

Positive Airway Pressure Therapy for Obstructive Sleep Apnea

Pnina Weiss, MD^{a,*}, Meir Kryger, MD, FRCPC^b

KEYWORDS

- Positive airway pressure therapy • Continuous positive airway pressure
- Bilevel positive airway pressure • Autotitrating positive airway pressure
- Average volume assured pressure support • Adaptive support ventilation
- Obstructive sleep apnea syndrome • Pressure relief

KEY POINTS

- Positive airway pressure (PAP) is considered first-line therapy for moderate to severe obstructive sleep apnea syndrome (OSAS) and may also be considered for mild obstructive sleep apnea, particularly if it is symptomatic or there are concomitant cardiovascular disorders.
- Continuous positive airway pressure (CPAP) is the most common initial mode of therapy for OSAS; however, bilevel positive airway pressure (BPAP) may be considered in patients who are unresponsive or intolerant of CPAP or who have concomitant respiratory insufficiency and hypoventilation.
- CPAP and BPAP are used in the autotitrating mode to initiate treatment or to determine the optimal pressure for patients with moderate to severe OSAS who do not have significant comorbidities.
- Adaptive support ventilation (ASV) is considered in patients with OSAS and respiratory insufficiency with central apnea; periodic breathing, such as Cheyne-Stokes respiration, or complex apnea. It is, however, contraindicated in patients with chronic heart failure with reduced ejection fraction less than or equal to 45%.
- Comfort features, such as mask interfaces, heated humidification, pressure relief modes, and ramps, have been developed to improve adherence to PAP, which despite proven efficacy, is low.

P. Weiss has no commercial conflict of interest.

M. Kryger is the principle investigator of a trial examining the efficacy of remote monitoring of positive airway pressure devices in military veterans (sponsors Respironics, Resmed), and a trial examining the efficacy of mandibular advancement devices in military veterans who will not use positive airway pressure (sponsors, Somnomed, Resmed). He is a scientific advisor to Inspire Medical and Dymedix.

^a Pediatric Respiratory Medicine and Medical Education, Yale University School of Medicine, 333 Cedar Street, New Haven, CT 06520, USA; ^b Pulmonary, Critical Care and Sleep Medicine, Yale School of Medicine, 333 Cedar Street, New Haven, CT 06520, USA

* Corresponding author.

E-mail address: pnina.weiss@yale.edu

Otolaryngol Clin N Am ■ (2016) ■–■
<http://dx.doi.org/10.1016/j.otc.2016.07.004>

0030-6665/16/© 2016 Elsevier Inc. All rights reserved.

oto.theclinics.com

BACKGROUND

Positive airway pressure (PAP) has been used to treat obstructive sleep apnea syndrome (OSAS) for more than 30 years.¹ PAP prevents upper airway collapse: it functions as a pneumatic splint,² increasing the caliber of the upper airway and it also increases lung volumes, which provides tracheal traction.³ PAP is considered first-line therapy for moderate to severe obstructive sleep apnea and may also be considered for mild obstructive sleep apnea, particularly if it is symptomatic or there are concomitant cardiovascular disorders.^{4–6} The indications for PAP include apnea hypopnea index (AHI) or respiratory disturbance index greater than or equal to 15 events per hour or AHI or respiratory disturbance index between 5 and 14 events per hour associated with symptoms such as excessive daytime sleepiness, impaired neurocognitive function, mood disorders, insomnia or cardiovascular disease (eg, hypertension, ischemic heart disease, congestive heart failure, atrial fibrillation) or history of stroke. The use of PAP for OSAS improves respiratory disturbances,⁷ daytime sleepiness,^{8,9} cognitive impairment,¹⁰ mood,¹¹ and quality of life¹²; reduces automobile accidents^{13,14}; and improves cardiovascular sequela, such as systemic hypertension.^{15–17} Treatment of OSAS with PAP is optimized by using a multidisciplinary approach including a sleep specialist, the referring physician, nurses, respiratory therapists, and the sleep technologist.

POSITIVE AIRWAY PRESSURE DELIVERY SYSTEMS

PAP devices are air pumps (fan-driven or turbine systems) that draw in external, filtered air to deliver pressured airflow. The airflow is adjusted by changing the diameter of the pressure valve or turbine/fan speed. Over the years, PAP machines have become more quiet, compact, and portable.

PAP is delivered by a variety of interfaces: nasal, oronasal, and oral (ie, nasal mask, nasal pillows, oronasal [face] mask, oral mask, and oral mask with nasal pillows). The choice of optimal interface is important, because it may influence a patient's acceptance of PAP therapy and long-term compliance.¹⁸ The most commonly used interfaces are the face and nasal masks. Nasal pillows¹⁹ and oral masks²⁰ may be considered as alternatives if a patient cannot tolerate the nasal or face masks. Face masks may be considered when nasal obstruction or mouth breathing limit the effectiveness of the nasal mask or greater inspired relative humidity is desired.²¹ Masks have been developed by manufacturers to maximize patient comfort, using softer cushions.

Most currently available PAP devices include digital software that keeps track of date and time of usage, and detects and measures apnea, hypopnea (AHI), snore, flow limitation, periodic breathing, air leaks and flow waveform. In essence, these devices can measure many of the respiratory parameters that are monitored during a polysomnogram (PSG). Without the extensive monitoring of the PSG, it is not possible to determine the sleep stage of the patient or to accurately assess some of the physiologic complications of the OSAS. However, devices have advanced to the point that they can use the measured respiratory parameters to provide feedback in a closed-loop system and to manipulate the output variables.

MODES OF POSITIVE AIRWAY PRESSURE

Many of the modes of PAP used for OSAS have variations of pressure-support or pressure-controlled ventilation. A target pressure is set and the resultant tidal volumes depend on the level of inspiratory pressure, respiratory system compliance, airway

Download English Version:

<https://daneshyari.com/en/article/5715643>

Download Persian Version:

<https://daneshyari.com/article/5715643>

[Daneshyari.com](https://daneshyari.com)