A 27-year-old man presented for sleep evaluation prior to his bariatric surgery. He was obese (weight 310 lb, BMI 44.5 kg/m²), and he reported snoring and excessive daytime sleepiness; his wife witnessed apneas. A split-night polysomnogram was performed, which documented severe obstructive sleep apnea with an apnea-hypopnea index (AHI) of 44/h and a required positive airway pressure of 15 cm H₂O for effective treatment. He was prescribed positive airway pressure (PAP) and underwent bariatric surgery 3 weeks after starting therapy.

Question: How and when will you adjust his PAP pressure to accommodate his anticipated weight loss?
Answer: Autotitrating PAP can be used to treat effectively while accommodating changing pressure requirements.

DISCUSSION

Airway collapsibility in patients with OSA is due to several factors, including reduced airway dimension and derangements in motor control of the airway and ventilatory control.1,2 This increased collapsibility is reflected by higher (or less negative) pressure at which the airway is prone to spontaneous collapse. PAP therapy pneumatically splints open the airway. Amount of PAP necessary to maintain airway patency is correlated with the patient’s obesity, AHI, neck circumference, and age.3,4 Autotitrating PAP (APAP) devices use breath-by-breath analysis of snoring, airflow, or impedance; they use proprietary algorithms to seek (within a pre-set range) the minimum pressure required to maintain airway patency. In appropriate patients, APAP may be a successful treatment option for OSAS and may obviate the need for retitration of CPAP in patients with an established diagnosis but changing pressure requirements.5 APAP is typically used in patients with markedly different pressure requirements in supine and nonsupine positions, but may also be used in patients whose anticipated changing health status or changing weight calls for rapid down- or up-titration of the airway pressure.6 Patients with congestive heart failure (CHF), chronic obstructive pulmonary disease (COPD), coexisting obesity-hypoventilation syndrome, central sleep apnea, and those who do not snore are not proven candidates for APAP.5

Weight loss is associated with a decrease in the frequency of apneas and hypopneas, averaging a 25% reduction for every 10% loss of the body weight.7 This is likely due to diminished mass loads on the airway from the surrounding adipose tissue, restoration of the “tracheal tug” on the pharyngeal tissues, and improved neuromuscular control, all resulting in a decrease in the pressure necessary to keep the airway open.8,9 Bariatric surgery is typically associated with a median weight loss of about 40 kg, or a drop in BMI of about 14 kg/m².10 Most of this weight loss takes place in the first two years following the surgery, but it may continue for up to 7 years.11,12 Obstructive sleep apnea is present in the majority of patients undergoing bariatric surgery, improves in almost all patients and resolves in an estimated 85% of those involved.10 In patients without contraindications, APAP is a good option in the patient undergoing bariatric surgery.

In the current patient, our initial CPAP titration showed when nonsupine in NREM, 10-12 cm H₂O was often successful, but that the pressure of 15 cm H₂O was required when he was in REM and supine. We chose to treat him with autotitrating PAP; we set the minimum APAP of 10 and the maximum of 20 cm H₂O. Our initial follow-up visit prior to surgery found him adherent to treatment and with clinical improvement. Our patient lost 47.6 kg, with a current BMI of 29.4 kg/m² at 7 months follow-up. Downloaded data from the APAP (Figure 1) showed a progressive decline of the 90th percentile of PAP from 18 to 10 cm H₂O, and of median PAP from 16 to 8 cm H₂O, respectively. Six weeks after his surgery, the minimum APAP pressure was lowered from 10 cm H₂O to 5 cm H₂O, in response to this change.

CLINICAL PEARLS

1. Following bariatric surgery, a fall in CPAP pressure requirement is expected.
2. In patients free of significant comorbidities, such as obesity-hypoventilation syndrome, COPD, or CHF, an autotitrating PAP device and clinical follow-up may allow a sensible way to deliver appropriate decreasing pressure requirements without repeating a sleep-study titration.

REFERENCES