
Mallampati score	4	2
Apnea-hypopnea index	101	80
Prescribed device	Bilevel PAP (PI=20 cmH ₂ O, PE=14 cmH ₂ O)	CPAP (p=7 cmH ₂ O)

*measured in arterial blood gas

The patient's profile showing a reduction in neck size is

demonstrated in Figure1.



Figure 1. The patient's profile before (left) and after (right) weight reduction

The neck size reduced from 63cm to 40cm.

Discussion

There are few studies showing the positive impact of weight loss on patients with OSA. In a randomized study, an 11 kg weight loss reduced the risk of OSA by 76% relative to the control group (4). In another randomized controlled trial which researched obese patients with OSA and typed 2 diabetes comorbidity, the weight loss significantly improved OSA as measured by AHI (5).

Although the disease still remained in severe range by the measure of AHI after weight reduction in the patient, the apneas were controlled easily with CPAP, which is much cheaper, instead of BPAP device.

The weight reduction by changes in lifestyle was associated with dramatic improvement in type2 diabetes and hypertension. Although the effect of weight reduction on diabetes and hypertension improvement have been shown in previous studies, in those, the weight loss was mostly induced by bariatric surgery

(6,7).

Thyroid function tests before and after weight reduction was not significantly different and he needed levothyroxine 0.1 mg daily to control his condition. Hypothyroidism and OSA share common presentations, and prevalence of Sleep Disordered Breathing (SDB) among patients with hypothyroidism has been found to be high (8). A study has shown the prevalence of 11.5% for undiagnosed hypothyroidism among obese and overweight patients diagnosed with SDB referred to sleep clinic for polysomnography (9). Moreover, weight reduction in a 17-month follow-up after bariatric surgery in a group of obese patients with comorbid hypothyroidism resulted in improvement of thyroid function in about half of subjects (10). Although in this case, the hypothyroidism did not resolve, it was controlled with 1.5 tabs of levothyroxine instead of 3 tabs, after reduction in body mass.

The Large tongue is an independent risk factor for moderate to severe obstructive sleep apnea (11), which

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will not change by weight reduction. This feature together with remained hypothyroidism could be considered as main etiologies for remained obstructive apneas.

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