

This month we are pleased to publish the first of 2 issues presenting the proceedings of the 45th RESPIRATORY CARE Journal Conference, "Sleep Disorders: Diagnosis and Treatment." Breathing disorders are highly prevalent during sleep. The occurrence of disordered breathing during sleep limits the ability to obtain deep, restful sleep, results in sleepiness during the daytime, and contributes to several comorbidities. Respiratory therapists are an integral part of the clinical management team and make several important contributions to the care of patients with sleep disorders. The topics reviewed in this conference are, therefore, extremely relevant to the day-to-day practice of respiratory therapists and others involved in the care of these patients. For the high quality of this conference, we are indebted to co-chairs Rajiv Dhand and Sai Parthasarathy.

Obstructive sleep apnea (OSA) is a disorder characterized by intermittent upper-airway collapse, which impairs ventilation and disrupts sleep. As reviewed by Kapur, there are a number of factors that contribute to upper-airway collapse, and the relative contributions of these factors vary between individuals with this condition. OSA is common in adults; males, older individuals, and the obese are at higher risk. Identifying patients at higher risk who should have a sleep study involves assessment of symptoms such as snoring, witnessed apnea, self-reported gasping, hypertension, body mass index, and neck circumference. OSA is associated with substantial economic costs to society. Continuous positive airway pressure therapy (CPAP) in patients with moderate to severe OSA is cost-effective.

Central sleep apnea (CSA) describes a group of conditions in which cessations in air flow occur without respiratory effort. This is in contrast to OSA, where patients have ongoing breathing efforts during respiratory events. As pointed out by Malhotra and Owens, however, considerable overlap exists in the pathogenesis and clinical presentation of OSA and CSA. CSA can be classified into conditions with excessive drive, such as with Cheyne-Stokes breathing, versus those with inadequate drive, such as sleep hypoventilation syndrome. An important concept contributing to the cessation of air flow during sleep is the apnea threshold, the P_{aCO_2} value below which will lead to apnea. Another important factor is the loss of the wakefulness drive to breathe, such that some rise in P_{aCO_2} is likely to occur at the onset of sleep. The treatment of CSA includes positive airway pressure (eg, bi-level positive airway pressure in hypoventilation patients) and optimization of medical therapy (eg, in Cheyne-Stokes breathing).

Polysomnography is essential for the diagnosis of sleep disorders. Patil nicely covers the advancements in technology that have transformed this field from the use of

analog studies collected on paper to computer-assisted collection of digitally transformed studies. He also describes the broad array of principles underlying the collection of the various signals. A clinical understanding of basic technical rules in the evaluation of polysomnography studies is necessary for both the scoring and interpretation of such studies.

Wide varieties of portable monitors are commercially available and they range from single-channel recorders to units that record a full polysomnogram. As described by Kuna, portable-monitor testing is being used increasingly in ambulatory management pathways for the diagnosis and treatment of patients with OSA. Interestingly, recent comparative effectiveness research studying the clinical outcomes of patients with a high pre-test probability for OSA who receive *ambulatory* management using portable-monitor testing shows that they have similar functional outcomes and adherence to CPAP treatment, compared to patients managed with *in-laboratory* polysomnography.

The principles of splinting the airway and delivering assisted ventilation underpin the basics of therapy for sleep-disordered breathing. Newer technologies to provide CPAP and bi-level PAP (BPAP) therapy have been introduced in recent years. These newer modes are described by Antonescu-Turcu and Parthasarathy. They cover not only the principles of the technology for these newer modes, but also the clinical rationale for such modalities.

Patient adherence to CPAP and BPAP is variable, leaving the undertreated patient with OSA at risk of development or worsening of comorbid medical conditions. Issues of adherence are described by Bollig. The severity of disease and the presence of daytime sleepiness appear to have some predictive quality for adherence. Adverse effects such as nasal congestion, dry mouth, or skin irritation occur in approximately 50% of CPAP users; addressing these adverse effects may improve adherence in some patients. Most important, intensive patient education and behavioral interventions have shown more positive effects on adherence.

Issues related to sleep and sleep-disordered breathing in hospitalized patients are becoming increasingly recognized. In the medical intensive care unit, patients requiring mechanical ventilation may show complete absence of the normal circadian rhythm. Sleep-disordered breathing is common in postoperative patients. Protocols to evaluate patients that determine the need and process for CPAP or BPAP in the hospitalized patient with OSA are being developed. Gay suggests that hospitals that are proactive in the development of protocols for identification and management of patients with sleep-disordered breathing are likely to be rewarded with reduced complications and costs, and this issue is likely to be incorporated in future pay-for-performance evaluations.