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Weigh the Options before Starting CPAP

Commentary on Quan et al. Impact of treatment with continuous positive airway pressure (CPAP) on weight in obstructive sleep apnea. J Clin Sleep Med 2013;9:989-993.

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Obstructive sleep apnea (OSA) and obesity are tightly linked; obesity predisposes to OSA,[1] and emerging evidence indicates that the converse is also likely to be true.[2] As a result, clinicians managing OSA frequently end up addressing weight loss. Because continuous positive airway pressure (CPAP) treatment improves so many aspects of the multisystem disorder known as sleep apnea, it would seem logical that CPAP therapy for OSA should also facilitate weight loss. Indeed, I used to misguidedly tell patients this. Unfortunately, this appears not to be the case.

The data thus far about CPAP and weight change have produced conflicting results, and are limited by small sample size, lack of blinding, imprecise measures of weight and/or adherence, and retrospective nature. In a retrospective, unblinded study of 183 OSA patients who were being treated with CPAP, Redenius et al. observed that none of the patients lost weight.[3] In fact, those patients who were most adherent to CPAP had the greatest increases in body mass index (BMI). Similarly, Bourey et al. demonstrated increased BMI in CPAP users at one month after CPAP initiation, though weight was stable at 6 months.[4] On the other hand, in a well-done randomized, crossover trial of 86 OSA patients, Sharma et al. demonstrated decrease in BMI (as well as other markers of metabolic syndrome), with 3 months of active CPAP compared with 3 months of sham CPAP.[5] Most recently, in a study of 40 men with sleep apnea who were randomized to a brief self-management intervention or to usual care, those in the self-management group who were most adherent to CPAP lost the most weight over a 3-month period.[6]

In this issue of *JCSM*, Quan et al. report the results of a secondary analysis of the Apnea Positive Pressure Long-term Efficacy Study (APPLES) study that addresses CPAP and weight change.[7] APPLES is large, double-blinded, randomized controlled trial which was primarily designed to look at the neurocognitive outcomes of CPAP treatment in patients with sleep apnea. As a part of this study, weight was measured at 2 and 6 months using consistent methodology. Patients were randomized to sleep laboratory-titrated therapeutic CPAP and sham CPAP arms, which were double blinded. The final analysis included 812 patients. All participants had an apnea plus hypopnea index (AHI) of more than 10 per hour and were over 18 years of age; 387 were randomized to sham CPAP and 425 to CPAP. Overall, there was a slight a decrease in weight in the sham CPAP arm but a statistically significant weight gain in the CPAP arm of the study. Increase in weight gain was associated with adherence in the active CPAP group, with each hour per night of CPAP usage over 6 months associated with a mean weight gain of 0.42 kg ($p = 0.001$). Indeed, those patients who met current acceptable levels of CPAP adherence (at least 4 hours a night on at least 70% of nights) gained more weight than those on active CPAP who were non-adherent (1.0 vs 0.3 kg, on average). The large sample size, 6-month follow-up, precise measurement of weight and adherence, and double-blinded randomized structure of the study are significant strengths that previous studies have lacked. The "dose-response" association between adherence and weight gain strengthens the validity of these findings.

The mechanism of this effect is unclear, but it is likely to be multifactorial. Leptin may have a role here, since obesity-related OSA is associated with resistance to the weight reducing effects of leptin, despite increased secretion and high levels of circulating leptin.[8] Further, leptin secretion is unchanged with CPAP.[9] In addition, increased insulin secretion and increased insulin resistance have been demonstrated with CPAP use.[9] There are several other putative mechanisms, including an anoretic effect of inflammatory cytokines in untreated OSA,[10] reduced energy expenditure resultant from CPAP treatment in the absence in changes in caloric intake,[11] and the ever-popular fluid shifts.[12] Regardless of the mechanism, weight gain appears common with initiation of CPAP and probably correlates with adherence.

CPAP is clearly the best-studied, most effective treatment for obstructive sleep apnea. But it is burdensome treatment, and adherence can be problematic. For this reason, clinicians managing sleep apnea need to be able to advise patients of alternative treatments, as well as risks and benefits of each. Weight loss is a therapeutic option for OSA, and data supports its efficacy.[13,14] In the OSA patient who is overweight or obese, clinicians ideally should counsel about weight loss when talking about treatment options. The current study indicates that it is probably not appropriate to suggest that CPAP can enhance weight loss. Indeed, it is possible that simultaneous initiation of CPAP and a weight loss program might undermine the attempts at weight loss.

Obesity is a chronic disease that is very difficult to treat. All of us who manage sleep apnea patients have experienced the frustration of trying to help patients lose weight. When a

morbidly obese patient arrives at your clinic with a full-calorie soda in one hand and a sugary snack in the other, then notifies you that he doesn't like the taste of diet soda, it is possible that weight loss counseling is unlikely to be effective. On the other hand, motivated, well-informed patients might be better off, in some instances, to focus on weight loss rather than immediately beginning CPAP treatment. Which candidates might be candidates for weight loss as initial, primary treatment?

Tuomilehto and colleagues demonstrated improvement in AHI (and resolution of OSA in some instances), in an RCT of very low calorie diet (VLCD) and lifestyle modification of patients with mild OSA.[15] They concluded "VLCD combined with active lifestyle counseling resulting in marked weight reduction is a feasible and effective treatment for the majority of patients with mild OSA." Patients with mild OSA are clearly candidates for aggressive weight management instead of CPAP, at least as initial treatment for OSA. This is particularly true since patients with mild disease or who are not sleepy may be less likely to adhere to CPAP in the long run.[16,17] With newly promoted scoring criteria for sleep disordered breathing,[18] many more cases of mild sleep apnea are likely to be diagnosed. Many of these patients might be better served by weight loss referral than by CPAP, at least on a trial basis.

It needs to be emphasized, however, that this approach really does require having a plan for weight reduction. If weight loss is going to be the primary treatment approach for sleep apnea, specific referrals, target weight goals, and careful follow-up are essential. We have adopted this approach in our center. When a decision is made to address mild sleep apnea with weight loss, we emphasize that OSA needs to be treated, refer to a commercial weight loss program (these generally more successful than clinically based programs),[19] set target weights and timelines, and follow-up. Unfortunately, many of these patients do ultimately become discouraged with weight loss efforts, and return for initiation of CPAP. CPAP is hard, but weight loss is harder. Nevertheless, some patients may be better served by this approach. And we don't know until we try.

CITATION

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The authors have indicated no financial conflicts of interest.